

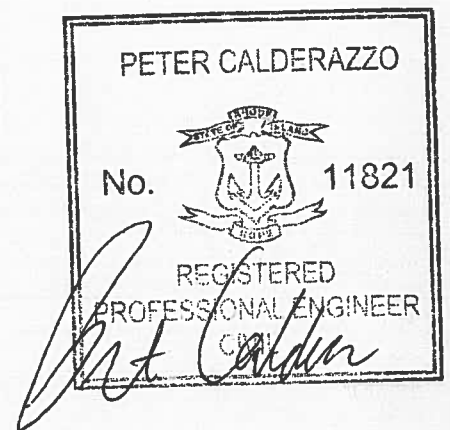
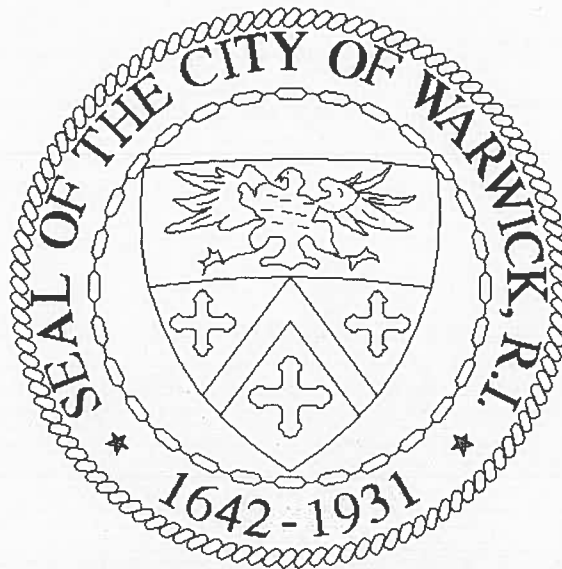
**CITY OF WARWICK, RHODE ISLAND
HONORABLE SCOTT AVEDISIAN, MAYOR**

**CITY OF WARWICK SEWER AUTHORITY
PETER T. GINAITT, CHAIRMAN**

**GARY MARINO
GARY JARVIS**

**JOHN JUSTO
TINA MORETTI**

JANINE BURKE-WELLS, EXECUTIVE DIRECTOR



JANUARY 2018

SPECIFICATIONS FOR CONSTRUCTION OF

**CONTRACT 97
EAST NATICK I, EAST NATICK II AND
KNIGHT STREET PUMP STATION UPGRADES**

**DEWBERRY ENGINEERS INC.
280 SUMMER STREET, 10TH FLOOR
BOSTON, MASSACHUSETTS 02210**

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SECTION 00100

INVITATION FOR BIDS

Sealed bids for the construction of the East Natick I, East Natick II and Knight Street Pump Station Upgrades, Contract No. 97, Warwick, Rhode Island, will be received by the Warwick Sewer Authority at the Office of the Warwick Sewer Authority, 125 Arthur Devine Blvd, Warwick, Rhode Island 02886 until February 9th, 2018, 2:00 P.M. Prevailing Time, and at that time the bids will be publicly opened and read aloud.

Bids must be mailed or hand delivered to the above-specified receiving address prior to the times specified. If mailed, bids shall be sent to the above-specified receiving address in time for bid opening.

Bidding Documents may be examined on or after January 18th, 2018, at the Office of Dewberry Engineers Inc., 280 Summer Street, Boston, Massachusetts 02210 or the Office of the Warwick Sewer Authority, 125 Arthur Devine Blvd, Warwick, Rhode Island 02886.

Bidding Documents may be obtained electronically by contacting Peter Calderazzo at 617-531-0748 or pcalderazzo@dewberry.com, from 8:00 a.m. to 4:00 p.m., Monday through Friday.

Each Bid must be accompanied by a bid security consisting of a BID BOND, CERTIFIED CHECK, TREASURER'S CHECK or CASHIER'S CHECK, issued by a responsible bank or trust company in the amount of 5% of the bid price.

The scope of work includes: the demolition and rehabilitation of existing structures, process, mechanical and electrical equipment at the East Natick I and Knight Street Pump Station sites; the demolition of an existing above-grade package pump station and related piping, controls and electrical equipment at the East Natick II Pump Station site; and the construction of a new submersible pump station including a new elevated steel platform and appurtenant work at the East Natick II Pump Station site.

The Project is to be completed and ready for final payment within one **hundred-eighty (180) calendar days** after the date when the Contract Times commence to run as provided in Paragraph 2.03 of the General Conditions, as modified by Paragraph 2.03.A of the Supplementary Conditions.

Successful bidder must furnish a performance bond and a payment bond in amount at least equal to one hundred percent (100%) of the contract price, as stipulated in Section 00700. The Surety Company shall be qualified to do business in the State of Rhode Island, and the form satisfactory to the Warwick Sewer Authority.

Pre-Bid Conference and Site visit will be held for bidders at Warwick Sewer Authority, 125 Arthur Devine Blvd, Warwick, Rhode Island 02886 on January 31, 2018 at 9:00 AM. Pre-Bid Conference and Site Visit is not mandatory but is encouraged. Bidders will also have the opportunity to view the sites of the work following the Pre-Bid Conference. Contact: Earl Bond, Asset Manager, Warwick Sewer Authority, (401) 468-4721.

Complete instructions for filing Bids are included in the Instructions to Bidders.

Bidders must be familiar with and comply with all permitting and licensing requirements of federal, state, and local laws, ordinances, and regulations applicable to the Work. Compliance with all such requirements, including but not limited to applicable chapters of Titles 5 and 28 of the State of Rhode Island General Laws, is a requirement for Bidders and any subcontractors.

This project is funded by the Department of Housing and Urban Development (HUD).

Compliance with State of Rhode Island General Laws, Chapters 37-12 and 37-13, and prevailing Wage Rate provisions is a requirement for Bidders and any subcontractors. Federal Minimum Wage Rates as determined by HUD also apply to this project.

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

The bidder agrees that its bid shall be good and may not be withdrawn for a period of 60 days, Saturdays, Sundays and legal holidays excluded, after the opening of the bids.

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

Warwick Sewer Authority
Warwick, Rhode Island

SECTION 00200

INSTRUCTIONS TO BIDDERS
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SECTION 00200

INSTRUCTIONS TO BIDDERS

ARTICLE 1 - DEFINED TERMS

- 1.1 Terms used in these Instructions to Bidders will have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below which are applicable to both the singular and plural thereof:
- A. *Bidder* - - The individual or entity who submits a Bid directly to the OWNER.
 - B. *Owner* - - Warwick Sewer Authority, Purchasing Department, 125 Arthur Devine Blvd., Warwick, RI 02886.
 - C. *Successful Bidder* - - The lowest responsible qualified Bidder submitting a responsive Bid, to whom the OWNER (on the basis of the OWNER's evaluation as hereinafter provided) makes an award.

ARTICLE 2 - COPIES OF BIDDING DOCUMENTS

- 2.1 Refer to Invitation for Bids for information on examination and procurement of documents.
- 2.2 Complete sets of Bidding Documents shall be used in preparing Bids; neither the OWNER nor ENGINEER assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.
- 2.3 OWNER and ENGINEER in making copies of Bidding Documents available on the above terms do so only for the purpose of obtaining Bids for the Work and do not confer a license or grant for any other use.

ARTICLE 3 - QUALIFICATIONS OF BIDDERS

- 3.1 Bidders shall be experienced in the kind of Work to be performed, shall have the necessary equipment therefor, and shall possess sufficient capital to properly execute the Work within the time allowed. Bids received from Bidders who have previously failed to complete Work within the time required, or who have previously performed similar Work in an unsatisfactory manner, may be rejected. A Bid may be rejected if Bidder cannot show that he has the necessary ability, plant and equipment to commence the Work at the time prescribed and thereafter to prosecute and complete the Work at the rate or within the time specified. A Bid may be rejected if Bidder is already obligated for the performance of other Work which would delay the commencement, prosecution or completion of the Work.
- 3.2 Bidders may be investigated by Owner or Engineer to determine if they are qualified to perform the Work. All Bidders shall be prepared to submit within five days of Owner's or Engineer's request, detailed written evidence of such information and data necessary to make this determination. The investigation of a Bidder will seek to determine whether the organization is adequate in size, is authorized to do business in the jurisdiction where the project is located, has had previous experience and whether available equipment and financial resources are adequate to assure Owner that the Work will be completed in accordance with the terms of the Agreement. Owner reserves the right to reject any Bid if the evidence submitted by, or investigation of such Bidder fails to satisfy Owner that such Bidder is properly qualified to carry out the obligations of the Contract and to complete the Work contemplated therein.
- 3.3 No award will be made to any Bidder who cannot meet all of the following requirements. Bidder:
- A. Shall not have defaulted on any contract within three years prior to the bid date.

- B. Shall maintain a permanent place of business.
- C. Shall have adequate personnel and equipment to perform the work expeditiously.
- D. Shall have suitable financial status to meet obligations incident to the work.
- E. Shall have appropriate technical experience satisfactory to Owner in the class of work involved.
- F. Shall be registered with the Secretary of the State of Rhode Island to do business in Rhode Island.
- G. Shall not have failed to perform satisfactorily on contracts of a similar nature.
- H. Shall not have failed to complete previous contracts on time.
- I. Shall not be presently debarred from doing public construction work with the State of Rhode Island.

ARTICLE 4 - EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA, AND SITE

4.1 It is the responsibility of each Bidder before submitting a Bid to:

- A. Examine and carefully study the Bidding Documents, including any Addenda and the other related data identified in the Bidding Documents;
- B. Visit the Site, become familiar with and satisfy Bidder as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;
 - 1. To visit the Site for the purposes of Article 4, a Pre-Bid Conference and Site Visit will be held for bidders. The time, date, location shall be stated in the Invitation for Bids. Bidders shall not make or attempt to make any visits to the Site without making such arrangements with the OWNER in advance.
- C. Become familiar with and satisfy Bidder as to all federal, state, and local Laws and Regulations that may affect cost, progress, or performance of the Work;
- D. Study all reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in paragraph 4.02 of the General Conditions, and carefully study all reports and drawings of a Hazardous Environmental Condition, if any, at the Site which have been identified in the Supplementary Conditions as provided in paragraph 4.06 of the General Conditions;
- E. Obtain and study (or assume responsibility for doing so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto;
- F. Agree at the time of submitting its Bid that 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 bid and within the times and in accordance with the other terms and conditions of the Bidding Documents;
- G. Become aware of the general nature of the Work to be performed by Owner and others at the site that relates to the Work as indicated in the Bidding Documents;

- H. Correlate the information known to Bidder, information and observations obtained from visits to the site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents;
 - I. Give Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Engineer is acceptable to Bidder; and
 - J. Determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.
- 4.2 On request, Owner will provide Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies as Bidder deems necessary for submission of a Bid. Bidder shall fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies.
- 4.3 **Underground Facilities**
- A. Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the site is based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others.
- 4.4 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated conditions appear in paragraphs 4.02, 4.03, and 4.04 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work appear in paragraph 4.06 of the General Conditions.
- 4.5 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 4, that without exception the bid 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, that Bidder has given Engineer written notice of all conflicts, errors, ambiguities, and discrepancies that Bidder has discovered in the Bidding Documents and the written resolutions thereof by Engineer are acceptable to Bidder, and that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and finishing the Work.

ARTICLE 5 - PRE-BID CONFERENCE

- 5.1 A Pre-Bid Conference and Site Visit will be held for bidders. The time, date, location shall be stated in the Invitation for Bids.

ARTICLE 6 - SITE AND OTHER AREAS

- 6.1 The Site is identified in the Bidding Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment, or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by CONTRACTOR. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by OWNER unless otherwise provided in the Bidding Documents.

ARTICLE 7 - INTERPRETATIONS AND ADDENDA

- 7.1 All questions about the meaning or intent of the Bidding Documents shall be submitted to the ENGINEER in writing. In order to receive consideration, questions must be received by Owner at least five (5) days prior to the date fixed for the opening of Bids. Interpretations or clarifications considered necessary by ENGINEER in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by Owner as having received the Bidding Documents not later than three days prior to the date fixed for the opening of Bids. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.
- 7.2 Addenda may be issued to clarify, correct, or change the Bidding Documents as deemed advisable by OWNER and ENGINEER.
- 7.3 The Bidder must acknowledge receipt of each Addendum, if any, in the space provided on the Bid Form. Please check with the OWNER or ENGINEER prior to submitting your bids to ensure that you have received all addenda.

ARTICLE 8 - BID SECURITY

- 8.1 Bids must be accompanied by Bid Security in an amount of 5% of the Bidder's maximum Bid price and in the form of a certified check, treasurer's check or cashier's check issued by a responsible bank or trust company or a bid bond payable to Owner.
- 8.2 All Bid Securities of General Bidders, except those under consideration by Owner, will be returned within 5 days, excluding Saturdays, Sundays and legal holidays, after the opening of General Bids. Other Bid Securities will be returned upon the execution and delivery of the Agreement. The Bid Security of the Successful Bidder will be retained until such bidder has executed the Agreement and furnished the required contract security, whereupon the bid security shall be returned. If the Successful Bidder fails to execute and deliver the Agreement and furnish the required contract security within 5 days after the Notice of Award, Owner may annul the Notice of Award and the Bid Security of that Bidder will be forfeited to Owner as liquidated damages for such failure.

ARTICLE 9 - CONTRACT TIMES

- 9.1 The number of days in which, or the date by which, the Work is to be completed and ready for final payment are set forth in the Bid Form and Agreement.

ARTICLE 10 - LIQUIDATED DAMAGES

- 10.1 Provisions for liquidated damages, if any, are set forth in the Bid Form and Agreement.

ARTICLE 11 - SUBSTITUTE AND "OR-EQUAL" ITEMS

- 11.1 The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents, including any Addenda issued prior to the receipt of Bids. The materials and equipment described in the Bidding Documents establish a standard of required type, function, quality, and performance to be met by any proposed substitute or "or-equal" item. Whenever it is specified or described in the Bidding Documents that a substitute or "or-equal" item of material or equipment may be furnished or used by the CONTRACTOR if acceptable to the ENGINEER, application for such acceptance will not be formally considered by ENGINEER until after the execution date of the Agreement. The procedure for submission of any such application by the CONTRACTOR and consideration by the ENGINEER is set forth in the General Conditions and Supplementary Conditions, and may be supplemented in the General Requirements.

ARTICLE 12 - PREPARATION OF BID

- 12.1 The Bid Form is included with the Bidding Documents.
- 12.2 The Bid Form shall be completed in ink. Blank spaces in the Bid Form shall be filled in correctly where indicated, and the Bidder must state, both in words and numerals, the prices for which he proposes to complete each and every item of Work. Ditto marks shall not be used.
- 12.3 A Bid by a corporation shall be executed in the corporate name by the president or vice-president or other corporate officer authorized to sign for the corporation. The corporate seal shall be affixed if indicated on the form and attested by the secretary or assistant secretary when indicated. The corporate address and state of incorporation shall be provided where indicated on the form.
- 12.4 A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must be provided) who is authorized to legally sign for the partnership. The address of the partnership shall be shown where indicated on the form.
- 12.5 A Bid by an individual shall show the Bidder's name and official address.
- 12.6 All names shall be printed below the signatures or in space, if provided, on the form.
- 12.7 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.
- 12.8 The telephone number and address of the Bidder for communications regarding the Bid shall be shown.
- 12.9 The Bid shall contain evidence of Bidder's authority and qualification to do business in the State of Rhode Island or covenant to obtain such qualification prior to award of the Contract. Bidder's State of Rhode Island contractor license number(s), if any or where such license(s) are required for the Work, shall be shown on the Bid Form or provided with the Bid.
- 12.10 The Bid submission must include, complete, all pages of the Bid Form, including the Bid Schedule, Bid security, Contractor Compliance Form, the Certification and Warrant Form and any other listed documents required to be submitted.

ARTICLE 13 - BASIS OF BID; EVALUATION OF BIDS

- 13.1 Lump Sum
- A. When a lump sum Bid for the Work, for individual items of the Work, or for alternates is called for, Bidder shall submit a price for each such item on a lump sum basis as set forth in the Bid Form.
- B. The price for each alternate selected by the OWNER will be added to or deleted from the base Bid as indicated on the Bid Form and applied in the evaluation of Bids.
- 13.2 Unit Price
- A. When unit price Bids are called for in the Bid Form for individual items of the Work, Bidder shall submit a price for each such item on a unit price basis as set forth in the Bid Form.
- B. The total estimated price for each item bid on a unit price basis will be determined as the product of the estimated quantity of the item and the unit price Bid for the item. The final quantities and Contract Price will be determined in accordance with paragraph 11.03 of the

General Conditions.

13.3 Evaluation

- A. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between words and figures will be resolved in favor of the words.
- B. Bid prices for lump sum and unit price basis items shall include such amounts as the Bidder deems proper for overhead and profit, including on account of cash allowances, if any, included in the Bid Form and as provided in paragraph 11.02 of the General Conditions.

ARTICLE 14 - SUBMISSION OF BID

- 14.1 The Bidding Documents furnished to each prospective Bidder include a Bid Form. The Bid Form shall be completely filled out and all information requested be provided, and the Bid Form shall be submitted with the Bid security and with all information and data required by the Cover Documents, the Advertisement or Invitation to Bid, these Instructions to Bidders, and the Bid Form.
- 14.2 A Bid shall be submitted no later than the date and time prescribed and at the place indicated in the Advertisement or Invitation to Bid. The Bid shall be enclosed in an opaque sealed envelope plainly marked with the Project title, the name and address of the Bidder, and shall be accompanied by the bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate envelope plainly marked on the outside with the notation "**WARWICK SEWER AUTHORITY, EAST NATICK I, II AND KNIGHT STREET PUMP STATION UPGRADES, BID ENCLOSED**". A mailed Bid shall be addressed to WARWICK SEWER AUTHORITY, 125 Arthur Devine Blvd., Warwick, RI 02886.

ARTICLE 15 - MODIFICATION AND WITHDRAWAL OF BID

- 15.1 Withdrawal Prior to Bid Opening
 - A. A Bidder may withdraw his Bid before the time fixed for the opening of Bids by communicating his purpose in writing to Owner. Upon receipt of such written notice, the unopened Bid will be returned to the Bidder.
- 15.2 Modification Prior to Bid Opening
 - A. If a Bidder wishes to modify his Bid, he must withdraw his initial Bid in the manner specified in paragraph 15.1.A and submit a new Bid.

ARTICLE 16 - OPENING OF BIDS

- 16.1 Bids will be opened as indicated in the Advertisement for Bids and publicly read aloud.
- 16.2 In order to be considered for selection, Bids must arrive at the designated location on or before the date and time specified in the Advertisement for Bids. Bidders mailing their Bids should allow for normal mail delivery time to ensure timely receipt of their Bids by Owner.
- 16.3 Bids received by mail or otherwise after the time specified for the opening of Bids will not be accepted and will be returned to the Bidder unopened.
- 16.4 No responsibility will attach to Owner, its employees or the Engineer for premature opening of a Bid not properly addressed and identified in accordance with the Bidding Documents.

ARTICLE 17 - BIDS TO REMAIN SUBJECT TO ACCEPTANCE

- 17.1 All Bids will remain subject to acceptance for the period of time stated in the Bid Form, but OWNER may, in its sole discretion, release any Bid and return any Bid security prior to the end of this period.

ARTICLE 18 - AWARD OF CONTRACT

- 18.1 OWNER reserves the right to reject any or all Bids, including without limitation nonconforming, non-responsive, unbalanced, or conditional Bids. OWNER further reserves the right to reject the Bid of any Bidder whom it finds, after reasonable inquiry and evaluation, to be non-responsible. OWNER also reserves the right to waive all informalities not involving price, time, or changes in the Work and to negotiate contract terms with the Successful Bidder.
- 18.2 More than one Bid for the same Work or Project from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the Work may be cause for disqualification of that Bidder and the rejection of all Bids in which that Bidder has an interest.
- 18.3 In evaluating Bids, OWNER will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices and other data, as may be requested in the Bid Form or prior to the Notice of Award.
- 18.4 In evaluating Bidders, OWNER will consider the qualifications and experience of Bidders and may consider the qualifications and experience of Subcontractors, Suppliers, and other individuals or entities proposed for those portions of the Work for which the identity of Subcontractors, Suppliers, and other individuals or entities are submitted as provided for in the Bid Form.
- 18.5 OWNER may conduct such investigations as OWNER deems necessary to establish the responsibility, qualifications, and financial ability of Bidders, proposed Subcontractors, individuals, or entities to perform the Work in accordance with the Contract Documents.
- 18.6 If the Contract is to be awarded, it will be awarded to the lowest responsive and responsible Bidder who has neither been disqualified nor rejected pursuant to this Article 18.

ARTICLE 19 - CONTRACT SECURITY AND INSURANCE

- 19.1 Performance and Labor and Materials (Payment) bonds shall be furnished by the successful Bidder. The amounts of and other requirements for Performance and Payment Bonds are stated in Article 5 of the General Conditions. Performance and Payment Bonds submitted shall be posted by a recognized surety company authorized to do business in the State of Rhode Island. All Performance and Payment Bonds signed by an agent must be accompanied by a certified copy of the authority to act. Additional requirements may be stated in the General or Supplementary Conditions.
- 19.2 The Successful Bidder shall within 5 days from the date of the Notice of Award deliver to Owner and Engineer, for review and approval, the Performance Bond and the Payment Bond he proposes to furnish at the time of the execution of the Agreement.
- 19.3 When the Successful Bidder delivers the executed Agreement to Owner, the Agreement shall be accompanied by the required contract securities.
- 19.4 The requirements for insurance to be provided by the Successful Bidder are stated in Article 5 of the General Conditions and in the Supplementary Conditions.

ARTICLE 20 - SIGNING OF CONTRACT

- 20.1 When Owner gives a Notice of Award to the Successful Bidder, it shall be accompanied by the required number of unsigned counterparts of the Agreement with the other Contract Documents which are identified in the Agreement as attached thereto. Within 5 days thereafter, Successful Bidder shall sign

and deliver the required number of counterparts of the Agreement and attached documents to Owner. Within ten days thereafter, Owner shall deliver one fully signed counterpart to Successful Bidder with a complete set of the Drawings with appropriate identification.

ARTICLE 21 - FAILURE TO EXECUTE A CONTRACT

- 21.1 Should the successful bidder fail to execute the Contract and/or to furnish the necessary Contract Bonds and insurance certificates as specified, with ten days – Saturdays, Sundays and legal holidays excluded – of notice in writing to him by the Owner or agent that he is to be awarded the Contract, the Owner may at its option determine that the bidder has refused to execute a Contract within the above specified time period the bidder's Proposal Guaranty shall be forfeited to the Owner, and the Contract may THEN be offered to the next lowest bidder.

ARTICLE 22 - TAX EXEMPTION

- 22.1 OWNER is exempt from sales taxes on materials and equipment permanently incorporated into the Work. A sales tax exemption certificate will be available from the OWNER. Such taxes shall not be included in the Bid. Refer to Paragraph 6.10 of the General Conditions, as may be modified by the Supplementary Conditions, for additional information.

ARTICLE 23 - PAYMENT AND RETAINAGE

- 23.1 Provisions concerning payments to CONTRACTOR and retainage by OWNER are set forth in Article 14 of the General Conditions and Supplementary Conditions.

ARTICLE 24 - LAWS AND REGULATIONS, WAGE RATES

- 24.1 All federal, state, and local laws, ordinances, and regulations applicable to the Work, labor, or materials or equipment used or incorporated into the Work, or means and methods used in the Work shall be observed and complied with fully; the language of such laws, ordinances, and regulations shall be deemed as included in the Contract Documents the same as if written fully therein. The Bidder shall be fully familiar with and informed of such laws, ordinances, and regulations, and if chosen as the Successful Bidder shall become responsible for full compliance with same.
- 24.2 Where the Bidding or Contract Documents bring attention to specific laws, ordinances, and regulations, or provisions of such laws, ordinances, and regulations, such attention or notice shall not relieve the Bidder or Successful Bidder of responsibility for full compliance with all applicable laws, ordinances, and regulations, or provisions of such.
- 24.3 Article 17 of the Supplementary Conditions set forth requirements for compliance with State of Rhode Island General Laws, Chapters 37-12 and 37-13, and prevailing Wage Rate provisions. The Successful Bidder shall conform to such requirements and Bids must be prepared accordingly.
- 24.4 Bidder attention is directed to permitting and licensing requirements of federal, state, and local laws, ordinances, and regulations applicable to the Work. Bidders must be able to demonstrate full compliance with all such requirements, including but not limited to applicable chapters of Titles 5 and 28 of the State of Rhode Island General Laws, either as required by the Bidding Documents and Contract Documents or as requested by the OWNER. By the submission of a Bid the Bidder represents to the OWNER that the Bidder is in full compliance with such requirements.

ARTICLE 25 - SEQUENCING OF WORK

- 25.1 The Contractor shall conform to the sequences of work as outlined in the Construction Drawings and Specifications as applicable. Variations or modifications to the work sequences shall be submitted in writing to the Engineer prior to construction, for their approval.

- 25.2 The Contractor shall coordinate work with the Warwick Sewer Authority as outlined in the Construction Drawings and Specifications, where appropriate, or as required by the owner.
- 25.3 All costs associated with sequencing of work and coordination shall be included in the bid prices for other items.

ARTICLE 26 - SAFETY AND HEALTH REGULATIONS

- 26.1 This Project is subject to all of the Safety and Health regulations (CFR 29, Part 1926 and all subsequent amendments) as promulgated by the U. S. Department of Labor on June 24, 1974 and CFR 29, Part 1910, General Industry Safety and Health regulations Identified as Applicable to Construction.
- 26.2 The Successful Bidder shall comply with the Department of Labor Safety and Health Regulations for Construction promulgated under the Occupational Safety and Health Act of 1970 (PL-91-596) and under Section 107 of the Contract Work Hours and safety Standards Act (PL- 91-54).

SECTION 00410

BID FORM

Proposal of _____(hereinafter called "Bidder")*

a corporation, organized and existing under the laws of the State of _____

a partnership

a joint venture

an individual doing business as _____

To the Warwick Sewer Authority (hereinafter called "Owner").

Gentlemen:

The Bidder, in compliance with your invitation for bids for Contract 97 (East Natick I, East Natick II and Knight Street Pump Station Upgrades Project) having examined the plans and specifications with related documents and the site of the proposed work, and being familiar with all of the conditions surrounding the construction of the proposed project including the availability of materials and labor, hereby proposes to furnish all labor, materials, and supplies, and to construct the project in accordance with the contract documents, as prepared by Dewberry Engineers Inc., within the time set forth below, and at the prices stated below. These prices are to cover all expenses incurred in performing the work required under the contract documents, of which this proposal is a part.

The Bidder hereby agrees to commence work under this contract on or before a date to be specified in the written "Notice to Proceed" from the Owner, and to fully complete the project within 180 consecutive calendar days of the date in the "Notice to Proceed". The Bidder further agrees to pay as liquidated damages the sum of \$2,500 for each consecutive calendar day thereafter during which the work has not been fully completed.

Bidder acknowledges receipt of the following addenda:

Addendum No.	Dated:
_____	_____
Addendum No.	Dated:
_____	_____
Addendum No.	Dated:
_____	_____

The Bidder agrees to perform the work described in the specifications and shown for the lump sum or unit prices included in the following Bid Schedules.

*Insert corporation, partnership, joint venture or individual as applicable

**BASE BID SCHEDULE – EAST NATICK I, EAST NATICK II AND KNIGHT STREET
 PUMP STATION UPGRADES**

ITEM NO.	BRIEF DESCRIPTION OF WORK UNIT OR LUMP SUM PRICE BID IN BOTH WORDS AND FIGURES	ESTIMATED QUANTITY*	TOTAL PRICE BID (IN FIGURES)
1	Demolition & Upgrades at the East Natick I Pump Station, including all appurtenant work; lump sum _____ _____	Lump Sum	\$ _____
	(\$ _____)		
2	Demolition & Upgrades at the East Natick II Pump Station, including all appurtenant work; lump sum _____ _____	Lump Sum	\$ _____
	(\$ _____)		
3	Demolition & Upgrades at the Knight Street Pump Station, including all appurtenant work; lump sum _____ _____	Lump Sum	\$ _____
	(\$ _____)		
4	Building Permits; allowance _____ _____	Allowance	\$ 5,000.00
	(\$ 5,000.00)		
5	Work by NGRID; allowance _____ _____	Allowance	\$ 6,500.00
	Ten thousand dollars _____ (\$ 6,500.00)		

ITEM NO.	BRIEF DESCRIPTION OF WORK UNIT OR LUMP SUM PRICE BID IN BOTH WORDS AND FIGURES	ESTIMATED QUANTITY	TOTAL PRICE BID (IN FIGURES)
6	Work Associated with Upgrading Owner's Existing SCADA & Radio Communication Equipment; allowance	Allowance	\$10,000.00
<hr/>			
Ten thousand dollars			
(\$ 10,000.00)			

The Base Bid Schedule Total for Items 1 through 6 inclusive is:

Dollars and _____ cents (\$ _____).

All entries shall be made clearly in ink or typewritten. Amounts are to be shown in both words and figures. In case of discrepancy, the amount shown in words shall govern.

The above lump sum and unit prices for the Base Bid Schedule shall include all labor, materials, bailing, shoring, removal, overhead, profit, insurance, engineering costs, etc., to cover the finished work of the several kinds called for.

The contract will be awarded to the lowest responsive qualified bidder.

The Bidder understands that the Owner reserves the right to reject any or all bids and to waive any formalities or informalities in the bidding. Any Bid Proposal that contains a unit price which is unduly high or low may be considered as unbalanced, and may be the basis for rejection.

The Bidder agrees that this bid shall be good and may not be withdrawn for a period of 60 days, Saturdays, Sundays and legal holidays excluded, after the opening of bids.

Within 10 days of receipt of the written notice of acceptance of this bid, the Bidder will execute the formal agreement attached in Section 00500 AGREEMENT.

Bid security in the form of a bid bond, certified check, treasurer's or cashier's check, payable to the Owner, is attached in the sum of five percent (5%) of the total bid including all alternates in accordance with the conditions of Section 00200 INSTRUCTIONS TO BIDDERS. The bid security may become the property of the Owner in the event the contract and bond are not executed within the time set forth above.

The selected Contractor shall furnish a performance bond and a payment bond in an amount at least equal to one hundred percent (100%) of the contract prices in accordance with Section 00610 PERFORMANCE BOND, Section 00620 PAYMENT BOND, and as stipulated in Article 5 – BONDS AND INSURANCE of Section 00700, GENERAL CONDITIONS of these specifications.

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

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

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

(Attach supplementary list if necessary.)

3. The Bidder is requested to state below what work of a similar character to that included in the proposed contract he has done, and give references that will enable the Owner to judge his experience, skill, and business standing. (Add supplementary page if necessary).

<u>Completion Date</u>	<u>Name of Project</u>	<u>Amount of Contract</u>	<u>Design Engineer</u>	<u>Reference Name/ Telephone No.</u>
------------------------	------------------------	---------------------------	------------------------	--

a.

b.

c.

d.

e.

4. Bank reference _____

(Name)

(Bank)

(Address)

(Telephone No.)

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

Respectfully submitted:

Date: _____

By: _____
(Signature)

(Name of Bidder)

(SEAL - if bid is by a corporation)

(Title)

(Business Name)

(Business Address)

(City and State)

(Telephone Number)

(Fax Number)

CERTIFICATION & WARRANT FORM*

**This form must be completed and submitted with sealed bid.
Failure to do so will result in automatic rejection.**

Any and all bids shall contain a certification and warrant that they comply with all relevant and pertinent statutes, laws, ordinances and regulations, in particular, but not limited to Chapter 16- Conflicts of Interest, of the Code of Ordinances of the City of Warwick. Any proven violation of this warranty and representation by a bidder at the time of the bid or during the course of the contract, included, but not limited to negligent acts, either directly or indirectly through agents and/or sub-contractors, shall render the bidder's contract terminated and the bidder shall be required to reimburse the City for any and all costs incurred by the City, including reasonable attorney fees, to prosecute and/or enforce this provision.

Signature

Date

Company Name

Address

Address

***This form cannot be altered**

Contractor Compliance Form

Section 3

THIS FORM MUST BE COMPLETED BY ALL GENERAL CONTRACTORS AND SUBCONTRACTORS PROVIDING BIDS

Property Owner's Name

Property Owner's Address

SECTION I. CONTRACTOR INFORMATION

Name

Address

Type of Business

RI License No.

SECTION 3 BUSINESS

YES No

WOMEN BUSINESS ENTERPRISE (WBE)

YES No

MINORITY BUSINESS ENTERPRISE (MBE)

YES No

Bidding as a:

- General Contractor
 Sub-Contractor, indicate General Contractor name

Current number of employees

Current number of women employees

Current number of minority employees

If minority employees enter racial/ethnic code from below:

Code

1

2

3

4

5

6

Number:

RACIAL/ETHNIC CODES

1. White 2. Black/African American 3. American Indian/Alaskan Native
4. Asian 5. Native Hawaiian/Pacific Islander 6. Hispanic/Latino

Total Dollar amount of Bid \$

(if exceeds \$100,000, complete Section II)

SECTION II. New Hires when Bid exceeds \$100,000 (must comply with Section 3 requirements)

	Number of New Hires	Number of new hires that are Section 3 Residents
Number of employees to be hired for this contract	<input type="text"/>	<input type="text"/>
Number of professionals to be hired for this contract	<input type="text"/>	<input type="text"/>
List Professional trade hired	<input type="text"/>	<input type="text"/>
Number of technicians to be hired for this contract	<input type="text"/>	<input type="text"/>
List Technician trade hired	<input type="text"/>	<input type="text"/>
Number of Office/Clerical to be hired for this contract	<input type="text"/>	<input type="text"/>
Number of Construction by trade to be hired for this contract	<input type="text"/>	<input type="text"/>
List below each type of trade for which there were new hires. Add Trades as necessary		
Plumber	<input type="text"/>	<input type="text"/>
Electrician	<input type="text"/>	<input type="text"/>
Carpenter	<input type="text"/>	<input type="text"/>
Masonry	<input type="text"/>	<input type="text"/>
Laborers	<input type="text"/>	<input type="text"/>
Other (specify) <input type="text"/>	<input type="text"/>	<input type="text"/>
Total number of Section 3 trainees to be hired	<input type="text"/>	<input type="text"/>
Number of Low-Income Project Area Residents (L.I.P.A.R.) to be hired	<input type="text"/>	<input type="text"/>

1. Construction Contracts

- A. Total dollar amount of all contracts awarded on the project \$
- B. Total dollar amount of contracts awarded to Section 3 businesses \$
- C. Percentage of the total dollar amount that was awarded to Section 3 businesses \$
- D. Total number of Section 3 businesses receiving contracts \$

2. Non-Construction Contracts

- A. Total dollar amount of all contracts awarded on the project \$
- B. Total dollar amount of contracts awarded to Section 3 businesses \$
- C. Percentage of the total dollar amount that was awarded to Section 3 businesses \$
- D. Total number of Section 3 businesses receiving contracts \$

SECTION III. SUMMARY

Indicate the efforts made to direct the employment and other economic opportunities generated by HUD financial assistance for housing and community development programs, to the greatest extent feasible, toward low-and very low-income persons, particularly those who are recipients of government assistance for housing. (Check **ALL** that apply)

- Attempted to recruit low-income residents through: local advertising media, signs prominently displayed at the project site, contracts with the community organizations and public or private agencies operating within the metropolitan area (or Nonmetropolitan County) in which the Section 3 covered program or project is located or similar methods.
- Participated in a HUD program or other program which promotes the training or employment of Section 3 residents.
- Participated in a HUD program or other program which promotes the award of contracts to business concerns which meet the definition of Section 3 business concerns.
- Coordinated with Youthbuild Programs administered in the metropolitan area in which the Section 3 covered project is located.
- Other; describe below

I hereby certify that it is the policy of the undersigned to comply with all existing laws prohibiting discrimination in all aspects of employment due to race, color, creed, sex, age, religion, national origin, marital status, receipt of public assistance or disability.

This shall be accomplished substantially by the following actions: Nondiscrimination in RECRUITING, HIRING, TRAINING, PROMOTING, SUBCONTRACTING, DEMOTION, LAYOFF, and/or TERMINATION.

General Contractor/Subcontractor Signature

Date

Contractor/Subcontractor Section 3 Compliance Plan

- A. The undersigned Contractor/Subcontractor for the project hereby agrees to implement at least the following steps directed at increasing the utilization of Section 3 residents and Section 3 business in accordance with 24 CFR Subpart A Part 135.1 to attempt to recruit from within the project area Section 3 residents through; local advertising media, signs placed at the proposed site for the project and community organizations and public or private institutions operating within or serving the project area.
- B. To seek the assistance, where necessary, in implementing a Section 3 compliance plan.
- C. To maintain a list of all Section 3 area residents who have made application for employment either on their own or on referral from any source, and to employ such persons, if otherwise eligible and if a vacancy exists.
- D. To maintain and provide the information requested on the Section 3 Summary Report (HUD 60002) related to employment and training records of Section 3 residents.
- E. To include this Section 3 compliance in all bid documents and to require all bidders to submit a Section 3 compliance plan including utilization goals and the specific steps planned to accomplish these goals.
- F. In the case of a general contractor, to insure that all Section 3 business concerns within the project area are notified of pending sub-contractual opportunities.
- G. To require all subcontractors to complete the Contractor Compliance Form before awarding any contracts.
- H. To maintain records, including copies of correspondence, memoranda, etc., which documents all steps taken to recruit Section 3 residents and Section 3 subcontractors from within the project area.
- I. To provide the information requested on Contract Compliance Activity Report related to contractors and subcontractors Notified and selected and the number of women and minority employees, the number of vacant positions and the Positions filled with lower income project area residents.

As officers and representatives of
Name of Contractor/Subcontractor

We the undersigned, have read and fully agree to this Section 3 Compliance Plan, and become a party to the full implementation of this program.

Print Name

Title

Date

Print Name

Title

Date

Section 3 Clause

All Section 3 covered contracts shall include the following Section 3 clause:

- A. The work to be performed under this contract is subject to the requirements of Section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u (Section 3). The purpose of Section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD Assisted projects covered by Section 3, shall, to the greatest extent feasible, be directed to low – and very low-income persons, particularly persons who are recipients of HUD assistance for housing.
- B. The parties to this contract agree to comply with HUD’s regulations in 24 CFR part 135, which implement Section 3. As evidenced by their execution of this contract, the parties to this contract certify that they are under no contractual or other impediment that would prevent them from complying with the part 135 regulations.
- C. The contractor agrees to send to each labor organization or representative of workers with which the Contractor has a collective bargaining agreement or other understanding, if any, a notice of advising the labor organization or worker’s representative of the contractor’s commitments under this Section 3 clause, and will post copies of the notice in conspicuous places at the work site where both employees and applicants for training and employment positions can see the notice. The notice shall describe the Section 3 preference, shall set forth minimum number and job titles subject to hire, availability of apprenticeship and training positions, the qualifications for each; and the name and location of the person(s) taking applications for each of the positions; and the anticipated date the work shall begin.
- D. The contractor agrees to include this Section 3 clause in every subcontract subject to compliance with regulations in 24 CFR part 135, and agrees to take appropriate action, as provided in an applicable provision of the subcontract Or in this Section 3 clause, upon a finding that the subcontractor is in violation of the regulations in 24 CFR part 135. The contractor will not subcontract with any subcontractor where the contractor has notice or knowledge that the Subcontractor has been found in violation of the regulations in 24 CFR part 135.
- E. The contractor will certify that any vacant employment positions, including training positions, that are filled (1) after the contractor is selected but before the contract is executed, and (2) with persons other than those to whom the regulations of 24 CFR part 135 require employment opportunities to be directed, were not filled to circumvent the contractor’s obligations under 24 CFR part 135.
- F. Noncompliance with HUD’s regulations in 24 CFR part 135 may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD assisted contracts.

F. With respect to work performed in connection with Section 3 covered Indian housing assistance, Section 7 (b) of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450e) also applies to the work to be performed under this contract Section 7 (b) requires that to the greatest extent feasible (i) preference and opportunities for training and employment shall be given to Indians, and (ii) preference in the award of contracts and subcontracts shall be given to Indian organizations and Indian-owned Economic Enterprises. Parties to this contract that are subject to the provisions of Section 3 and Section 7(b) agree to comply with Section 3 to the maximum extent feasible, but not in derogation of compliance with Section 7(b).

Print Name

Title

Date

Print Name

Title

Date

Section 3, Women, Minority Business Concern Questionnaire

Business Name

Business Contact Person

Address

Phone Number

1. Is your business a Section 3 Business Concern? Yes No
2. Is your business a Women-Owned business concern? Yes No
2. (a) Please list any self-certifications, agency certifications, and/or program certifications your Business holds:
3. Is your business a Disadvantaged/Minority-owned business concern? Yes No

What is a Section 3 business concern? (Adapted from <http://www.hud.gov/offices/fheo/section3/Section3.pdf>)

A business that:

- Is 51 percent or more owned by Section 3 residents;
- Employs Section 3 residents for at least 30 percent of its full-time, permanent staff; or
- Provide evidence of a commitment to subcontract to Section 3 business concerns, 25 percent or More of the dollar amount of the awarded contract.

Who are Section 3 residents?

(HUD Income Limits available online <http://hud.gov/offices/cpd/affordablehousing/programs/home/limits/income/index.cfm>)

Section 3 residents are:

- Public housing residents or,
- Persons who live in the area where a HUD-assisted project is located and who have a household Income that falls below HUD's income limits

Determining Income Levels

- Low income is defined as 80% or below the median income of that area
- Very low income is defined as 50% or below the median income of that area

How is a "woman-owned small business" defined? (Adapted from <http://www.vwbc.org/documents/wobCERT.pdf>)

The Federal Acquisition Regulations (FAR) defines a "woman-owned small business concern" in Part 19.001 Definitions, as follows: "Woman-owned small business concern means a small business concern –(a) which is at least 51 percent owned by one or more women; or, in case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more women; and (b) whose management and daily business operations are controlled by one or more women."

How is a "minority-owned business" defined?

Although definitions vary, in general a minority-owned business is a for-profit enterprise, physically located in the United States or its trust territories, which is owned, operated, and controlled by minority group member(s). "Minority group members" most often identified are US Citizens who are Asian, African-American, Hispanic, and Native American (for a complete listing, see <http://www.sba.gov/library/cfrs/13cfr124.html>). Ownership by minority individuals means the business is at least 51 percent owned by such individuals, or, in case of a publicly-owned business, at least 51 percent of the stock is owned by one or more such individuals. Further, the management and daily operations are controlled by those minority group members.

Certification – The information above is true and complete to the best of my knowledge and belief.

Signature

Date

SECTION 00500

AGREEMENT

This Agreement, made this _____ day of _____ in the year Two Thousand and Eighteen between the Warwick Sewer Authority, hereinafter called Owner and _____ hereinafter called Contractor.

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

ARTICLE 1 WORK

1.1 Contractor shall complete all Work as specified or indicated in the Contract Documents.

ARTICLE 2 ENGINEER

2.1 The Project has been designed by Dewberry Engineers Inc., 280 Summer Street, Boston, MA 02210, who is hereinafter called Engineer.

ARTICLE 3 - CONTRACT TIMES

3.1 Dates for Substantial Completion and Final Completion

- A. The Work will be substantially completed within 180 calendar days from the date of the Notice to Proceed and completed and ready for final payment in accordance with paragraph 14.07 of the General Conditions.
- B. Final completion date of the Work must not extend beyond December 31, 2018.

3.2 Liquidated Damages

- A. Liquidated Damages for Failure to Achieve Substantial Completion:
 - 1. Owner and Contractor recognize that time is of the essence as to Substantial Completion and that Owner will suffer financial loss if the Work is not substantially complete within either of the time specified in Article 3, Paragraph 3.1.A above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. Owner and Contractor also recognize the delays, expense and difficulties involved in proving in a legal proceeding the actual loss suffered by Owner if the Work is not substantially complete on time. Accordingly, if the Contractor shall neglect, fail or refuse to complete the Work within the time specified for Substantial Completion, or any proper extension granted by the Owner, then the Contractor agrees, as partial consideration for the awarding of this contract, to pay to the Owner the sum of Two Thousand Five hundred dollars (\$2,500.00) for each and every calendar day that the Contractor shall be in default in completing the Work within the time stipulated in Article 3.1.A above, for Substantial Completion. The amount is fixed and agreed upon by and between the Contractor and the Owner, not as a penalty, but because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the Owner would in such event sustain, and the amount is agreed to be the amount of damages that the Owner would sustain. The Owner shall have the right to deduct the amount of any such accruing damages from any periodic payments due to the Contractor under this contract.
- B. Additional Damages for Failure to Achieve Final Completion:

1. Owner and Contractor recognize that, even after Substantial Completion has been achieved, any delay in achieving final completion beyond the time specified in Article 3, Paragraph 3.1.A above, may cause the Owner further damage. Accordingly, after Substantial Completion, if Contractor shall neglect, refuse or fail to complete the remaining Work within the Contract Time, Contractor shall pay Owner the actual costs reasonably incurred by the Owner for each day that expires after the time specified in Article 3, Paragraph 3.1.A for the Work to be completed and made ready for final payment (adjusted for any extensions thereof made in accordance with Article 12 of the General Conditions) until the Work is completed and ready for final payment. The Owner shall have the right to deduct the amount of any such accruing costs from any monies due the Contractor under this Contract.

ARTICLE 4 CONTRACT PRICE

- 4.1 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the prices stated in Contractor's Bid, attached hereto as an exhibit.

ARTICLE 5 PROGRESS PAYMENTS

- 5.1 Applications for Payment shall be processed in accordance with Article 14 of the General Conditions and in accordance with Rhode Island General Law.
- 5.2 Owner shall make progress payments on account of the Contract Price on the basis of processed Applications for Payment monthly during construction. All progress payments will be measured by the schedule of values established in paragraph 2.07.A of the General Conditions.
- 5.3 Owner shall retain from progress payments 5 percent of the value of Work completed.

ARTICLE 6 CONTRACTOR'S REPRESENTATIONS

- 6.1 Contractor makes the following representations:
 - A. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.
 - B. Contractor has visited the site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
 - C. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.
 - D. Contractor has obtained and carefully studied (or assumes responsibility for having done so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, including applying the specific means, methods, techniques, sequences, and procedures of construction, if any, expressly required by the Contract Documents to be employed by Contractor, and safety precautions and programs incident thereto.
 - E. Contractor does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.

- F. Contractor is aware of the general nature of Work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.
- G. Contractor has correlated the information known to Contractor, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.
- H. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
- I. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

ARTICLE 7 CONTRACT DOCUMENTS

7.1 Contents

- A. The Contract Documents consist of the following:
 - 1. This Agreement – Section 00500 (all pages, inclusive);
 - 2. Performance Bond;
 - 3. Payment Bond;
 - 4. General Conditions – Section 00700 (all pages, inclusive);
 - 5. Supplementary Conditions – Section 00800 (all pages, inclusive);
 - 6. Specifications as listed in the Table of Contents of the Bid Documents;
 - 7. As-Bid Plans (as referenced in Section 00200, Not Included)
 - 8. Addenda (numbers _____ to _____, inclusive);
 - 9. Exhibits to this Agreement (enumerated as follows):
 - a. Contractor's Bid – Section 00410 (all pages, inclusive);
 - b. Documentation submitted by Contractor prior to Notice of Award;
 - 10. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
 - a. Notice to Proceed;
 - b. Written Amendments;
 - c. Work Change Directives;
 - d. Change Order(s).
- B. The documents listed in paragraph 7.1.A are attached to this Agreement (except as expressly noted otherwise above).
- C. There are no Contract Documents other than those listed above in this Article 7.
- D. The Contract Documents may only be amended, modified, or supplemented as provided in paragraph 3.04 of the General Conditions.

ARTICLE 8 MISCELLANEOUS

8.1 Terms

- A. Terms used in this Agreement will have the meanings indicated in the General Conditions.

8.2 Assignment of Contract

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

8.3 Successors and Assigns

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

8.4 Severability

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

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement. One counterpart each has been delivered to Owner and Contractor. All portions of the contract Documents have been signed or identified by Owner and Contractor or on their behalf.

This Agreement will be effective on _____, 2018 (which is the Effective Date of the Agreement).

OWNER:

Warwick Sewer Authority

Warwick, Rhode Island

By: Its Executive Director

(Name)

(Signature)

CONTRACTOR:

By _____

(Name)

(Signature)

(Title)

(Address)

(City and State)

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

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

and acting Secretary of _____ and I further certify that a meeting of the
(Name of Corporation)
Directors of said Company, duly called and held on _____, at which
(Date of Meeting)

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

VOTED: To authorize and empower

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

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

By: _____
(Secretary of Corporation)

A True Copy:

Attest: _____
(Notary Public)

My Commission Expires: _____
(Date)

SECTION 00610

PERFORMANCE BOND

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

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

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

_____ hereinafter called the "Surety" and licensed by the State Division
of Insurance to do business under the laws of the State of Rhode Island, are held and firmly bound
to the City of Warwick Sewer Authority hereinafter called "Owner", in the penal sum of
_____ Dollars

(\$_____) in lawful money of the United States, for the payment of which
sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and
successors, jointly and severally, firmly by these presents.

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

**EAST NATICK I, EAST NATCIK II AND KNIGHT STREET
PUMP STATION UPGRADES
Contract No. 97**

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

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

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

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

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

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

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

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

ATTEST:

(Principal Secretary) By _____
Principal

(Address-Zip Code)

Witness as to Principal (SEAL)

(Address-Zip Code)

ATTEST:

By _____
Surety
(Attorney-in-Fact)

(Address-Zip Code)

Witness as to Surety (SEAL)

(Address-Zip Code)

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

SECTION 00620

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: That we _____

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

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

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

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

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

**EAST NATICK I, EAST NATICK II AND KNIGHT STREET PUMP STATION
UPGRADES
Contract No. 97**

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

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

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

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

ATTEST:

		Principal
_____	By	_____
(Principal Secretary)		_____

		(Address-Zip Code)

_____	(SEAL)
Witness as to Principal	

(Address-Zip Code)	

ATTEST:

		Surety
_____	By	_____
		(Attorney-in-Fact)

		(Address-Zip Code)

_____	(SEAL)
Witness as to Surety	

(Address-Zip Code)	

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

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly By



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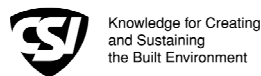
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These General Conditions have been prepared for use with the Suggested Forms of Agreement Between Owner and Contractor Nos. C-520 or C-525 (2002 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other. Comments concerning their usage are contained in the EJCDC Construction Documents, General and Instructions (No. C-001) (2002 Edition). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (No. C-800) (2002 Edition).

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GENERAL CONDITIONS

ARTICLE 1 - DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. 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 which is evidence of the agreement between Owner and Contractor covering the Work.

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. *Asbestos*--Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

5. *Bid*--The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

6. *Bidder*--The individual or entity who submits a Bid directly to Owner.

7. *Bidding Documents*--The Bidding Requirements and the proposed Contract Documents (including all Addenda).

8. *Bidding Requirements*--The Advertisement or Invitation to Bid, Instructions to Bidders, bid security of acceptable form, if any, and the Bid Form with any supplements.

9. *Change Order*--A document recommended by Engineer 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, issued on or after the Effective Date of the Agreement.

10. *Claim*--A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.

11. *Contract*--The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents*-- Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor's submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.

13. *Contract Price*--The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).

14. *Contract Times*--The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any, (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.

15. *Contractor*--The individual or entity with whom Owner has entered into the Agreement.

16. *Cost of the Work*--See Paragraph 11.01.A for definition.

17. *Drawings*--That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.

18. *Effective Date of the Agreement*--The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

19. *Engineer*--The individual or entity named as such in the Agreement.

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

21. *General Requirements*--Sections of Division 1 of the Specifications. The General Requirements pertain to all sections of the Specifications.

22. *Hazardous Environmental Condition*--The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto in connection with the Work.

23. *Hazardous Waste*--The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.

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

25. *Liens*--Charges, security interests, or encumbrances upon Project funds, real property, or personal property.

26. *Milestone*--A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

27. *Notice of Award*--The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.

28. *Notice to Proceed*--A written notice given 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 under the Contract Documents.

29. *Owner*--The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.

30. *PCBs*--Polychlorinated biphenyls.

31. *Petroleum*--Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.

32. *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.

33. *Project*--The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.

34. *Project Manual*--The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.

35. *Radioactive Material*--Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

36. *Related Entity* -- An officer, director, partner, employee, agent, consultant, or subcontractor.

37. *Resident Project Representative*--The authorized representative of Engineer who may be assigned to the Site or any part thereof.

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

39. *Schedule of Submittals*--A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.

40. *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.

41. *Shop Drawings*--All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.

42. *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 for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.

43. *Specifications*--That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain

administrative requirements and procedural matters applicable thereto.

44. *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 at the Site.

45. *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.

46. *Successful Bidder*--The Bidder submitting a responsive Bid to whom Owner makes an award.

47. *Supplementary Conditions*--That part of the Contract Documents which amends or supplements these General Conditions.

48. *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 any Subcontractor.

49. *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 those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

50. *Unit Price Work*--Work to be paid for on the basis of unit prices.

51. *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, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.

52. *Work Change Directive*--A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times

but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 Terminology

A. The following words or terms are not defined but, when used in the Bidding Requirements or Contract Documents, have the following 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 requirements of and information in the Contract Documents and conformance with the design concept of the completed 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 Paragraph 9.09 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 14.04 or 14.05).

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. When “furnish,” “install,” “perform,” or “provide” is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, “provide” is implied.

F. Unless stated otherwise in the Contract Documents, words or phrases which 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. 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 Insurance:* Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.

2.02 Copies of Documents

A. Owner shall furnish to Contractor up to ten printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

2.03 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 Agreement

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 Agreement. 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 Agreement, whichever date is earlier.

2.04 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 the date on which the Contract Times commence to run.

2.05 Before Starting Construction

A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), 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 Documents;

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.

2.06 Preconstruction Conference

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 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

2.07 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 2.05.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 component parts of the Work.

ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, AMENDING, 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. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided whether or not specifically called for at no additional cost to Owner.

C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

3.02 *Reference Standards*

A. Standards, Specifications, Codes, Laws, and Regulations

1. Reference to standards, specifications, manuals, 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, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement 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 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 Contract Documents. No such provision or instruction shall be effective to assign to Owner, or Engineer, or any of, their Related Entities, 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 Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

A. Reporting Discrepancies

1. *Contractor's Review of Contract Documents Before Starting Work:* Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor may discover and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.

2. *Contractor's Review of Contract Documents During Performance of Work:* If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, or of any instruction of any Supplier, 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 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.

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 knew or reasonably should have known thereof.

B. Resolving Discrepancies

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

a. the provisions of any standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); 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 *Amending and Supplementing Contract Documents*

A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.

B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:

1. A Field Order;

2. Engineer's approval of a Shop Drawing or Sample; (Subject to the provisions of Paragraph 6.17.D.3); or

3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

A. Contractor and any Subcontractor or Supplier or other individual or entity performing or furnishing all of the Work under a direct or indirect contract with Contractor, 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 Engineer's consultants, including electronic media editions; or

2. reuse any of 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 adaption by Engineer.

B. The prohibition 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.

3.06 *Electronic Data*

A. Copies of data furnished by Owner or Engineer to Contractor or Contractor to Owner or Engineer that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's

sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.

B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party..

C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

ARTICLE 4 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.01 *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. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

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 the Work is to be performed 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.

4.02 *Subsurface and Physical Conditions*

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

1. those reports of explorations and tests of subsurface conditions at or contiguous to the Site that Engineer has used in preparing the Contract Documents; and

2. those drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) that Engineer has used in preparing the Contract Documents.

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their Related Entities 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.

4.03 *Differing Subsurface or Physical Conditions*

A. *Notice:* If Contractor believes that any subsurface or physical condition at or contiguous to the Site that is uncovered or revealed 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 4.02 is materially inaccurate; or

2. is of such a nature as to require a change in the Contract Documents; 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 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

B. *Engineer's Review:* After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer's findings and conclusions.

C. Possible Price and Times Adjustments

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition 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 meet any one or more of the categories described in Paragraph 4.03.A; and

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 Paragraphs 9.07 and 11.03.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:

a. Contractor knew of the existence of such conditions at the time Contractor made a final 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

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

c. Contractor failed to give the written notice as required by Paragraph 4.03.A.

3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, Owner and Engineer, and any of their Related Entities shall not be liable to Contractor for any claims, costs, losses, or 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) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous 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 shall not be responsible for the accuracy or completeness of any such information or data; 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 such information and data,
- b. locating all Underground Facilities shown or indicated in the Contract Documents,
- c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction, and
- d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, 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 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will

promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

4.05 *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.

4.06 *Hazardous Environmental Condition at Site*

A. *Reports and Drawings:* Reference is made to the Supplementary Conditions for the identification of those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that have been utilized by the Engineer in the preparation of the Contract Documents.

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their Related Entities 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 any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.

D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) 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.

E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered to Contractor written notice: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. 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, either party may make a Claim therefor as provided in Paragraph 10.05.

F. 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. If Owner and Contractor cannot agree as to

entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.

G. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, 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: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06. G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

H. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, 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 created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 - BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

A. Contractor shall furnish performance and payment bonds, 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 Documents. 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 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.

B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent must be accompanied by a certified copy of the agent's authority to act.

C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, 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 requirements of Paragraphs 5.01.B and 5.02.

5.02 *Licensed Sureties and Insurers*

A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.03 *Certificates of Insurance*

A. Contractor shall deliver to Owner, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.

B. Owner shall deliver to Contractor, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.

5.04 *Contractor's Liability Insurance*

A. Contractor shall purchase and maintain such liability and other insurance as is appropriate for the Work being performed and as will provide protection

from claims set forth below which 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:

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

2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;

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

4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:

a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or

b. by any other person for any other reason;

5. 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; and

6. 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.

B. The policies of insurance required by this Paragraph 5.04 shall:

1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, include as additional insured (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, 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;

2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;

3. include completed operations insurance;

4. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;

5. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);

6. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and

7. with respect to completed operations insurance, and any insurance coverage written on a claims-made basis, remain in effect for at least two years after final payment.

a. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

5.05 *Owner's Liability Insurance*

A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, 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.

5.06 *Property Insurance*

A. Unless otherwise provided in the Supplementary Conditions, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full 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 interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured;

2. be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, false work, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage, (other than caused by flood) and such other perils or causes of loss as may be specifically required by the Supplementary Conditions;

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

4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;

5. allow for partial utilization of the Work by Owner;

6. include testing and startup; and

7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other additional insured to whom a certificate of insurance has been issued.

B. Owner shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured.

C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.

D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any

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

E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.

5.07 *Waiver of Rights*

A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies 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 of the insureds or additional insureds thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, 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 Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insured or additional insured (and the officers, directors, 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 as trustee or otherwise payable under any policy so issued.

B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, 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 utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.

C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.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, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds*

A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order .

B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

5.09 *Acceptance of Bonds and Insurance; Option to Replace*

A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract

Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, 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. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

6.01 *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. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.

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. The superintendent will be Contractor's representative at the Site and shall have authority to act on behalf of Contractor. All communications given to or

received from the superintendent shall be binding on Contractor.

6.02 *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. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner's written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

6.03 *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.

B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, 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.

6.04 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 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 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 *Substitutes and "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 specification or description 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 or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.

1. *"Or-Equal" Items:* If in Engineer's sole discretion 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, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, 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

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.

2. Substitute Items

a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.

b. Contractor shall submit sufficient information as provided below to allow Engineer to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.

c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented in the General Requirements and as Engineer may decide is appropriate under the circumstances.

d. 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:

1) shall certify that the proposed substitute item will:

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

b) be similar in substance to that specified, and

c) be suited to the same use as that specified;

2) will state:

a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time;

b) whether or not 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

c) whether or not incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;

3) will identify:

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

b) available engineering, sales, maintenance, repair, and replacement services;

4) and shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change,

B. Substitute Construction Methods or Procedures: If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.

C. Engineer's Evaluation: Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by either a Change Order for a substitute or an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.

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

E. Engineer's Cost Reimbursement: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not Engineer approves a substitute item so proposed or submitted by Contractor, Contractor shall reimburse Owner for the charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the 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.

F. Contractor's Expense: Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

6.06 Concerning Subcontractors, Suppliers, and Others

A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.

B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. 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 any right of Owner or Engineer to reject defective Work.

C. 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. 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 anything in the Contract Documents create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual

or entity except as may otherwise be required by Laws and Regulations.

D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.

E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.

F. 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.

G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as an additional insured on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, 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 such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.07 *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, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, 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.

6.08 *Permits*

A. Unless otherwise provided in the Supplementary Conditions, 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 opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

6.09 *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 knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear 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. However, it shall not be Contractor's primary responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

6.10 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.

6.11 Use of Site and Other Areas

A. Limitation on Use of Site and Other Areas

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.

2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.

3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, 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 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 by or based upon Contractor's performance of the Work.

B. Removal of Debris During Performance of the Work: During the progress of the Work Contractor shall keep the Site and other 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 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 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 property to stresses or pressures that will endanger it.

6.12 Record Documents

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

6.13 Safety and Protection

A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. 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, 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 owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

C. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.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 (except damage or loss attributable to the fault of Draw-

ings or Specifications or to the acts or omissions of Owner or Engineer or , 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).

D. Contractor's duties and responsibilities for safety and for protection of the Work 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 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *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.

6.15 *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.

6.16 *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.

6.17 *Shop Drawings and Samples*

A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the acceptable Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

1. Shop Drawings

a. Submit number of copies specified in the General Requirements.

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 6.17.D.

2. *Samples*: Contractor shall also submit Samples to Engineer for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample submittals.

a. Submit number of Samples specified in the Specifications.

b. 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 6.17.D.

B. 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. Submittal Procedures

1. Before submitting each Shop Drawing or Sample, Contractor shall have determined and verified:

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

b. the suitability of all materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work;

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

d. shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.

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 and approval of that 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 both a written communication separate from the Shop Drawing's or Sample Submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

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 (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

3. Engineer's review and approval 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 6.17.C.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's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

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.

6.18 Continuing the Work

A. 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, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 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 Related Entities shall be entitled to rely on representation of 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 or the issuance of a notice of acceptability by Engineer;

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

7. any correction of defective Work by Owner.

6.20 Indemnification

A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, 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 respective consultants, agents, officers, directors, partners, or employees 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 6.20.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 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, 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.

6.21 *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 law.

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, Shop Drawings 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 6.21, 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 6.17.D.1.

E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

ARTICLE 7 - OTHER WORK AT THE SITE

7.01 *Related Work at Site*

A. Owner may perform other work related to the Project at the Site with Owner's employees, or via other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:

1. written notice thereof will be given to Contractor prior to starting any such other work; and
2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.

B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and shall properly coordinate the Work with theirs. 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 their work and will only cut or alter their work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.

C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, 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.

7.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:

1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;
2. the specific matters to be covered by such authority and responsibility will be itemized; and
3. the extent of such authority and responsibilities will be provided.

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

7.03 *Legal Relationships*

A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.

B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's actions or inactions.

C. Contractor shall be liable to Owner and any other contractor for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's action or inactions.

ARTICLE 8 - OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

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

8.02 *Replacement of Engineer*

A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

8.03 *Furnish Data*

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

8.04 *Pay When Due*

A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

8.05 *Lands and Easements; Reports and Tests*

A. Owner's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site that have been utilized by Engineer in preparing the Contract Documents.

8.06 *Insurance*

A. Owner's responsibilities, if any, in respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.07 *Change Orders*

A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility in respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 *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.

8.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 *Evidence of Financial Arrangements*

A. If and to the extent Owner has agreed to furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents, Owner's responsibility in respect thereof will be as set forth in the Supplementary Conditions.

ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *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 Documents and will not be changed without written consent of Owner and Engineer.

9.02 *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 9.09. 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.

9.03 *Project Representative*

A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. 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.

9.04 *Authorized Variations in Work*

A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which 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. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

9.05 *Rejecting Defective Work*

A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.06 *Shop Drawings, Change Orders and Payments*

A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.

B. In connection with 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, see Paragraph 6.21.

C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.

D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 *Determinations for Unit Price Work*

A. 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 Paragraph 10.05.

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

A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question

B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believe that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.

C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.

D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show

partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents 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 14.07.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 9.09 shall also apply to, the Resident Project Representative, if any, and assistants, if any.

ARTICLE 10 - CHANGES IN THE WORK; CLAIMS

10.01 *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 by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall

promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 *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 as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.B.

10.03 *Execution of Change Orders*

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

1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;

2. 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; and

3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 *Notification to Surety*

A. If notice 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) is required by the provisions of any bond to be given to a surety, 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.

10.05 *Claims*

A. *Engineer's Decision Required:* All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.

B. *Notice:* Written notice stating the general nature of each Claim, shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Time shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).

C. *Engineer's Action:* Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:

1. deny the Claim in whole or in part,

2. approve the Claim, or

3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.

D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.

E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.

F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

ARTICLE 11 - COST OF THE WORK;
ALLOWANCES; UNIT PRICE WORK

11.01 *Cost of the Work*

A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items, and shall not include any of the costs itemized in Paragraph 11.01.B.

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 at the Site. 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, 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 11.01.

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, 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 5.06.D), 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 telegrams, long distance telephone calls, telephone service at the Site, expresses, and similar petty cash items in connection with the Work.

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

B. 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 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which 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 Paragraphs 11.01.A and 11.01.B.

C. Contractor's Fee: When all the Work 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 or when a Claim for an 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 12.01.C.

D. Documentation: Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, 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.

11.02 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

1. Contractor agrees that:

a. 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

b. 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

1. 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.

11.03 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. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.

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. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 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; and

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

3. Contractor believes that Contractor 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 12 - CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. The value of any Work covered by a Change Order or of any Claim for 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, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an

allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).

C. *Contractor's Fee:* 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 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;

b. for costs incurred under Paragraph 11.01.A.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 Paragraph 12.01.C.2.a is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;

d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;

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 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted

by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 *Delays*

A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.

B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, 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 Price or the Contract Times, or both. 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.

C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is 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 described in this Paragraph 12.03.C.

D. Owner, Engineer and the Related Entities of each of them shall not be liable to Contractor for any claims, costs, losses, or 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) sustained by Contractor on or in connection with any other project or anticipated project.

E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

ARTICLE 13 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 *Notice of Defects*

A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. All defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 *Access to Work*

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

13.03 *Tests and Inspections*

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

B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:

1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;

2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in said Paragraph 13.04.C; and

3. as otherwise specifically provided in the Contract Documents.

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 and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to

be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.

E. 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, it must, if requested by Engineer, be uncovered for observation.

F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

13.04 *Uncovering Work*

A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.

B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, 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, furnishing all necessary labor, material, and equipment.

C. If it is found that the uncovered Work is defective, 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 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 Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.

D. 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, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 *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, 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.

13.06 *Correction or Removal of Defective Work*

A. Promptly after receipt of notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. 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 removal (including but not limited to all costs of repair or replacement of work of others).

B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 *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 land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. repair such defective land or areas; or
2. correct such defective Work; or
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 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. 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) will be paid by Contractor.

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 13.07, 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 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. 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) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 *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 in accordance with Paragraph 13.06.A, 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, 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 13.09, 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, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, 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 (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) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. 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 13.09.

ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

A. The Schedule of Values established as provided in Paragraph 2.07.A 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.

14.02 *Progress Payments*

A. 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 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.

B. *Review of Applications*

1. Engineer will, within 10 days after receipt of each Application for Payment, 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 on the Site 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, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and to 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 Documents; or

b. that 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 moneys 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 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent

inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:

- a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;
- b. the Contract Price has been reduced by Change Orders;
- c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or
- d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. Payment Becomes Due

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

D. Reduction in Payment

1. Owner may refuse to make payment of the full amount recommended by Engineer because:

- a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;
- b. 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;
- c. there are other items entitling Owner to a set-off against the amount recommended; or
- d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.

2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action 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, when Contractor corrects to Owner's satisfaction the reasons for such action.

3. If it is subsequently determined that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1.

14.03 Contractor's Warranty of Title

A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

14.04 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 (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.

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 tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will within 14 days after submission of the tentative certificate to Owner notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will within said 14 days execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial

Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.

E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to complete or correct items on the tentative list.

14.05 *Partial Utilization*

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. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor will certify to Owner and Engineer that such part of the Work is substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and 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 14.04 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 5.10 regarding property insurance.

14.06 *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 is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 *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, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.

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

a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.7;

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

c. a list of all Claims against Owner that Contractor believes are unsettled; and

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

3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner or Owner's property might in any way be responsible 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.

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 Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. 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 14.09. 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. Payment Becomes Due

1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and , will be paid by Owner to Contractor.

14.08 *Final Completion Delayed*

A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 *Waiver of Claims*

A. The making and acceptance of final payment will constitute:

1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and

2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance

with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

15.01 *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 notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

15.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will 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 established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);

2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;

3. Contractor's disregard of the authority of Engineer; or

4. Contractor's violation in any substantial way of any provisions of the Contract Documents.

B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:

1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion),

2. 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

3. complete the Work as Owner may deem expedient.

C. If Owner proceeds as provided in Paragraph 15.02.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 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) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed 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.

D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.

E. 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. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.

F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B, and 15.02.C.

15.03 *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;

3. 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) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. reasonable expenses directly attributable to termination.

B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) 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 15.03.

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 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 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 16 - DISPUTE RESOLUTION

16.01 *Methods and Procedures*

A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be

governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.

B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.

C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:

1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions, or

2. agrees with the other party to submit the Claim to another dispute resolution process, or

3. gives written notice to the other party of their intent to submit the Claim to a court of competent jurisdiction.

ARTICLE 17 - MISCELLANEOUS

17.01 *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 to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 *Computation of Times*

A. When any period of time is referred to in the Contract Documents 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.

17.03 *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 Documents. 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.

17.04 *Survival of Obligations*

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

17.05 *Controlling Law*

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

17.06 *Headings*

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

SECTION 00800

SUPPLEMENTARY CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract (EJCDC C-700, 2002 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.

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

SC-1.01.A.29

Add the following paragraph immediately after paragraph 1.01.A.29:

- “a. Owner’s Project Representative – The authorized representative of Owner who may be assigned to the Site or any part thereof.

SC-1.01.A.43

Delete paragraph 1.01.A.43 in its entirety and insert the following in its place:

- 43. Specifications – Sections included under Division 1 through Division 16 of the Project Manual.

ARTICLE 2 – PRELIMINARY MATTERS

SC-2.01.B

Delete paragraph 2.01.B in its entirety and insert the following in its place:

- B. Within 10 calendar days from the date of the Notice of Award, Contractor shall deliver to Owner, with a copy to Engineer, certificates of insurance (and other evidence requested by Owner) which Contractor is required to purchase and maintain in accordance with the requirements of Article 5.

SC-2.03

Delete paragraph 2.03 in its entirety and insert the following in its place:

- 2.03 Contract Time will commence to run on the date specified in the Notice to Proceed.

ARTICLE 4 – AVAILABILITY OF LANDS, SUBSURFACE AND PHYSICAL CONDITIONS, HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

SC-4.03.B

Amend paragraph 4.03.B by striking out the following:

(with a copy to Contractor)

ARTICLE 5 - BONDS AND INSURANCE

SC-5.02.A

Add the following language at the end of paragraph 5.02.A:

Surety and insurance companies shall be rated B+ or higher at the time of contract award by A. M. Best.

SC-5.03.B

Add the following new paragraph immediately after paragraph 5.03.B:

- C. Insurance certificate(s) shall also contain the following:
1. Clarification regarding whether the General Liability policy covers all of the Contractor's operations or only the Work under this contract, with project specific limits.
 2. Confirmation that the General Liability policy includes explosion, collapse and underground (XCU) coverage.
 3. Confirmation that Automobile insurance covers all Scheduled, Hired and Non-Owned vehicles.
 4. Names of all additional insureds as specified herein.

SC-5.04.B

Delete paragraph 5.04.B.7 in its entirety and insert the following in its place:

- B.7. be written on an occurrence basis, and not on a claims-made basis.

SC-5.04.B.7

Add the following new paragraph immediately after paragraph 5.04.B.7:

- C. The limits of liability for the insurance required by paragraph 5.04 shall provide coverage for not less than the following amounts or greater where required by law:
1. Worker's Compensation and Employer's Liability:
 - a. Worker's Compensation \$100,000
 - b. Employer's Liability:

Each Accident	\$1,000,000
Disease per Employee	\$1,000,000
 2. Contractor's General Liability under paragraphs 5.04.A.3 through A.5 of the General Conditions which shall include completed operations and product liability coverages:
 - a. Annual Aggregate \$5,000,000
 - b. Products/Completed Operations Aggregate \$1,000,000
 - c. Personal and Advertising Injury \$1,000,000
 - d. Each Occurrence (Bodily Injury and Property Damage) \$1,000,000
 - e. Builder's Risk Insurable value of the contract
 - f. Excess or Umbrella Liability, which may be used to satisfy the limits of liability required for the insurance to be purchased and maintained in accordance with paragraph 5.04 \$3,000,000

3. Comprehensive Automobile Liability under paragraph 5.04.A.6 of the General Conditions including all scheduled, hired and non-owned vehicles:
 - a. Bodily Injury:

Each Person	\$1,000,000
Each Accident	\$1,000,000
 - b. Property Damage:

Each Accident	\$1,000,000
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4. The following shall be listed as additional insured on all policies except worker's compensation:
 - a. City of Warwick Sewer Authority
125 Arthur Devine Blvd.
Warwick RI 02888

SC-5.05

Delete paragraph 5.05 in its entirety and insert the following in its place:

- 5.05 Contractor shall purchase and maintain a separate Owner's Protective Liability policy, issued to Owner at the expense of Contractor, including Owner and Engineer as named insured. This insurance shall provide coverage for not less than the following amounts:

Bodily Injury	\$1,000,000	Each Occurrence
Property Damage	\$1,000,000	Each Occurrence
	\$5,000,000	Annual Aggregate
Pollution Damage	\$1,000,000	Each Occurrence
	\$3,000,000	Annual Aggregate

SC-5.06

Delete Section 5.06 in its entirety.

SC-5.08

Delete paragraph 5.08 in its entirety.

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

SC-6.01.B Add the following new paragraph immediately after paragraph 6.01.B:

- C. Whenever Owner shall notify Contractor, in writing, that any person on the Work appears to be incompetent, disorderly, or otherwise unsatisfactory, such person shall be removed from the Project and shall not again be employed on it except with the consent of Owner.

SC-6.06

Delete paragraphs 6.06.A and 6.06.B in their entirety and insert the following in their 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.

- B. Should the Engineer notify the Contractor in writing that any person on the work is, in his opinion, incompetent, unfaithful, disorderly, or otherwise unsatisfactory, such person shall be discharged from the work and shall not again be employed on it, except with the consent of the Engineer.

SC-6.06.C

Add the following new paragraph immediately after paragraph 6.06.C.2:

- 3. 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 Applications for Payment.

SC-6.08

Delete the word "Owner" in the last sentence and replace with the word "Contractor"

SC-6.10

Add the following sentence at the end of paragraph 6.10.A:

All materials provided under this Contract are exempt from the Sales and Use Taxes of the State of Rhode Island. The tax exemption number will be provided to the Contractor.

SC-6.20.C

Add the following new paragraph immediately after paragraph 6.20.C:

- D. If, through 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 such damage alleged to have been sustained, Owner shall notify Contractor, who shall indemnify, defend, and save harmless Owner against any such claim.

ARTICLE 10 - CHANGES IN THE WORK; CLAIMS

SC-10.05.B

Amend the first sentence of paragraph 10.05.B by replacing "30 days" with "15 days".

Amend the second sentence of paragraph 10.05.B by replacing "60 days" with "30 days".

SC-10.05.C.2

Delete paragraph 10.05.C.2 in its entirety and replace with the following:

- 2. Recommend approval of the claim to the Owner, or

ARTICLE 11 - COST OF THE WORK; CASH ALLOWANCES; UNIT PRICE WORK

SC-11.01.A.5.c

Delete paragraph 11.01.A.5.c in its entirety and replace with the following:

- c. The fair rental of all machinery and equipment used on the extra work for the period of such use. The fair rental for all machinery and equipment shall be based upon the most recent edition of "Rental Rate Bluebook for Construction Equipment" (the "Bluebook"), published by Nielson/Dataquest, or a similar publication approved by Engineer. Reasonable rental periods shall be used. If a piece of equipment used on extra work for a short period of time (hours or days) is on the job, or has previously been rented for a long period of time (months), then the long-term rental rate shall be used in determining costs.

SC-11.01.B.1

Insert in the first sentence after the word "architects" the word "superintendents".

SC-11.01.B.5

Add the following new paragraph immediately after paragraph 11.01.B.5:

6. Costs of or rental of small tools; costs of or rental of buildings.

ARTICLE 13 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

SC-13.03.A

Insert after the word "notice" the words "(minimum 24 hours)" in paragraph 13.03.A.

SC-13.04.B

Insert in the first sentence of paragraph 13.04.B after the word "others" the words "following prior written concurrence of Engineer to cover such work".

SC-13.05.A

Add the following new paragraph immediately after paragraph 13.05.A:

- B. If Owner stops work under Paragraph 13.05, Contractor shall not be entitled to an extension of Contract Time nor to an increase in Contract Price.

SC-13.06.B

Add the following new paragraph immediately after Paragraph 13.06.B:

- C. At any time during the progress of the Work, Engineer shall have the right to reject any work which does not conform to the requirements of the Contract Documents, even though such work has been previously inspected and paid for.

ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

SC-14.02.A.3

Add the following new paragraphs immediately after paragraph 14.02.A.3:

4. With each application for payment the CONTRACTOR shall submit certified payrolls for all his employees that performed work on the project for the payment application period and for all Subcontractors' employees to demonstrate compliance with Rhode Island General Laws Chapter 37-13-1 through 37-13-7 and State of Rhode Island Department of Labor prevailing wage requirements. Certified payrolls shall be prepared and submitted on the "Statement of Compliance" forms as prescribed and in accordance with the State of Rhode Island Department of Labor
5. The form used for preparation and submission of Application for Payments shall be AIA Form G702 and G703, which shall be provided by the CONTRACTOR, unless another

form is approved by the OWNER prior to the submission of the first Application for Payment.

SC-14.02.B.5.d

Add the following new paragraph immediately after paragraph 14.02.B.5.d:

- e. Owner is required to pay Engineer additional compensation because of Contractor delays or rejection of defective Work.

SC-14.04

Delete paragraphs 14.04.A through 14.04.E in their entirety and insert the following in its place:

- 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 (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a Certificate of Substantial Completion. Within a reasonable time thereafter, Owner, Contractor and Engineer shall make an inspection of the Work to determine the status of completion. If, after consultation with Owner, Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor. If, after consultation with Owner, Engineer considers and the Owner agrees that the Work is substantially complete, Engineer will prepare and deliver to Contractor, in a form approved by Owner, a Certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be included in the certificate a list of items to be completed or corrected before final payment.

SC-14.05.A.3

Add the following new paragraph immediately after paragraph 14.05.A.3:

4. Owner may at any time request Contractor in writing to permit Owner to take over operation of any part of the Work although it is not substantially complete. A copy of such request will be sent to Engineer, and within a reasonable time thereafter Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion and will prepare a list of the items remaining to be completed or corrected thereon before final payment. If Contractor does not object in writing to Owner and Engineer that such part of the Work is not ready for separate operation by Owner, Engineer will finalize the list of items to be completed or corrected and will deliver such lists to Owner and Contractor together with a written recommendation as to the division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, maintenance, utilities, insurance, warranties, and guarantees for that part of the Work which will become binding upon Owner and Contractor at the time when Owner takes over such operation (unless they shall have otherwise agreed in writing and so informed Engineer). During such operation and prior to Substantial Completion of such part of the Work, Owner shall allow Contractor reasonable access to complete or correct items on said list and to complete other related Work.

Paragraph 14.05.A.4 shall be renumbered to 14.05.A.5

SC-14.07

Delete paragraphs 14.07.B. and 14.07.C in their entirety and insert the following in their place:

- B. 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, 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 his/her recommendation of payment and present the Application 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 14.09. Otherwise, Engineer will return the Application 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. If the Application and accompanying documentation are appropriate as to form and substance, Owner shall in accordance with the applicable Law, pay Contractor the amount recommended by Engineer.

ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

SC- 15.02.A.4

Add the following new paragraph immediately after paragraph 15.02.A.4:

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 16 - DISPUTE RESOLUTION

SC-16.01

Delete paragraphs 16.01.A through 16.01.C in their entirety and insert the following in its place:

- A. Dispute resolution methods and procedures, if any, shall be as set forth in the Supplementary Conditions. If no method and procedure has been set forth, and subject to the provisions of paragraphs 9.08 and 10.05, Owner and Contractor may exercise such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any dispute.

ARTICLE 17 - MISCELLANEOUS

SC-17.06

Add the following new paragraphs immediately after paragraph 17.06.

17.07 Wage Rates

- A. The Contractor shall comply with all minimum wage rates in accordance with the Rhode Island Department of Labor Laws (reference the General Laws of Rhode Island, Chapters 37-12 and 37-13, as amended) and the Federal Labor Standard Provisions that apply to this project. A copy of the State of Rhode Island wage rate schedule is included in Attachment B herein, and a copy of the Federal Labor Standard requirements for this project is included in Attachment C. 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 Commissioner. Such approved minimum rate shall be retroactive to the time of the initial employment of such person in such trade or occupation. The Contractor shall notify the Owner of its intention to employ persons in trades or occupations not classified in the wage determinations as soon as possible in order to allow sufficient time for the Owner to obtain approved rates for such trades or occupations.
- B. The schedules 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 rate in excess of the applicable rate contained in these Contract Documents. All disputes in regard to the payment of wages in excess of those specified in the schedules shall be resolved by Contractor.

- C. The said schedules of wages shall continue to be the minimum rates to be paid during the life of this Agreement and a legible copy of said schedules shall be kept posted in a conspicuous place at the site of the work.
- D. The Contractor shall regularly submit to the Owner, but no less frequently than his requests for payment, certified payrolls for all his applicable employees performing work on the Project and for all his subcontractors. Certified payrolls shall be submitted on "Statement of Compliance" forms or other such forms as prescribed and provided by the State of Rhode Island Department of Labor.

17.08 State of Rhode Island General Law Chapter 37-13

- A. The CONTRACTOR'S attention is specifically called to the provisions of Rhode Island General Law Chapter 37-13, Sections 37-13-1 through 37-13-13, as amended, which are appended at the end of these Supplementary Conditions. The CONTRACTOR shall fully adhere to all provisions of the latest revision of this Chapter. Appending the referenced Sections of this Chapter of State of Rhode Island General Laws shall in no way limit the responsibilities of the CONTRACTOR to comply with this and all other applicable Federal, State and local laws. The CONTRACTOR shall verify that he complies with the latest revision of this and all other such applicable laws.

17.09 Compliance

- A. All Subcontractors employed by the CONTRACTOR for the Work shall fully comply with the requirements of this Article.
- B. The CONTRACTOR shall bear full responsibility for compliance to the requirements of this Article by both himself and by his Subcontractors. Submissions made to the OWNER shall not relieve, nor be construed to relieve, the CONTRACTOR of this responsibility.

END OF SECTION

SECTION 00800
SUPPLEMENTARY CONDITIONS
ATTACHMENTS

ATTACHMENT A

State of Rhode Island General Law Chapter 37-13,
Sections 37-13-1 thru 37-13-13

**State of Rhode Island General Law Chapter 37-13,
Sections 37-13-1 thru 37-13-13**

BELOW ARE COPIES OF R.I.G.L. §37-13-1 THROUGH 37-13-13, WHICH IS A PARTIAL LIST OF STATE LABOR LAWS CONCERNING PAYMENT OF PREVAILING WAGES. A COMPLETE COPY OF THE LAW CAN BE OBTAINED AT THE STATE DEPARTMENT OF LABOR. SAID COPIES OF THE SECTIONS BELOW DOES NOT LIMIT A RESPONSIBILITY UNDER R.I.G.L. §37-13-1, ET SEQ.

§ 37-13-1 "Public works" defined. – "Public works" as used in this chapter shall mean any public work consisting of grading, clearing, demolition, improvement, completion, repair, alteration, or construction of any public road or any bridge, or portion thereof, or any public building, or portion thereof, or any heavy construction, or any public works projects of any nature or kind whatsoever.

§ 37-13-2 "Contractor" defined – Information required. – The term "contractor" as used in this chapter shall mean the bidder whose bid has been accepted by an authorized agency or awarding authority as the bidder possessing the skills, ability, and integrity necessary to the faithful performance of the contract or work, and who shall certify that he or she is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the contract or work. Essential information in regard to qualifications shall be submitted in such form to the awarding authority and the director of labor and training as the director of labor and training shall require. The authorized agency or awarding authority shall reserve the right to reject all bids, if it be in the public interest to do so.

§ 37-13-3 Contractors subject to provisions – Weekly payment of employees. – All contractors, who have been awarded contracts for public works by an awarding agency or authority of the state or of any city,
§ 37-13-5 Payment for trucking or materials furnished – Withholding of sums due. – A contractor or subcontractor on public works authorized by a proper authority shall pay any obligation or charge for trucking and material which have been furnished for the use of the contractor or subcontractor, in connection with the public works being performed by him or

town, committee, or by any person or persons therein, in which state or municipal funds are used and of which the contract price shall be in excess of one thousand dollars (\$1,000), whether payable at the time of the signing of the contract or at a later date, and their subcontractors, on those public works shall pay their employees at weekly intervals and shall comply with the provisions set forth in §§ 37-13-4 – 37-13-14 and § 37-13-16.

§ 37-13-4 Provisions applicable to public works contracts – Lists of subcontractors. – All public works shall be done by contract, subject to the same provisions of law relating thereto and to the letting thereof, which are applicable to similar contracts of the awarding authority or authorized agency, hereinafter called the "proper authority", in the general location where the work is to be performed and which are not contrary to the provisions of §§ 37-13-1 – 37-13-14 and § 37-13-16. Each contractor after the award of a contract for public works shall submit to the proper authority a list of his or her subcontractors of any part or all of the work. The list shall be submitted in such manner or form as the proper authority shall uniformly require from contractors in all public works.

her, within ninety (90) days after the obligation or charge is incurred or the trucking service has been performed or the material has been delivered to the site of the work, whichever is later. When it is brought to the notice of the proper authority in a city or town, or the proper authority in the state having supervision of the contract, that the obligation or charge has not

been paid by the contractor or subcontractor, the proper authority may deduct and hold for a period not exceeding sixty (60) days, from sums of money due to the contractor or subcontractor, the equivalent amount of such sums certified by a trucker or materialman creditor as due him or her, as provided in this section, and which the proper authority determines is reasonable for trucking performed or materials furnished for the public works.

§ 37-13-6 Ascertainment of prevailing rate of wages and other payments – Specification of rate in call for bids and in contract. – Before awarding any contract for public works to be done, the proper authority shall ascertain from the director of labor and training the general prevailing rate of the regular, holiday, and overtime wages paid and the general prevailing payments on behalf of employees only, to lawful welfare, pension, vacation, apprentice training, and educational funds (payments to the funds must constitute an ordinary business expense deduction for federal income tax purposes by contractors) in the city, town, village, or other appropriate political subdivision of the state in which the work is to be performed, for each craft, mechanic, teamster, laborer, or type of worker needed to execute the contract for the public works. The proper authority shall, also, specify in the call for bids for the contract and in the contract itself the general prevailing rate of the regular, holiday, and overtime wages paid and the payments on behalf of employees only, to the welfare, pension, vacation, apprentice training, and education funds existing in the locality for each craft, mechanic, teamster, laborer, or type of worker needed to execute the contract or work.

§ 37-13-7 Specification in contract of amount and frequency of payment of wages. – (a) Every call for bids for every contract in excess of one thousand dollars (\$1,000), to which the state of Rhode Island or any political subdivision thereof or any public agency or quasi-public agency is a party, for construction, alteration, and/or repair, including painting and decorating, of public buildings or public works of the state of Rhode
(B) The rate of costs to the contractor or subcontractor which may be reasonably anticipated in providing benefits to employees

Island or any political subdivision thereof, or any public agency or quasi-public agency and which requires or involves the employment of employees, shall contain a provision stating the minimum wages to be paid various types of employees which shall be based upon the wages that will be determined by the director of labor and training to be prevailing for the corresponding types of employees employed on projects of a character similar to the contract work in the city, town, village, or other appropriate political subdivision of the state of Rhode Island in which the work is to be performed. Every contract shall contain a stipulation that the contractor or his or her subcontractor shall pay all the employees employed directly upon the site of the work, unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account, the full amounts accrued at time of payment computed at wage rates not less than those stated in the call for bids, regardless of any contractual relationships which may be alleged to exist between the contractor or subcontractor and the employees, and that the scale of wages to be paid shall be posted by the contractor in a prominent and easily accessible place at the site of the work; and the further stipulation that there may be withheld from the contractor so much of the accrued payments as may be considered necessary to pay to the employees employed by the contractor, or any subcontractor on the work, the difference between the rates of wages required by the contract to be paid the employees on the work and the rates of wages received by the employees and not refunded to the contractor, subcontractors, or their agents.

(b) The terms "wages", "scale of wages", "wage rates", "minimum wages", and "prevailing wages" shall include:

(1) The basic hourly rate of pay; and

(2) The amount of:

(A) The rate of contribution made by a contractor or subcontractor to a trustee or to a third person pursuant to a fund, plan, or program; and

pursuant to an enforceable commitment to carry out a financially responsible plan or program which was communicated in writing

to the employees affected, for medical or hospital care, pensions on retirement or death, compensation for injuries or illness resulting from occupational activity, or insurance to provide any of the foregoing, for unemployment benefits, life insurance, disability and sickness insurance, or accident insurance, for vacation and holiday pay, for defraying costs of apprenticeship or other similar programs, or for other bona fide fringe benefits, but only where the contractor or subcontractor is not required by other federal, state, or local law to provide any of the benefits; provided, that the obligation of a contractor or subcontractor to make payment in accordance with the prevailing wage determinations of the director of labor and training insofar as this chapter of this title and other acts incorporating this chapter of this title by reference are concerned may be discharged by the making of payments in cash, by the making of contributions of a type referred to in subsection (b)(2), or by the assumption of an enforceable commitment to bear the costs of a plan or program of a type referred to in this subdivision, or any combination thereof, where the aggregate of any payments, contributions, and costs is not less than the rate of pay described in subsection (b)(1) plus the amount referred to in subsection (b)(2).

(c) The term "employees", as used in this section, shall include employees of contractors or subcontractors performing jobs on various types of public works including mechanics, apprentices, teamsters, chauffeurs, and laborers engaged in the transportation of gravel or fill to the site of public works, the removal and/or delivery of gravel or fill or ready-mix concrete, sand, bituminous stone, or asphalt flowable fill from the site of public works, or the transportation or removal of gravel or fill from one location to another on the site of public works, and the employment of the employees shall be subject to the provisions of subsections (a) and (b).

(d) The terms "public agency" and "quasi-public agency" shall include, but not be limited to, the Rhode Island industrial recreational building authority, the Rhode Island economic development corporation, the Rhode Island airport corporation, the Rhode Island industrial facilities corporation, the Rhode Island refunding bond authority, the Rhode Island

housing and mortgage finance corporation, the Rhode Island resource recovery corporation, the Rhode Island public transit authority, the Rhode Island student loan authority, the Rhode Island water resources board corporate, the Rhode Island health and education building corporation, the Rhode Island higher education assistance authority, the Rhode Island turnpike and bridge authority, the Narragansett Bay water quality management district commission, Rhode Island telecommunications authority, the convention center authority, the board of governors for higher education, the board of regents for elementary and secondary education, the capital center commission, the housing resources commission, the Quonset Point-Davisville management corporation, the Rhode Island children's crusade for higher education, the Rhode Island depositors economic protection corporation, the Rhode Island lottery commission, the Rhode Island partnership for science and technology, the Rhode Island public building authority, and the Rhode Island underground storage tank board.

§ 37-13-8 Investigation and determination of prevailing wages – Filing of schedule. –

The director of labor and training shall investigate and determine the prevailing wages and payments made to or on behalf of employees, as set forth in § 37-13-7, paid in the trade or occupation in the city, town, village, or other appropriate political subdivision of the state and keep a schedule on file in his or her office of the customary prevailing rate of wages and payments made to or on behalf of the employees which shall be open to public inspection. In making a determination, the director of labor may adopt and use such appropriate and applicable prevailing wage rate determinations as have been made by the secretary of labor of the United States of America in accordance with the Davis-Bacon Act, as amended, 40 U.S.C. § 276a.

§ 37-13-9 Statutory provisions included in contracts. – A copy of §§ 37-13-5, 37-13-6, and 37-13-7 shall be inserted in all contracts for public works awarded by the state, any city, town, committee, an authorized agency, or awarding authority thereof, or any person or persons in their behalf in which state or

municipal funds are used if the contract price is in excess of one thousand dollars (\$1,000).

§ 37-13-10 Overtime compensation. – Labor performed under the provisions of §§ 37-13-1 – 37-13-16, during the period of forty (40) hours in any one week and during the period of eight (8) hours in any one day, shall be considered a legal week's work or a legal day's work, as the case may be, and any number of hours of employment in any one week greater than the number of forty (40) hours or in any one day greater than the number of eight (8) hours shall be compensated at the prevailing rate of wages for overtime employment; provided, however, when the director of labor and training has determined in the investigation provided for in §§ 37-13-7 and 37-13-8 that there is a prevailing practice in a city, town, or other appropriate political subdivision to pay an overtime rate of wages for work of any craft, mechanic, teamster, laborer, or type of worker needed to execute the work other than hours worked in any one week greater than the number of forty (40) or in hours worked in any one day greater than the number of eight (8), then the prevailing practice shall determine the legal workday and the legal workweek in the city or town for the work and the prevailing rate of overtime wages shall be paid for such work in excess of that legal workday or week, as the case may be.

§ 37-13-11 Posting of prevailing wage rates. – Each contractor awarded a contract for public works with a contract price in excess of one thousand dollars (\$1,000), and each subcontractor who performs work on those public works, shall post in conspicuous places on the project, where covered workers are employed, posters which contain the current, prevailing rate of wages and the current, prevailing rate of payments to the funds required to be paid for each craft or type of worker employed to execute the contract as set forth in §§ 37-13-6 and 37-13-7. Posters shall be furnished to contractors and subcontractors by the director of labor and training, who shall determine the size and context thereof from time to time, at the time a contract is awarded. A contractor or subcontractor who fails to comply with the provisions of this section shall be deemed guilty of a misdemeanor and shall pay to the director of labor and training one hundred

dollars (\$100) for each calendar day of noncompliance as determined by him or her. Contracts set forth in this section shall not be awarded by the state, any city, town, or any agency thereof until the director of labor and training has prepared and delivered the posters to the division of purchases, if the state or any agency thereof is the proper authority, or to the city, town, or an agency thereof, if it is the proper authority, and the contractor to whom the contract is to be awarded.

§ 37-13-12 Wage records of contractors. – Each contractor awarded a contract with a contract price in excess of one thousand dollars (\$1,000) for public works, and each subcontractor who performs work on those public works, shall keep an accurate record showing the name, occupation, and actual wages paid to each worker employed by him or her and the payments to all the employee funds specified in §§ 37-13-6 and 37-13-7 by him or her in connection with the contract or work. The director and his or her authorized representatives shall have the right to enter any place of employment at all reasonable hours for the purpose of inspecting the wage records and seeing that all provisions of this chapter are complied with.

§ 37-13-12.1 Obstruction of enforcement. – Any effort of any employer to obstruct the director and his or her authorized representatives in the performance of their duties shall be deemed a violation of this chapter and punishable as such.

§ 37-13-12.2 Subpoena powers. – The director and his or her authorized representatives shall have power to administer oaths and examine witnesses under oath, issue subpoenas, subpoenas duces tecum, compel the attendance of witnesses, and the production of papers, books, accounts, records, payrolls, documents, and testimony, and to take depositions and affidavits in any proceeding before the director.

§ 37-13-12.3 Compelling obedience to subpoenas. – In case of failure of any person to comply with any subpoena lawfully issued, or subpoena duces tecum, or on the refusal of

any witness to testify to any matter regarding which he or she may be lawfully interrogated, it shall be the duty of the superior court, or any judge thereof, on application by the director, to compel obedience by proceedings in the nature of those for contempt.

§ 37-13-12.4 Penalty for violations. – Except as otherwise provided in this chapter, any employer who shall violate or fail to comply with any of the provisions of this chapter shall **§ 37-13-13 Furnishing payroll record to director of labor and training.** – Each contractor awarded a contract with a contract price in excess of one thousand dollars (\$1,000) for public works, and each subcontractor who performs work on public works, shall furnish a certified copy of his or her payroll record of his or her employees employed upon the public works to the director of labor and training on a weekly basis for the preceding week. The director of labor and training may promulgate reasonable rules and regulations to enforce the provisions of this

be guilty of a misdemeanor and upon conviction thereof shall be punished by a fine of not less than fifty dollars (\$50.00) nor more than one hundred dollars (\$100) for each separate offense, or by imprisonment for not less than ten (10) nor more than ninety (90) days, or by both fine and imprisonment. Each day of failure to pay wages due an employee at the time specified in this chapter shall constitute a separate and distinct violation.

section. A contractor or subcontractor who fails to comply with the provisions of this section shall be deemed guilty of a misdemeanor and shall pay to the director of labor and training one hundred dollars (\$100) for each calendar day of noncompliance as determined by the director of labor and training. Any of those revenues shall be deposited as general revenues.

NOTE: THE SUCCESSFUL CONTRACTOR MUST SUBMIT TO THE PROVIDENCE WATER SUPPLY BOARD PROJECT MANAGER A COMPLETE LIST OF ALL SUBCONTRACTORS OF ANY PART OR ALL OF THE WORK TO BE PERFORMED IMMEDIATELY AFTER THE AWARD OF THE CONTRACT AND PRIOR TO THE START OF ANY WORK. ALL SUBCONTRACTORS MUST COMPLY FULLY WITH ALL STATE LABOR LAWS.

NOTE: BEFORE FINAL PAYMENT AND/OR RETAINAGE IS TO BE RELEASED, THE SUCCESSFUL VENDOR MUST SUBMIT A NOTARIZED CONFIRMATION BY A RESPONSIBLE OFFICER OF THE COMPANY CONFIRMING THAT ALL CONTRACTORS AND SUBCONTRACTORS WORKING ON THIS PROJECT HAVE FULLY COMPLIED WITH ALL STATE LABOR LAWS INCLUDING BUT NOT LIMITED TO PAYMENT OF PREVAILING WAGES, AND POSTING SAID WAGES ON SITE.

SECTION 00800
SUPPLEMENTARY CONDITIONS
ATTACHMENTS

ATTACHMENT B

State of Rhode Island Wage Rates

General Decision Number: RI170001 11/10/2017 RI1

Superseded General Decision Number: RI20160001

State: Rhode Island

Construction Types: Building, Heavy (Heavy and Marine) and Highway

Counties: Rhode Island Statewide.

BUILDING CONSTRUCTION PROJECTS (does not include residential construction consisting of single family homes and apartments up to and including 4 stories) HEAVY, HIGHWAY AND MARINE CONSTRUCTION PROJECTS

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.20 for calendar year 2017 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.20 (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2017. The EO minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/06/2017
1	01/13/2017
2	01/27/2017
3	02/03/2017
4	02/17/2017
5	03/03/2017
6	03/10/2017
7	03/17/2017
8	04/07/2017
9	04/21/2017
10	05/05/2017
11	05/12/2017
12	06/02/2017
13	06/16/2017
14	06/30/2017
15	07/07/2017
16	07/28/2017
17	08/04/2017
18	08/25/2017
19	09/01/2017
20	09/22/2017
21	10/13/2017
22	11/10/2017

ASBE0006-006 06/01/2015

Rates Fringes

HAZARDOUS MATERIAL HANDLER
(Includes preparation,
wetting, stripping, removal
scrapping, vacuuming, bagging)

& disposing of all insulation materials, whether they contain asbestos or not, from mechanical systems).....\$ 31.63 18.30

ASBE0006-008 09/01/2017

Rates Fringes

Asbestos Worker/Insulator
Includes application of all insulating materials, protective coverings, coatings & finishes to all types of mechanical systems.\$ 41.48 27.35

BOIL0029-001 01/01/2017

Rates Fringes

BOILERMAKER.....\$ 42.42 24.92

BRII0003-001 12/01/2016

Rates Fringes

Bricklayer, Stonemason, Pointer, Caulker & Cleaner.....\$ 37.38 25.30

BRII0003-002 09/01/2017

Rates Fringes

Marble Setter, Terrazzo Worker & Tile Setter.....\$ 37.16 27.09

BRII0003-003 09/01/2017

Rates Fringes

Marble, Tile & Terrazzo Finisher.....\$ 31.32 25.80

CARP0094-001 06/05/2017

Rates Fringes

CARPENTER (Includes Soft Floor Layer).....\$ 35.28 27.15
Diver Tender.....\$ 36.28 27.15
DIVER.....\$ 47.08 27.15
Piledriver.....\$ 35.28 27.15
WELDER.....\$ 36.28 27.15

FOOTNOTES:

When not diving or tending the diver, the diver and diver tender shall receive the piledriver rate. Diver tenders shall receive \$1.00 per hour above the pile driver rate when tending the diver.

Work on free-standing stacks, concrete silos & public utility electrical power houses, which are over 35 ft. in height when constructed: \$.50 per hour additional.

Work on exterior concrete shear wall gang forms, 45 ft. or more above ground elevation or on setback: \$.50 per hour additional.

The designated piledriver, known as the "monkey": \$1.00 per hour additional.

 CARP1121-002 10/01/2017

	Rates	Fringes
MILLWRIGHT.....	\$ 36.85	27.50

 ELEC0099-002 06/01/2017

	Rates	Fringes
ELECTRICIAN.....	\$ 38.08	57.24%
Teledata System Installer.....	\$ 28.56	13.1%+13.76

FOOTNOTES:

Work of a hazardous nature, or where the work height is 30 ft. or more from the floor, except when working OSHA-approved lifts: 20% per hour additional.

Work in tunnels below ground level in combined sewer outfall: 20% per hour additional.

 ELEV0039-001 01/01/2017

	Rates	Fringes
ELEVATOR MECHANIC.....	\$ 48.45	31.585+A+B

FOOTNOTES:

A. PAID HOLIDAYS: New Years Day; Memorial Day; Independence Day; Labor Day; Veterans' Day; Thanksgiving Day; the Friday after Thanksgiving Day; and Christmas Day.

B. Employer contributes 8% basic hourly rate for 5 years or more of service of 6% basic hourly rate for 6 months to 5 years of service as vacation pay credit.

 ENGI0057-001 06/04/2017

	Rates	Fringes
Operating Engineer: (power plants, sewer treatment plants, pumping stations, tunnels, caissons, piers, docks, bridges, wind turbines, subterranean & other marine and heavy construction work)		
GROUP 1.....	\$ 37.15	25.10+a
GROUP 2.....	\$ 32.77	25.10+a
GROUP 3.....	\$ 29.92	25.10+a
GROUP 4.....	\$ 36.20	25.10+a
GROUP 5.....	\$ 27.00	25.10+a

GROUP 6.....	\$ 21.00	25.10+a
GROUP 7.....	\$ 32.85	25.10+a
GROUP 8.....	\$ 36.77	25.10+a

a. BOOM LENGTHS, INCLUDING JIBS:

- 150 feet and over + \$ 2.00
- 180 feet and over + \$ 3.00
- 210 feet and over + \$ 4.00
- 240 feet and over + \$ 5.00
- 270 feet and over + \$ 7.00
- 300 feet and over + \$ 8.00
- 350 feet and over + \$ 9.00
- 400 feet and over + \$10.00

a. PAID HOLIDAYS:

New Year's Day, President's Day, Memorial Day, July Fourth, Victory Day, Labor Day, Columbus Day, Veterans Day, Thanksgiving Day, Christmas Day. a: Any employee who works 3 days in the week in which a holiday falls shall be paid for the holiday.

a. FOOTNOTES:

Hazmat work: \$2.00 per hour additional.
Tunnel/Shaft work: \$5.00 per hour additional.

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Digging machine, Ross Carrier, crane, lighter, locomotive, derrick, hoist, elevator, bidwell-type machine, shot & water blasting machine, paver, spreader, graders, front end loader (3 yds. and over), vibratory hammer & vacuum truck, roadheaders, forklifts, economobile type equipment, tunnel boring machines, concrete pump and on site concrete plants.

GROUP 2: Oilers on cranes.

GROUP 3: Oiler on crawler backhoe.

GROUP 4: Bulldozer, bobcats, skid steer loader, tractor, scraper, combination loader backhoe, roller, front end loader (less than 3 yds.), street and mobile-powered sweeper (3-yd. capacity), 8-ft. sweeper minimum 65 HP).

GROUP 5: Well-point installation crew.

GROUP 6: Utility Engineers and Signal Persons

GROUP 7: Heater, concrete mixer, stone crusher, welding machine, generator and light plant, gas and electric driven pump and air compressor.

GROUP 8: Boat & tug operator.

* ENGI0057-002 11/06/2017

Rates Fringes

Power Equipment Operator
(highway construction
projects; water and sewerline
projects which are incidental

to highway construction projects; and bridge projects that do not span water)

GROUP 1.....	\$ 33.05	25.10
GROUP 2.....	\$ 27.75	25.10
GROUP 3.....	\$ 21.75	25.10
GROUP 4.....	\$ 28.33	25.10
GROUP 5.....	\$ 32.03	25.10
GROUP 6.....	\$ 31.65	25.10
GROUP 7.....	\$ 27.30	25.10
GROUP 8.....	\$ 28.68	25.10
GROUP 9.....	\$ 30.63	25.10

a. FOOTNOTE: a. Any employee who works three days in the week in which a holiday falls shall be paid for the holiday.

a. PAID HOLIDAYS: New Year's Day, President's Day, Memorial Day, July Fourth, Victory Day, Labor Day, Columbus Day, Veterans Day, Thanksgiving Day & Christmas Day.

POWER EQUIPMENT OPERATOR CLASSIFICATIONS

GROUP 1: Digging machine, crane, piledriver, lighter, locomotive, derrick, hoist, boom truck, John Henry's, directional drilling machine, cold planer, reclaimer, paver, spreader, grader, front end loader (3 yds. and over), vacuum truck, test boring machine operator, veemere saw, water blaster, hydro-demolition robot, forklift, economobile, Ross Carrier, concrete pump operator and boats

GROUP 2: Well point installation crew

GROUP 3: Utility engineers and signal persons

GROUP 4: Oiler on cranes

GROUP 5: Combination loader backhoe, front end loader (less than 3 yds.), forklift, bulldozers & scrapers and boats

GROUP 6: Roller, skid steer loaders, street sweeper

GROUP 7: Gas and electric drive heater, concrete mixer, light plant, welding machine, pump & compressor

GROUP 8: Stone crusher

GROUP 9: Mechanic & welder

 ENGI0057-003 06/04/2017

BUILDING CONSTRUCTION

	Rates	Fringes
Power Equipment Operator		
GROUP 1.....	\$ 36.42	25.10+a
GROUP 2.....	\$ 36.20	25.10+a
GROUP 3.....	\$ 32.20	25.10+a
GROUP 4.....	\$ 29.35	25.10+a
GROUP 5.....	\$ 35.50	25.10+a
GROUP 6.....	\$ 35.07	25.10+a
GROUP 7.....	\$ 32.39	25.10+a

a. BOOM LENGTHS, INCLUDING JIBS:

- 150 ft. and over: + \$ 2.00
- 180 ft. and over: + \$ 3.00
- 210 ft. and over: + \$ 4.00
- 240 ft. and over: + \$ 5.00
- 270 ft. and over: + \$ 7.00
- 300 ft. and over: + \$ 8.00
- 350 ft. and over: + \$ 9.00
- 400 ft. and over: + \$10.00

a. PAID HOLIDAYS: New Year's Day, President's Day, Memorial Day, July Fourth, Victory Day, Labor Day, Columbus Day, Veterans Day, Thanksgiving Day & Christmas Day. a: Any employee who works 3 days in the week in which a holiday falls shall be paid for the holiday.

- a. FOOTNOTE: Hazmat work: \$2.00 per hour additional.
Tunnel/Shaft work: \$5.00 per hour additional.

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Digging machine, Ross carrier, crane, boomtrucks, lighter, locomotive, derrick, hoist, elevator, bidwell-type machine, shot & water blasting machine, paver, spreader, front end loader (3 yds. and over), vibratory hammer and vacuum truck

GROUP 2: Telehandler equipment, forklift, concrete pump & on-site concrete plant

GROUP 3: Fireman & oiler

GROUP 4: Oiler on crawler backhoe

GROUP 5: Bulldozer, skid steer loaders, bobcats, tractor, grader, scraper, combination loader backhoe, roller, front end loader (less than 3 yds.), street and mobile powered sweeper (3 yds. capacity), 8-ft. sweeper (minimum 65 hp)

GROUP 6: Well point installation crew

GROUP 7: Heater, concrete mixer, stone crusher, welding machine, generator for light plant, gas and electric driven pump & air compressor

IRON0037-001 09/16/2017

	Rates	Fringes
IRONWORKER.....	\$ 34.89	26.87

LABO0271-001 06/05/2016

BUILDING CONSTRUCTION

	Rates	Fringes
LABORER		
GROUP 1.....	\$ 29.20	23.80
GROUP 2.....	\$ 29.45	23.80
GROUP 3.....	\$ 29.95	23.80
GROUP 4.....	\$ 30.20	23.80
GROUP 5.....	\$ 31.20	23.80

LABORERS CLASSIFICATIONS

GROUP 1: Laborer, Carpenter Tender, Mason Tender, Cement Finisher Tender, Scaffold Erector, Wrecking Laborer, Asbestos Removal [Non-Mechanical Systems]

GROUP 2: Asphalt Raker, Adzemen, Pipe Trench Bracer, Demolition Burner, Chain Saw Operator, Fence & Guard Rail Erector, Setter of Metal Forms for Roadways, Mortar Mixer, Pipelayer, Riprap & Dry Stonewall Builder, Highway Stone Spreader, Pneumatic Tool Operator, Wagon Drill Operator, Tree Trimmer, Barco-Type Jumping Tamper, Mechanical Grinder Operator

GROUP 3: Pre-Cast Floor & Roof Plank Erectors

GROUP 4: Air Track Operator, Hydraulic & Similar Self-Powered Drill, Block Paver, Rammer, Curb Setter, Powderman & Blaster

GROUP 5: Toxic Waste Remover

LAB00271-002 06/05/2016

HEAVY AND HIGHWAY CONSTRUCTION

	Rates	Fringes
LABORER		
COMPRESSED AIR		
Group 1.....	\$ 46.63	21.80
Group 2.....	\$ 36.15	21.80
Group 3.....	\$ 48.63	21.80
FREE AIR		
Group 1.....	\$ 38.70	21.80
Group 2.....	\$ 36.15	21.80
Group 3.....	\$ 40.70	21.80
LABORER		
Group 1.....	\$ 29.20	21.80
Group 2.....	\$ 29.45	21.80
Group 3.....	\$ 30.20	21.80
Group 4.....	\$ 22.70	21.80
Group 5.....	\$ 31.20	21.80
OPEN AIR CAISSON, UNDERPINNING WORK AND BORING CREW		
Bottom Man.....	\$ 35.20	21.80
Top Man & Laborer.....	\$ 34.25	21.80
TEST BORING		
Driller.....	\$ 35.65	21.80
Laborer.....	\$ 34.25	21.80

LABORER CLASSIFICATIONS

GROUP 1: Laborer; Carpenter tender; Cement finisher tender; Wrecking laborer; Asbestos removers [non-mechanical systems]; Plant laborer; Driller in quarries

GROUP 2: Adzeperson; Asphalt raker; Barcotype jumping tamper; Chain saw operators; Concrete and power buggy operator; Concrete saw operator; Demolition burner; Fence and guard rail erector; Highway stone spreader; Laser beam operator; Mechanical grinder operator; Mason tender; Mortar mixer; Pneumatic tool operator; Riprap and dry stonewall

builder; Scaffold erector; Setter of metal forms for roadways; Wagon drill operator; Wood chipper operator; Pipelayer; Pipe trench bracer

GROUP 3: Air track drill operator; Hydraulic and similar powered drills; Brick paver; Block paver; Rammer and curb setter; Powderperson and blaster

GROUP 4: Flagger & signaler

GROUP 5: Toxic waste remover

LABORER - COMPRESSED AIR CLASSIFICATIONS

GROUP 1: Mucking machine operator, tunnel laborer, brake person, track person, miner, grout person, lock tender, gauge tender, miner: motor person & all others in compressed air

GROUP 2: Change house attendant, powder watchperson, top person on iron

GROUP 3: Hazardous waste work within the "HOT" zone

LABORER - FREE AIR CLASSIFICATIONS

GROUP 1: Grout person - pumps, brake person, track person, form mover & stripper (wood & steel), shaft laborer, laborer topside, outside motorperson, miner, conveyor operator, miner welder, heading motorperson, erecting operator, mucking machine operator, nozzle person, rodperson, safety miner, shaft & tunnel, steel & rodperson, mole nipper, concrete worker, form erector (wood, steel and all accessories), cement finisher (this type of work only), top signal person, bottom person (when heading is 50' from shaft), burner, shield operator and TBM operator

GROUP 2: Change house attendant, powder watchperson

GROUP 3: Hazardous waste work within the "HOT" zone

PAIN0011-005 06/01/2017

	Rates	Fringes
PAINTER		
Brush and Roller.....	\$ 32.72	20.45
Epoxy, Tanks, Towers, Swing Stage & Structural Steel.....	\$ 34.72	20.45
Spray, Sand & Water Blasting.....	\$ 35.72	20.45
Taper.....	\$ 33.47	20.45
Wall Coverer.....	\$ 33.22	20.45

PAIN0011-006 06/01/2017

	Rates	Fringes
GLAZIER.....	\$ 36.28	20.45

FOOTNOTES:

SWING STAGE: \$1.00 per hour additional.

PAID HOLIDAYS: Labor Day & Christmas Day.

PAIN0011-011 06/01/2017

	Rates	Fringes
Painter (Bridge Work).....	\$ 48.55	20.45

PAIN0035-008 06/01/2011

	Rates	Fringes
Sign Painter.....	\$ 24.79	13.72

PLAS0040-001 06/06/2017

BUILDING CONSTRUCTION

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER...	\$ 33.55	26.80

FOOTNOTE: Cement Mason: Work on free swinging scaffolds under 3 planks width and which is 20 or more feet above ground and any offset structure: \$.30 per hour additional.

PLAS0040-002 07/23/2017

HEAVY AND HIGHWAY CONSTRUCTION

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER...	\$ 30.40	21.75

PLAS0040-003 07/03/2017

	Rates	Fringes
PLASTERER.....	\$ 34.15	27.05

PLUM0051-002 09/01/2017

	Rates	Fringes
Plumbers and Pipefitters.....	\$ 40.69	28.80

ROOF0033-004 06/01/2017

	Rates	Fringes
ROOFER.....	\$ 34.85	23.52

SFRI0669-001 04/01/2017

	Rates	Fringes
SPRINKLER FITTER.....	\$ 43.92	21.49

SHEE0017-002 06/01/2017

	Rates	Fringes
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Sheet Metal Worker.....\$ 35.42 34.09

TEAM0251-001 05/01/2017

HEAVY AND HIGHWAY CONSTRUCTION

	Rates	Fringes
TRUCK DRIVER		
GROUP 1.....	\$ 26.96	23.6325+A+B+C
GROUP 2.....	\$ 27.11	23.6325+A+B+C
GROUP 3.....	\$ 27.16	23.6325+A+B+C
GROUP 4.....	\$ 27.21	23.6325+A+B+C
GROUP 5.....	\$ 27.31	23.6325+A+B+C
GROUP 6.....	\$ 27.71	23.6325+A+B+C
GROUP 7.....	\$ 27.91	23.6325+A+B+C
GROUP 8.....	\$ 27.41	23.6325+A+B+C
GROUP 9.....	\$ 27.66	23.6325+A+B+C
GROUP 10.....	\$ 27.46	23.6325+A+B+C

FOOTNOTES:

A. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day, plus Presidents' Day, Columbus Day, Veteran's Day & V-J Day, providing the employee has worked at least one day in the calendar week in which the holiday falls.

B. Employee who has been on the payroll for 1 year or more but less than 5 years and has worked 150 Days during the last year of employment shall receive 1 week's paid vacation; 5 to 10 years - 2 weeks' paid vacation; 10 or more years - 3 week's paid vacation.

C. Employees on the seniority list shall be paid a one hundred dollar (\$100.00) bonus for every four hundred (400) hours worked, up to a maximum of five hundred dollars (\$500.00)

All drivers working on a defined hazard material job site shall be paid a premium of \$2.00 per hour over applicable rate.

TRUCK DRIVER CLASSIFICATIONS

GROUP 1: Pick-up trucks, station wagons, & panel trucks

GROUP 2: Two-axle on low beds

GROUP 3: Two-axle dump truck

GROUP 4: Three-axle dump truck

GROUP 5: Four- and five-axle equipment

GROUP 6: Low-bed or boom trailer.

GROUP 7: Trailers when used on a double hook up (pulling 2 trailers)

GROUP 8: Special earth-moving equipment, under 35 tons

GROUP 9: Special earth-moving equipment, 35 tons or over

GROUP 10: Tractor trailer

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations

Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

SECTION 00800
SUPPLEMENTARY CONDITIONS
ATTACHMENTS

ATTACHMENT C

Federal Labor Standards Provisions

Applicability

The Project or Program to which the construction work covered by this contract pertains is being assisted by the United States of America and the following Federal Labor Standards Provisions are included in this Contract pursuant to the provisions applicable to such Federal assistance.

A. 1. (i) Minimum Wages. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period.

Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under 29 CFR 5.5(a)(1)(ii) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible, place where it can be easily seen by the workers.

(ii) (a) Any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. HUD shall approve an additional classification and wage rate and fringe benefits therefor only when the following criteria have been met:

- (1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and
 - (2) The classification is utilized in the area by the construction industry; and
 - (3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.
- (b) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and HUD or its designee agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by HUD or its designee to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB control number 1215-0140.)
- (c) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and HUD or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), HUD or its designee shall refer the questions, including the views of all interested parties and the recommendation of HUD or its designee, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)
- (d) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (1)(ii)(b) or (c) of this paragraph, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.
- (iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.
- (iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part

of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program. Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

2. Withholding. HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee or helper, employed or working on the site of the work, all or part of the wages required by the contract, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased. HUD or its designee may, after written notice to the contractor, disburse such amounts withheld for and on account of the contractor or subcontractor to the respective employees to whom they are due. The Comptroller General shall make such disbursements in the case of direct Davis-Bacon Act contracts.

3. (i) Payrolls and basic records. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in Section 1(b)(2)(B) of the Davis-bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5 (a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been

communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs. (Approved by the Office of Management and Budget under OMB Control Numbers 1215-0140 and 1215-0017.)

(ii) (a) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i) except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this subparagraph for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to HUD or its designee. (Approved by the Office of Management and Budget under OMB Control Number 1215-0149.)

(b) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be provided under 29 CFR 5.5 (a)(3)(ii), the appropriate information is being maintained under 29 CFR 5.5(a)(3)(i), and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR Part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(c) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by subparagraph A.3.(ii)(b).

(d) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under subparagraph A.3.(i) available for inspection, copying, or transcription by authorized representatives of HUD or its designee or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, HUD or its designee may, after written notice to the contractor, sponsor, applicant or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and Trainees.

(i) **Apprentices.** Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who

is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) **Trainees.** Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by

the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) **Equal employment opportunity.** The utilization of apprentices, trainees and journeymen under 29 CFR Part 5 shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR Part 3 which are incorporated by reference in this contract

6. Subcontracts. The contractor or subcontractor will insert in any subcontracts the clauses contained in subparagraphs 1 through 11 in this paragraph A and such other clauses as HUD or its designee may by appropriate instructions require, and a copy of the applicable prevailing wage decision, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in this paragraph.

7. Contract termination; debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act Requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and HUD or its designee, the U.S. Department of Labor, or the employees or their representatives.

10. (i) Certification of Eligibility. By entering into this contract the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be

awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001. Additionally, U.S. Criminal Code, Section 1010, Title 18, U.S.C., "Federal Housing Administration transactions", provides in part: "Whoever, for the purpose of . . . influencing in any way the action of such Administration . . . makes, utters or publishes any statement knowing the same to be false . . . shall be fined not more than \$5,000 or imprisoned not more than two years, or both."

11. Complaints, Proceedings, or Testimony by Employees. No laborer or mechanic to whom the wage, salary, or other labor standards provisions of this Contract are applicable shall be discharged or in any other manner discriminated against by the Contractor or any subcontractor because such employee has filed any complaint or instituted or caused to be instituted any proceeding or has testified or is about to testify in any proceeding under or relating to the labor standards applicable under this Contract to his employer.

B. Contract Work Hours and Safety Standards Act. The provisions of this paragraph B are applicable where the amount of the prime contract exceeds \$100,000. As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.

(1) **Overtime requirements.** No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which the individual is employed on such work to work in excess of 40 hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.

(2) **Violation; liability for unpaid wages; liquidated damages.** In the event of any violation of the clause set forth in subparagraph (1) of this paragraph, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in subparagraph (1) of this paragraph, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by the clause set forth in subparagraph (1) of this paragraph.

(3) Withholding for unpaid wages and liquidated damages. HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contract, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act which is held by the same prime contractor such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in subparagraph (2) of this paragraph.

(4) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in subparagraph (1) through (4) of this paragraph and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in subparagraphs (1) through (4) of this paragraph.

C. Health and Safety. The provisions of this paragraph C are applicable where the amount of the prime contract exceeds \$100,000.

(1) No laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his health and safety as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation.

(2) The Contractor shall comply with all regulations issued by the Secretary of Labor pursuant to Title 29 Part 1926 and failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act, (Public Law 91-54, 83 Stat 96). 40 USC 3701 et seq.

(3) The contractor shall include the provisions of this paragraph in every subcontract so that such provisions will be binding on each subcontractor. The contractor shall take such action with respect to any subcontractor as the Secretary of Housing and Urban Development or the Secretary of Labor shall direct as a means of enforcing such provisions.

CERTIFICATION OF BIDDER

FEDERAL LABOR STANDARDS PROVISIONS- DAVIS BACON ACT AND "RELATED ACTS"

This certification is required to insure that the Bidder understands that the Project or Program to which the construction work covered by any construction greater than \$2,000, is being assigned by the United States of America and that the various Federal Labor Standards Provisions, summarized in the form HUD-4010, "Federal Labor Standards Provisions" are included in any such contract, pursuant to the provisions applicable to such Federal assistance.

The Bidder certifies receipt of form HUD-4010, "Federal Labor Standards Provisions", must be included and attached to each and every construction bid document and/or construction contract greater than \$2,000, that is subject to the Davis-Bacon Act and "Related Acts."

Wage Determination – The Wage Determination applicable to this project is:

Determination Number:

Modification Number:

Date:

A hard copy of this Determination must be included within these bid specifications.

Wage Determination Posting – Contractors and sub-contractors shall post the prevailing wage rates for each craft and classification in a prominent and easily accessible place at the site of the work, or at such places as are used by them to pay workers.

The undersigned is required to ensure that all specifications and/or contracts include all applicable Federal wage rate determinations and the required labor standards provisions summarized by form HUD-4010, "Federal Labor Standards Provisions."

Weekly Certified Payrolls – It is the responsibility of each contractor and sub-contractor to submit weekly certified payrolls for project work (<http://www.dol.gov/whd/forms/wh347.pdf>). It is the responsibility of the undersigned (prime contractor) to review payrolls submitted by subcontractors to ensure that there are no discrepancies or underpayments.

CERTIFICATION BY BIDDER

Name and Address of Bidder (Include ZIP Code):

Name and Title of Signer (Please print or type below:)

Signature

Date

EMPLOYEE RIGHTS UNDER THE DAVIS-BACON ACT

FOR LABORERS AND MECHANICS EMPLOYED ON FEDERAL OR FEDERALLY ASSISTED CONSTRUCTION PROJECTS

THE UNITED STATES DEPARTMENT OF LABOR WAGE AND HOUR DIVISION

PREVAILING WAGES

You must be paid not less than the wage rate listed in the Davis-Bacon Wage Decision posted with this Notice for the work you perform.

OVERTIME

You must be paid not less than one and one-half times your basic rate of pay for all hours worked over 40 in a work week. There are few exceptions.

ENFORCEMENT

Contract payments can be withheld to ensure workers receive wages and overtime pay due, and liquidated damages may apply if overtime pay requirements are not met. Davis-Bacon contract clauses allow contract termination and debarment of contractors from future federal contracts for up to three years. A contractor who falsifies certified payroll records or induces wage kickbacks may be subject to civil or criminal prosecution, fines and/or imprisonment.

APPRENTICES

Apprentice rates apply only to apprentices properly registered under approved Federal or State apprenticeship programs.

PROPER PAY

If you do not receive proper pay, or require further information on the applicable wages, contact the Contracting Officer listed below:

or contact the U.S. Department of Labor's Wage and Hour Division.



For additional information:

1-866-4-USWAGE
(1-866-487-9243) TTY: 1-877-889-5627



WWW.WAGEHOUR.DOL.GOV



U.S. Wage and Hour Division
Rev. Dec. 2008

PAYROLL

(For Contractor's Optional Use; See Instructions at www.dol.gov/whd/forms/wh347instr.htm)

U.S. Department of Labor
Wage and Hour Division

Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number.

OMB No.: 1235-0008
Expires: 02/28/2018

NAME OF CONTRACTOR OR SUBCONTRACTOR ADDRESS

PAYROLL NO.	PROJECT AND LOCATION	PROJECT OR CONTRACT NO.
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(1) NAME AND INDIVIDUAL IDENTIFYING NUMBER (e.g., LAST FOUR DIGITS OF SOCIAL SECURITY NUMBER) OF WORKER	(2) NO OF EXEMPTIONS	(3) WORK CLASSIFICATION	(4) DAY AND DATE		(5) TOTAL HOURS	(6) RATE OF PAY	(7) GROSS AMOUNT EARNED	(8) DEDUCTIONS				(9) NET WAGES PAID FOR WEEK	
			HOURS WORKED EACH DAY					FICA	WITH- HOLDING TAX	OTHER	TOTAL DEDUCTIONS		
			OT OR ST.										

While completion of Form WH-347 is optional, it is mandatory for covered contractors and subcontractors performing work on Federally financed or assisted construction contracts to respond to the information collection contained in 29 C.F.R. §§ 3.3, 5.5(e). The Copeland Act (40 U.S.C. § 3145) contractors and subcontractors performing work on Federally financed or assisted construction contracts to "furnish weekly a statement with respect to the wages paid each employee during the preceding week." U.S. Department of Labor (DOL) regulations at 29 C.F.R. § 5.5(a)(3)(ii) require contractors to submit weekly a copy of all payrolls to the Federal agency contracting for or financing the construction project, accompanied by a signed "Statement of Compliance" indicating that the payrolls are correct and complete and that each laborer or mechanic has been paid not less than the proper Davis-Bacon prevailing wage rate for the work performed. DOL and federal contracting agencies receiving this information review the information to determine if employees have received legally required wages and fringe benefits.

Public Burden Statement

We estimate that it will take an average of 55 minutes to complete this collection, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. If you have any comments regarding these estimates or any other aspect of this collection, including suggestions for reducing this burden, send them to the Administrator, Wage and Hour Division, U.S. Department of Labor, Room S3502, 200 Constitution Avenue, N.W., Washington, D.C. 20210

Date _____

I, _____ (Name of Signatory Party) _____ (Title)

do hereby state:

(1) That I pay or supervise the payment of the persons employed by _____ (Contractor or Subcontractor) on the _____ (Building or Work); that during the payroll period commencing on the _____ day of _____, and ending the _____ day of _____ all persons employed on said project have been paid the full weekly wages earned, that no rebates have been or will be made either directly or indirectly to or on behalf of said _____ (Contractor or Subcontractor) from the full

weekly wages earned by any person and that no deductions have been made either directly or indirectly from the full wages earned by any person, other than permissible deductions as defined in Regulations, Part 3 (29 C.F.R. Subtitle A), issued by the Secretary of Labor under the Copeland Act, as amended (48 Stat. 948, 63 Stat. 108, 72 Stat. 967; 76 Stat. 357; 40 U.S.C. § 3145), and described below:

(2) That any payrolls otherwise under this contract required to be submitted for the above period are correct and complete; that the wage rates for laborers or mechanics contained therein are not less than the applicable wage rates contained in any wage determination incorporated into the contract; that the classifications set forth therein for each laborer or mechanic conform with the work he performed.

(3) That any apprentices employed in the above period are duly registered in a bona fide apprenticeship program registered with a State apprenticeship agency recognized by the Bureau of Apprenticeship and Training, United States Department of Labor, or if no such recognized agency exists in a State, are registered with the Bureau of Apprenticeship and Training, United States Department of Labor.

(4) That: (a) WHERE FRINGE BENEFITS ARE PAID TO APPROVED PLANS, FUNDS, OR PROGRAMS

- in addition to the basic hourly wage rates paid to each laborer or mechanic listed in the above referenced payroll, payments of fringe benefits as listed in the contract have been or will be made to appropriate programs for the benefit of such employees, except as noted in section 4(c) below.

(b) WHERE FRINGE BENEFITS ARE PAID IN CASH

- Each laborer or mechanic listed in the above referenced payroll has been paid, as indicated on the payroll, an amount not less than the sum of the applicable basic hourly wage rate plus the amount of the required fringe benefits as listed in the contract, except as noted in section 4(c) below.

(c) EXCEPTIONS

EXCEPTION (CRAFT)	EXPLANATION

REMARKS:

NAME AND TITLE	SIGNATURE

THE WILLFUL FALSIFICATION OF ANY OF THE ABOVE STATEMENTS MAY SUBJECT THE CONTRACTOR OR SUBCONTRACTOR TO CIVIL OR CRIMINAL PROSECUTION. SEE SECTION 1001 OF TITLE 18 AND SECTION 231 OF TITLE 31 OF THE UNITED STATES CODE.

SECTION 00800
SUPPLEMENTARY CONDITIONS
ATTACHMENTS

ATTACHMENT D

Federal Regulations for HUD Funded Assisted Projects

FEDERAL REGULATIONS

Certification Regarding Debarment and Suspension

U.S. Department of Housing
and Urban Development

Certification A: Certification Regarding Debarment, Suspension, and Other Responsibility Matters - Primary Covered Transactions

1. The prospective primary participant certifies to the best of its knowledge and belief that its principals;

a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal debarment or agency;

b. Have not within a three-year period preceding this proposal, been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification, or destruction of records, making false statements, or receiving stolen property;

c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph (1)(b) of this certification; and

d. Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State, or local) terminated for cause or default.

2. Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

Instructions for Certification (A)

1. By signing and submitting this proposal, the prospective primary participant is providing the certification set out below.

2. The inability of a person to provide the certification required below will not necessarily result in denial of participation in this covered transaction. The prospective participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective primary participant to furnish a certification or an explanation shall disqualify such person from participation in this transaction.

3. The certification in this clause is a material representation of fact upon which reliance was placed when the department or agency determined to enter into this transaction. If it is later determined that the prospective primary participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause of default.

4. The prospective primary participant shall provide immediate written notice to the department or agency to whom this proposal is submitted if at any time the prospective primary participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

5. The terms **covered transaction, debarred, suspended, ineligible, lower tier covered transaction, participant, person, primary covered transaction, principal, proposal, and voluntarily excluded**, as used in this clause, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549. You may contact the department or agency to which this proposal is being submitted for assistance in obtaining a copy of these regulations.

6. The prospective primary participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

7. The prospective primary participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transaction," provided by the department or agency entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

8. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines this eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.

9. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

10. Except for transactions authorized under paragraph (6) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause of default.

Certification B: Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.
2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

Instructions for Certification (B)

1. By signing and submitting this proposal, the prospective lower tier participant is providing the certification set out below.
2. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.
3. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
4. The terms covered transaction, debarred, suspended, ineligible, lower tier covered transaction, participant, person, primary covered transaction, principal, proposal, and voluntarily excluded, as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of these regulations.

5. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.
6. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.
7. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.
8. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
9. Except for transactions authorized under paragraph (5) of these instructions, if a participant in a lower covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies including suspension and/or debarment.

Applicant		Date
Signature of Authorized Certifying Official		Title

Title 37: Patents, Trademarks, and Copyrights
PART 401—RIGHTS TO INVENTIONS MADE BY NONPROFIT ORGANIZATIONS AND SMALL BUSINESS FIRMS
UNDER GOVERNMENT GRANTS, CONTRACTS, AND COOPERATIVE AGREEMENTS

§401.14 Standard patent rights clauses.

(a) The following is the standard patent rights clause to be used as specified in §401.3(a).

Patent Rights (Small Business Firms and Nonprofit Organizations)

(a) Definitions

(1) *Invention* means any invention or discovery which is or may be patentable or otherwise protectable under Title 35 of the United States Code, or any novel variety of plant which is or may be protected under the Plant Variety Protection Act (7 U.S.C. 2321 *et seq.*).

(2) *Subject invention* means any invention of the *contractor* conceived or first actually reduced to practice in the performance of work under this *contract*, provided that in the case of a variety of plant, the date of determination (as defined in section 41(d) of the Plant Variety Protection Act, 7 U.S.C. 2401(d)) must also occur during the period of *contract* performance.

(3) *Practical Application* means to manufacture in the case of a composition or product, to practice in the case of a process or method, or to operate in the case of a machine or system; and, in each case, under such conditions as to establish that the invention is being utilized and that its benefits are, to the extent permitted by law or government regulations, available to the public on reasonable terms.

(4) *Made* when used in relation to any invention means the conception or first actual reduction to practice of such invention.

(5) *Small Business Firm* means a small business concern as defined at section 2 of Pub. L. 85-536 (15 U.S.C. 632) and implementing regulations of the Administrator of the Small Business Administration. For the purpose of this clause, the size standards for small business concerns involved in government procurement and subcontracting at 13 CFR 121.3-8 and 13 CFR 121.3-12, respectively, will be used.

(6) *Nonprofit Organization* means a university or other institution of higher education or an organization of the type described in section 501(c)(3) of the Internal Revenue Code of 1954 (26 U.S.C. 501(c)) and exempt from taxation under section 501(a) of the Internal Revenue Code (25 U.S.C. 501(a)) or any nonprofit scientific or educational organization qualified under a state nonprofit organization statute.

(b) Allocation of Principal Rights

The *Contractor* may retain the entire right, title, and interest throughout the world to each subject invention subject to the provisions of this clause and 35 U.S.C. 203. With respect to any subject invention in which the *Contractor* retains title, the Federal government shall have a nonexclusive, nontransferable, irrevocable, paid-up license to practice or have practiced for or on behalf of the United States the subject invention throughout the world.

(c) Invention Disclosure, Election of Title and Filing of Patent Application by *Contractor*

(1) The *contractor* will disclose each subject invention to the *Federal Agency* within two months after the inventor discloses it in writing to *contractor* personnel responsible for patent matters. The disclosure to the agency shall be in the form of a written report and shall identify the *contract* under which the invention was made and the inventor(s). It shall be sufficiently complete in technical detail to convey a clear understanding to the extent known at the time of the disclosure, of the nature, purpose, operation, and the physical, chemical, biological or electrical characteristics of the invention. The disclosure shall also identify any publication, on sale or public use of the

invention and whether a manuscript describing the invention has been submitted for publication and, if so, whether it has been accepted for publication at the time of disclosure. In addition, after disclosure to the *agency*, the *Contractor* will promptly notify the *agency* of the acceptance of any manuscript describing the invention for publication or of any on sale or public use planned by the *contractor*.

(2) The *Contractor* will elect in writing whether or not to retain title to any such invention by notifying the *Federal agency* within two years of disclosure to the *Federal agency*. However, in any case where publication, on sale or public use has initiated the one year statutory period wherein valid patent protection can still be obtained in the United States, the period for election of title may be shortened by the *agency* to a date that is no more than 60 days prior to the end of the statutory period.

(3) The *contractor* will file its initial patent application on a subject invention to which it elects to retain title within one year after election of title or, if earlier, prior to the end of any statutory period wherein valid patent protection can be obtained in the United States after a publication, on sale, or public use. The *contractor* will file patent applications in additional countries or international patent offices within either ten months of the corresponding initial patent application or six months from the date permission is granted by the Commissioner of Patents and Trademarks to file foreign patent applications where such filing has been prohibited by a Secrecy Order.

(4) Requests for extension of the time for disclosure, election, and filing under subparagraphs (1), (2), and (3) may, at the discretion of the *agency*, be granted.

(d) Conditions When the Government May Obtain Title

The *contractor* will convey to the *Federal agency*, upon written request, title to any subject invention—

(1) If the *contractor* fails to disclose or elect title to the subject invention within the times specified in (c), above, or elects not to retain title; provided that the *agency* may only request title within 60 days after learning of the failure of the *contractor* to disclose or elect within the specified times.

(2) In those countries in which the *contractor* fails to file patent applications within the times specified in (c) above; provided, however, that if the *contractor* has filed a patent application in a country after the times specified in (c) above, but prior to its receipt of the written request of the *Federal agency*, the *contractor* shall continue to retain title in that country.

(3) In any country in which the *contractor* decides not to continue the prosecution of any application for, to pay the maintenance fees on, or defend in reexamination or opposition proceeding on, a patent on a subject invention.

(e) Minimum Rights to *Contractor* and Protection of the *Contractor* Right to File

(1) The *contractor* will retain a nonexclusive royalty-free license throughout the world in each subject invention to which the Government obtains title, except if the *contractor* fails to disclose the invention within the times specified in (c), above. The *contractor's* license extends to its domestic subsidiary and affiliates, if any, within the corporate structure of which the *contractor* is a party and includes the right to grant sublicenses of the same scope to the extent the *contractor* was legally obligated to do so at the time the *contract* was awarded. The license is transferable only with the approval of the *Federal agency* except when transferred to the successor of that party of the *contractor's* business to which the invention pertains.

(2) The *contractor's* domestic license may be revoked or modified by the *funding Federal agency* to the extent necessary to achieve expeditious practical application of the subject invention pursuant to an application for an exclusive license submitted in accordance with applicable provisions at 37 CFR part 404 and *agency* licensing regulations (if any). This license will not be revoked in that field of use or the geographical areas in which the *contractor* has achieved practical application and continues to make the benefits of the invention reasonably accessible to the public. The license in any foreign country may be revoked or modified at the discretion of the *funding Federal agency* to the extent the *contractor*, its licensees, or the domestic subsidiaries or affiliates have failed to achieve practical application in that foreign country.

(3) Before revocation or modification of the license, the *funding Federal agency* will furnish the *contractor* a written notice of its intention to revoke or modify the license, and the *contractor* will be allowed thirty days (or such

other time as may be authorized by the *funding Federal agency* for good cause shown by the *contractor* after the notice to show cause why the license should not be revoked or modified. The *contractor* has the right to appeal, in accordance with applicable regulations in 37 CFR part 404 and *agency* regulations (if any) concerning the licensing of Government-owned inventions, any decision concerning the revocation or modification of the license.

(f) *Contractor* Action to Protect the Government's Interest

(1) The *contractor* agrees to execute or to have executed and promptly deliver to the *Federal agency* all instruments necessary to (i) establish or confirm the rights the Government has throughout the world in those subject inventions to which the *contractor* elects to retain title, and (ii) convey title to the *Federal agency* when requested under paragraph (d) above and to enable the government to obtain patent protection throughout the world in that subject invention.

(2) The *contractor* agrees to require, by written agreement, its employees, other than clerical and nontechnical employees, to disclose promptly in writing to personnel identified as responsible for the administration of patent matters and in a format suggested by the *contractor* each subject invention made under *contract* in order that the *contractor* can comply with the disclosure provisions of paragraph (c), above, and to execute all papers necessary to file patent applications on subject inventions and to establish the government's rights in the subject inventions. This disclosure format should require, as a minimum, the information required by (c)(1), above. The *contractor* shall instruct such employees through employee agreements or other suitable educational programs on the importance of reporting inventions in sufficient time to permit the filing of patent applications prior to U.S. or foreign statutory bars.

(3) The *contractor* will notify the *Federal agency* of any decisions not to continue the prosecution of a patent application, pay maintenance fees, or defend in a reexamination or opposition proceeding on a patent, in any country, not less than thirty days before the expiration of the response period required by the relevant patent office.

(4) The *contractor* agrees to include, within the specification of any United States patent applications and any patent issuing thereon covering a subject invention, the following statement, "This invention was made with government support under (identify the *contract*) awarded by (identify the Federal agency). The government has certain rights in the invention."

(g) Subcontracts

(1) The *contractor* will include this clause, suitably modified to identify the parties, in all subcontracts, regardless of tier, for experimental, developmental or research work to be performed by a small business firm or domestic nonprofit organization. The subcontractor will retain all rights provided for the *contractor* in this clause, and the *contractor* will not, as part of the consideration for awarding the subcontract, obtain rights in the subcontractor's subject inventions.

(2) The *contractor* will include in all other subcontracts, regardless of tier, for experimental developmental or research work the patent rights clause required by (*cite section of agency implementing regulations or FAR*).

(3) In the case of subcontracts, at any tier, when the prime award with the Federal agency was a contract (but not a grant or cooperative agreement), the *agency*, subcontractor, and the contractor agree that the mutual obligations of the parties created by this clause constitute a contract between the subcontractor and the Federal agency with respect to the matters covered by the clause; provided, however, that nothing in this paragraph is intended to confer any jurisdiction under the Contract Disputes Act in connection with proceedings under paragraph (j) of this clause.

(h) Reporting on Utilization of Subject Inventions

The *Contractor* agrees to submit on request periodic reports no more frequently than annually on the utilization of a subject invention or on efforts at obtaining such utilization that are being made by the *contractor* or its licensees or assignees. Such reports shall include information regarding the status of development, date of first commercial sale or use, gross royalties received by the contractor, and such other data and information as the *agency* may reasonably specify. The *contractor* also agrees to provide additional reports as may be requested by the *agency* in connection with any march-in proceeding undertaken by the *agency* in accordance with paragraph (j) of this clause.

As required by 35 U.S.C. 202(c)(5), the *agency* agrees it will not disclose such information to persons outside the government without permission of the *contractor*.

(i) Preference for United States Industry

Notwithstanding any other provision of this clause, the *contractor* agrees that neither it nor any assignee will grant to any person the exclusive right to use or sell any subject inventions in the United States unless such person agrees that any products embodying the subject invention or produced through the use of the subject invention will be manufactured substantially in the United States. However, in individual cases, the requirement for such an agreement may be waived by the *Federal agency* upon a showing by the *contractor* or its assignee that reasonable but unsuccessful efforts have been made to grant licenses on similar terms to potential licensees that would be likely to manufacture substantially in the United States or that under the circumstances domestic manufacture is not commercially feasible.

(j) March-in Rights

The *contractor* agrees that with respect to any subject invention in which it has acquired title, the *Federal agency* has the right in accordance with the procedures in 37 CFR 401.6 and any supplemental regulations of the *agency* to require the *contractor*, an assignee or exclusive licensee of a subject invention to grant a nonexclusive, partially exclusive, or exclusive license in any field of use to a responsible applicant or applicants, upon terms that are reasonable under the circumstances, and if the *contractor*, assignee, or exclusive licensee refuses such a request the *Federal agency* has the right to grant such a license itself if the *Federal agency* determines that:

(1) Such action is necessary because the *contractor* or assignee has not taken, or is not expected to take within a reasonable time, effective steps to achieve practical application of the subject invention in such field of use.

(2) Such action is necessary to alleviate health or safety needs which are not reasonably satisfied by the *contractor*, assignee or their licensees;

(3) Such action is necessary to meet requirements for public use specified by Federal regulations and such requirements are not reasonably satisfied by the *contractor*, assignee or licensees; or

(4) Such action is necessary because the agreement required by paragraph (i) of this clause has not been obtained or waived or because a licensee of the exclusive right to use or sell any subject invention in the United States is in breach of such agreement.

(k) Special Provisions for *Contracts* with Nonprofit Organizations

If the *contractor* is a nonprofit organization, it agrees that:

(1) Rights to a subject invention in the United States may not be assigned without the approval of the *Federal agency*, except where such assignment is made to an organization which has as one of its primary functions the management of inventions, provided that such assignee will be subject to the same provisions as the *contractor*;

(2) The *contractor* will share royalties collected on a subject invention with the inventor, including Federal employee co-inventors (when the agency deems it appropriate) when the subject invention is assigned in accordance with 35 U.S.C. 202(e) and 37 CFR 401.10;

(3) The balance of any royalties or income earned by the *contractor* with respect to subject inventions, after payment of expenses (including payments to inventors) incidental to the administration of subject inventions, will be utilized for the support of scientific research or education; and

(4) It will make efforts that are reasonable under the circumstances to attract licensees of subject invention that are small business firms and that it will give a preference to a small business firm when licensing a subject invention if the *contractor* determines that the small business firm has a plan or proposal for marketing the invention which, if executed, is equally as likely to bring the invention to practical application as any plans or proposals from applicants that are not small business firms; provided, that the *contractor* is also satisfied that the small business firm has the

capability and resources to carry out its plan or proposal. The decision whether to give a preference in any specific case will be at the discretion of the *contractor*. However, the *contractor* agrees that the Secretary may review the *contractor's* licensing program and decisions regarding small business applicants, and the *contractor* will negotiate changes to its licensing policies, procedures, or practices with the Secretary when the Secretary's review discloses that the *contractor* could take reasonable steps to implement more effectively the requirements of this paragraph (k)(4).

(l) Communication

(Complete According to Instructions at 401.5(b))

(b) When the Department of Energy (DOE) determines to use alternative provisions under §401.3(a)(4), the standard clause at §401.14(a), of this section, shall be used with the following modifications unless a substitute clause is drafted by DOE:

(1) The title of the clause shall be changed to read as follows: *Patent Rights to Nonprofit DOE Facility Operators*

(2) Add an "(A)" after "(1)" in paragraph (c)(1) and add subparagraphs (B) and (C) to paragraph (c)(1) as follows:

(B) If the subject invention occurred under activities funded by the naval nuclear propulsion or weapons related programs of DOE, then the provisions of this subparagraph (c)(1)(B) will apply in lieu of paragraphs (c)(2) and (3). In such cases the contractor agrees to assign the government the entire right, title, and interest thereto throughout the world in and to the subject invention except to the extent that rights are retained by the contractor through a greater rights determination or under paragraph (e), below. The contractor, or an employee-inventor, with authorization of the contractor, may submit a request for greater rights at the time the invention is disclosed or within a reasonable time thereafter. DOE will process such a request in accordance with procedures at 37 CFR 401.15. Each determination of greater rights will be subject to paragraphs (h)-(k) of this clause and such additional conditions, if any, deemed to be appropriate by the *Department of Energy*.

(C) At the time an invention is disclosed in accordance with (c)(1)(A) above, or within 90 days thereafter, the contractor will submit a written statement as to whether or not the invention occurred under a naval nuclear propulsion or weapons-related program of the *Department of Energy*. If this statement is not filed within this time, subparagraph (c)(1)(B) will apply in lieu of paragraphs (c)(2) and (3). The contractor statement will be deemed conclusive unless, within 60 days thereafter, the Contracting Officer disagrees in writing, in which case the determination of the Contracting Officer will be deemed conclusive unless the contractor files a claim under the Contract Disputes Act within 60 days after the Contracting Officer's determination. Pending resolution of the matter, the invention will be subject to subparagraph (c)(1)(B).

(3) Paragraph (k)(3) of the clause will be modified as prescribed at §401.5(g).

(c) As prescribed in §401.3, replace (b) of the basic clause with the following paragraphs (1) and (2):

(b) Allocation of principal rights. (1) The Contractor may retain the entire right, title, and interest throughout the world to each subject invention subject to the provisions of this clause, including (2) below, and 35 U.S.C. 203. With respect to any subject invention in which the Contractor retains title, the Federal Government shall have a nonexclusive, nontransferable, irrevocable, paid-up license to practice or have practiced for or on behalf of the United States the subject invention throughout the world.

(2) If the Contractor performs services at a Government owned and operated laboratory or at a Government owned and contractor operated laboratory directed by the Government to fulfill the Government's obligations under a Cooperative Research and Development Agreement (CRADA) authorized by 15 U.S.C. 3710a, the Government may require the Contractor to negotiate an agreement with the CRADA collaborating party or parties regarding the allocation of rights to any subject invention the Contractor makes, solely or jointly, under the CRADA. The agreement shall be negotiated prior to the Contractor undertaking the CRADA work or, with the permission of the Government, upon the identification of a subject invention. In the absence of such an agreement, the Contractor agrees to grant

the collaborating party or parties an option for a license in its inventions of the same scope and terms set forth in the CRADA for inventions made by the Government.

[52 FR 8554, Mar. 18, 1987, as amended at 69 FR 17301, Apr. 2, 2004]

Clean Water Requirements

33 U.S.C. 1251

Clean Water - (1) The Contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 *et seq* . The Contractor agrees to report each violation to the Purchaser and understands and agrees that the Purchaser will, in turn, report each violation as required to assure notification to OHCD/HUD and the appropriate EPA Regional Office.

(2) The Contractor also agrees to include these requirements in each subcontract exceeding \$100,000 financed in whole or in part with Federal assistance provided by the State.

CLEAN AIR

42 U.S.C. 7401 *et seq*

40 CFR 15.61

49 CFR Part 18

Clean Air - (1) The Contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act, as amended, 42 U.S.C. §§ 7401 *et seq*. The Contractor agrees to report each violation to the Purchaser and understands and agrees that the Purchaser will, in turn, report each violation as required to assure notification to OHCD/HUD and the appropriate EPA Regional Office.

(2) The Contractor also agrees to include these requirements in each subcontract exceeding \$100,000 financed in whole or in part with Federal assistance provided by OHCD/HUD.

Lobbying

31 U.S.C. 1352
49 CFR Part 19
49 CFR Part 20

APPENDIX A, 49 CFR PART 20—CERTIFICATION REGARDING LOBBYING

Certification for Contracts, Grants, Loans, and Cooperative Agreements

(To be submitted with each bid or offer exceeding \$100,000)

The undersigned [Contractor] certifies, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for making lobbying contacts to an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form—LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions [as amended by "Government wide Guidance for New Restrictions on Lobbying," 61 Fed. Reg. 1413 (1/19/96). Note: Language in paragraph (2) herein has been modified in accordance with Section 10 of the Lobbying Disclosure Act of 1995 (P.L. 104-65, to be codified at 2 U.S.C. 1601, *et seq.*.)]
3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31, U.S.C. § 1352 (as amended by the Lobbying Disclosure Act of 1995). Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

[Note: Pursuant to 31 U.S.C. § 1352(c)(1)-(2)(A), any person who makes a prohibited expenditure or fails to file or amend a required certification or disclosure form shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such expenditure or failure.]

The Contractor, _____, certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Contractor understands and agrees that the provisions of 31 U.S.C. A 3801, *et seq.*, apply to this certification and disclosure, if any.

_____ Signature of Contractor's Authorized Official

_____ Name and Title of Contractor's Authorized Official

_____ Date

Title 37: Patents, Trademarks, and Copyrights

PART 401—RIGHTS TO INVENTIONS MADE BY NONPROFIT ORGANIZATIONS AND SMALL BUSINESS FIRMS UNDER GOVERNMENT GRANTS, CONTRACTS, AND COOPERATIVE AGREEMENTS

§401.14 Standard patent rights clauses.

(a) The following is the standard patent rights clause to be used as specified in §401.3(a).

Patent Rights (Small Business Firms and Nonprofit Organizations)

(a) Definitions

(1) *Invention* means any invention or discovery which is or may be patentable or otherwise protectable under Title 35 of the United States Code, or any novel variety of plant which is or may be protected under the Plant Variety Protection Act (7 U.S.C. 2321 *et seq.*).

(2) *Subject invention* means any invention of the *contractor* conceived or first actually reduced to practice in the performance of work under this *contract*, provided that in the case of a variety of plant, the date of determination (as defined in section 41(d) of the Plant Variety Protection Act, 7 U.S.C. 2401(d)) must also occur during the period of *contract* performance.

(3) *Practical Application* means to manufacture in the case of a composition or product, to practice in the case of a process or method, or to operate in the case of a machine or system; and, in each case, under such conditions as to establish that the invention is being utilized and that its benefits are, to the extent permitted by law or government regulations, available to the public on reasonable terms.

(4) *Made* when used in relation to any invention means the conception or first actual reduction to practice of such invention.

(5) *Small Business Firm* means a small business concern as defined at section 2 of Pub. L. 85-536 (15 U.S.C. 632) and implementing regulations of the Administrator of the Small Business Administration. For the purpose of this clause, the size standards for small business concerns involved in government procurement and subcontracting at 13 CFR 121.3-8 and 13 CFR 121.3-12, respectively, will be used.

(6) *Nonprofit Organization* means a university or other institution of higher education or an organization of the type described in section 501(c)(3) of the Internal Revenue Code of 1954 (26 U.S.C. 501(c) and exempt from taxation under section 501(a) of the Internal Revenue Code (25 U.S.C. 501(a)) or any nonprofit scientific or educational organization qualified under a state nonprofit organization statute.

(b) Allocation of Principal Rights

The *Contractor* may retain the entire right, title, and interest throughout the world to each subject invention subject to the provisions of this clause and 35 U.S.C. 203. With respect to any subject invention in which the *Contractor* retains title, the Federal government shall have a nonexclusive, nontransferable, irrevocable, paid-up license to practice or have practiced for or on behalf of the United States the subject invention throughout the world.

(c) Invention Disclosure, Election of Title and Filing of Patent Application by *Contractor*

(1) The *contractor* will disclose each subject invention to the *Federal Agency* within two months after the inventor discloses it in writing to *contractor* personnel responsible for patent matters. The disclosure

to the agency shall be in the form of a written report and shall identify the *contract* under which the invention was made and the inventor(s). It shall be sufficiently complete in technical detail to convey a clear understanding to the extent known at the time of the disclosure, of the nature, purpose, operation, and the physical, chemical, biological or electrical characteristics of the invention. The disclosure shall also identify any publication, on sale or public use of the invention and whether a manuscript describing the invention has been submitted for publication and, if so, whether it has been accepted for publication at the time of disclosure. In addition, after disclosure to the *agency*, the *Contractor* will promptly notify the *agency* of the acceptance of any manuscript describing the invention for publication or of any on sale or public use planned by the *contractor*.

(2) The *Contractor* will elect in writing whether or not to retain title to any such invention by notifying the *Federal agency* within two years of disclosure to the *Federal agency*. However, in any case where publication, on sale or public use has initiated the one year statutory period wherein valid patent protection can still be obtained in the United States, the period for election of title may be shortened by the *agency* to a date that is no more than 60 days prior to the end of the statutory period.

(3) The *contractor* will file its initial patent application on a subject invention to which it elects to retain title within one year after election of title or, if earlier, prior to the end of any statutory period wherein valid patent protection can be obtained in the United States after a publication, on sale, or public use. The *contractor* will file patent applications in additional countries or international patent offices within either ten months of the corresponding initial patent application or six months from the date permission is granted by the Commissioner of Patents and Trademarks to file foreign patent applications where such filing has been prohibited by a Secrecy Order.

(4) Requests for extension of the time for disclosure, election, and filing under subparagraphs (1), (2), and (3) may, at the discretion of the *agency*, be granted.

(d) Conditions When the Government May Obtain Title

The *contractor* will convey to the *Federal agency*, upon written request, title to any subject invention—

(1) If the *contractor* fails to disclose or elect title to the subject invention within the times specified in (c), above, or elects not to retain title; provided that the *agency* may only request title within 60 days after learning of the failure of the *contractor* to disclose or elect within the specified times.

(2) In those countries in which the *contractor* fails to file patent applications within the times specified in (c) above; provided, however, that if the *contractor* has filed a patent application in a country after the times specified in (c) above, but prior to its receipt of the written request of the *Federal agency*, the *contractor* shall continue to retain title in that country.

(3) In any country in which the *contractor* decides not to continue the prosecution of any application for, to pay the maintenance fees on, or defend in reexamination or opposition proceeding on, a patent on a subject invention.

(e) Minimum Rights to *Contractor* and Protection of the *Contractor* Right to File

(1) The *contractor* will retain a nonexclusive royalty-free license throughout the world in each subject invention to which the Government obtains title, except if the *contractor* fails to disclose the invention within the times specified in (c), above. The *contractor's* license extends to its domestic subsidiary and

affiliates, if any, within the corporate structure of which the *contractor* is a party and includes the right to grant sublicenses of the same scope to the extent the *contractor* was legally obligated to do so at the time the *contract* was awarded. The license is transferable only with the approval of the *Federal agency* except when transferred to the successor of that party of the *contractor's* business to which the invention pertains.

(2) The *contractor's* domestic license may be revoked or modified by the *funding Federal agency* to the extent necessary to achieve expeditious practical application of the subject invention pursuant to an application for an exclusive license submitted in accordance with applicable provisions at 37 CFR part 404 and *agency* licensing regulations (if any). This license will not be revoked in that field of use or the geographical areas in which the *contractor* has achieved practical application and continues to make the benefits of the invention reasonably accessible to the public. The license in any foreign country may be revoked or modified at the discretion of the *funding Federal agency* to the extent the *contractor*, its licensees, or the domestic subsidiaries or affiliates have failed to achieve practical application in that foreign country.

(3) Before revocation or modification of the license, the *funding Federal agency* will furnish the *contractor* a written notice of its intention to revoke or modify the license, and the *contractor* will be allowed thirty days (or such other time as may be authorized by the *funding Federal agency* for good cause shown by the *contractor*) after the notice to show cause why the license should not be revoked or modified. The *contractor* has the right to appeal, in accordance with applicable regulations in 37 CFR part 404 and *agency* regulations (if any) concerning the licensing of Government-owned inventions, any decision concerning the revocation or modification of the license.

(f) *Contractor* Action to Protect the Government's Interest

(1) The *contractor* agrees to execute or to have executed and promptly deliver to the *Federal agency* all instruments necessary to (i) establish or confirm the rights the Government has throughout the world in those subject inventions to which the *contractor* elects to retain title, and (ii) convey title to the *Federal agency* when requested under paragraph (d) above and to enable the government to obtain patent protection throughout the world in that subject invention.

(2) The *contractor* agrees to require, by written agreement, its employees, other than clerical and nontechnical employees, to disclose promptly in writing to personnel identified as responsible for the administration of patent matters and in a format suggested by the *contractor* each subject invention made under *contract* in order that the *contractor* can comply with the disclosure provisions of paragraph (c), above, and to execute all papers necessary to file patent applications on subject inventions and to establish the government's rights in the subject inventions. This disclosure format should require, as a minimum, the information required by (c)(1), above. The *contractor* shall instruct such employees through employee agreements or other suitable educational programs on the importance of reporting inventions in sufficient time to permit the filing of patent applications prior to U.S. or foreign statutory bars.

(3) The *contractor* will notify the *Federal agency* of any decisions not to continue the prosecution of a patent application, pay maintenance fees, or defend in a reexamination or opposition proceeding on a patent, in any country, not less than thirty days before the expiration of the response period required by the relevant patent office.

(4) The *contractor* agrees to include, within the specification of any United States patent applications and any patent issuing thereon covering a subject invention, the following statement, "This invention was made with government support under (identify the *contract*) awarded by (identify the Federal agency). The government has certain rights in the invention."

(g) Subcontracts

(1) The *contractor* will include this clause, suitably modified to identify the parties, in all subcontracts, regardless of tier, for experimental, developmental or research work to be performed by a small business firm or domestic nonprofit organization. The subcontractor will retain all rights provided for the *contractor* in this clause, and the *contractor* will not, as part of the consideration for awarding the subcontract, obtain rights in the subcontractor's subject inventions.

(2) The *contractor* will include in all other subcontracts, regardless of tier, for experimental developmental or research work the patent rights clause required by (cite section of agency implementing regulations or FAR).

(3) In the case of subcontracts, at any tier, when the prime award with the Federal agency was a contract (but not a grant or cooperative agreement), the *agency*, subcontractor, and the contractor agree that the mutual obligations of the parties created by this clause constitute a contract between the subcontractor and the Federal agency with respect to the matters covered by the clause; provided, however, that nothing in this paragraph is intended to confer any jurisdiction under the Contract Disputes Act in connection with proceedings under paragraph (j) of this clause.

(h) Reporting on Utilization of Subject Inventions

The *Contractor* agrees to submit on request periodic reports no more frequently than annually on the utilization of a subject invention or on efforts at obtaining such utilization that are being made by the *contractor* or its licensees or assignees. Such reports shall include information regarding the status of development, date of first commercial sale or use, gross royalties received by the contractor, and such other data and information as the *agency* may reasonably specify. The *contractor* also agrees to provide additional reports as may be requested by the *agency* in connection with any march-in proceeding undertaken by the *agency* in accordance with paragraph (j) of this clause. As required by 35 U.S.C. 202(c)(5), the *agency* agrees it will not disclose such information to persons outside the government without permission of the *contractor*.

(i) Preference for United States Industry

Notwithstanding any other provision of this clause, the *contractor* agrees that neither it nor any assignee will grant to any person the exclusive right to use or sell any subject inventions in the United States unless such person agrees that any products embodying the subject invention or produced through the use of the subject invention will be manufactured substantially in the United States. However, in individual cases, the requirement for such an agreement may be waived by the *Federal agency* upon a showing by the *contractor* or its assignee that reasonable but unsuccessful efforts have been made to grant licenses on similar terms to potential licensees that would be likely to manufacture substantially in the United States or that under the circumstances domestic manufacture is not commercially feasible.

(j) March-in Rights

The *contractor* agrees that with respect to any subject invention in which it has acquired title, the *Federal agency* has the right in accordance with the procedures in 37 CFR 401.6 and any supplemental regulations of the *agency* to require the *contractor*, an assignee or exclusive licensee of a subject invention to grant a nonexclusive, partially exclusive, or exclusive license in any field of use to a responsible applicant or applicants, upon terms that are reasonable under the circumstances, and if the *contractor*, assignee, or exclusive licensee refuses such a request the *Federal agency* has the right to grant such a license itself if the *Federal agency* determines that:

- (1) Such action is necessary because the *contractor* or assignee has not taken, or is not expected to take within a reasonable time, effective steps to achieve practical application of the subject invention in such field of use.
- (2) Such action is necessary to alleviate health or safety needs which are not reasonably satisfied by the *contractor*, assignee or their licensees;
- (3) Such action is necessary to meet requirements for public use specified by Federal regulations and such requirements are not reasonably satisfied by the *contractor*, assignee or licensees; or
- (4) Such action is necessary because the agreement required by paragraph (i) of this clause has not been obtained or waived or because a licensee of the exclusive right to use or sell any subject invention in the United States is in breach of such agreement.

(k) Special Provisions for *Contracts* with Nonprofit Organizations

If the *contractor* is a nonprofit organization, it agrees that:

- (1) Rights to a subject invention in the United States may not be assigned without the approval of the *Federal agency*, except where such assignment is made to an organization which has as one of its primary functions the management of inventions, provided that such assignee will be subject to the same provisions as the *contractor*;
- (2) The *contractor* will share royalties collected on a subject invention with the inventor, including Federal employee co-inventors (when the agency deems it appropriate) when the subject invention is assigned in accordance with 35 U.S.C. 202(e) and 37 CFR 401.10;
- (3) The balance of any royalties or income earned by the *contractor* with respect to subject inventions, after payment of expenses (including payments to inventors) incidental to the administration of subject inventions, will be utilized for the support of scientific research or education; and
- (4) It will make efforts that are reasonable under the circumstances to attract licensees of subject invention that are small business firms and that it will give a preference to a small business firm when licensing a subject invention if the *contractor* determines that the small business firm has a plan or proposal for marketing the invention which, if executed, is equally as likely to bring the invention to practical application as any plans or proposals from applicants that are not small business firms; provided, that the *contractor* is also satisfied that the small business firm has the capability and resources to carry out its plan or proposal. The decision whether to give a preference in any specific case will be at the discretion of the *contractor*. However, the *contractor* agrees that the Secretary may review

the *contractor's* licensing program and decisions regarding small business applicants, and the *contractor* will negotiate changes to its licensing policies, procedures, or practices with the Secretary when the Secretary's review discloses that the *contractor* could take reasonable steps to implement more effectively the requirements of this paragraph (k)(4).

(l) Communication

(Complete According to Instructions at 401.5(b))

(b) When the Department of Energy (DOE) determines to use alternative provisions under §401.3(a)(4), the standard clause at §401.14(a), of this section, shall be used with the following modifications unless a substitute clause is drafted by DOE:

(1) The title of the clause shall be changed to read as follows: *Patent Rights to Nonprofit DOE Facility Operators*

(2) Add an "(A)" after "(1)" in paragraph (c)(1) and add subparagraphs (B) and (C) to paragraph (c)(1) as follows:

(B) If the subject invention occurred under activities funded by the naval nuclear propulsion or weapons related programs of *DOE*, then the provisions of this subparagraph (c)(1)(B) will apply in lieu of paragraphs (c)(2) and (3). In such cases the contractor agrees to assign the government the entire right, title, and interest thereto throughout the world in and to the subject invention except to the extent that rights are retained by the contractor through a greater rights determination or under paragraph (e), below. The contractor, or an employee-inventor, with authorization of the contractor, may submit a request for greater rights at the time the invention is disclosed or within a reasonable time thereafter. *DOE* will process such a request in accordance with procedures at 37 CFR 401.15. Each determination of greater rights will be subject to paragraphs (h)-(k) of this clause and such additional conditions, if any, deemed to be appropriate by the *Department of Energy*.

(C) At the time an invention is disclosed in accordance with (c)(1)(A) above, or within 90 days thereafter, the contractor will submit a written statement as to whether or not the invention occurred under a naval nuclear propulsion or weapons-related program of the *Department of Energy*. If this statement is not filed within this time, subparagraph (c)(1)(B) will apply in lieu of paragraphs (c)(2) and (3). The contractor statement will be deemed conclusive unless, within 60 days thereafter, the Contracting Officer disagrees in writing, in which case the determination of the Contracting Officer will be deemed conclusive unless the contractor files a claim under the Contract Disputes Act within 60 days after the Contracting Officer's determination. Pending resolution of the matter, the invention will be subject to subparagraph (c)(1)(B).

(3) Paragraph (k)(3) of the clause will be modified as prescribed at §401.5(g).

(c) As prescribed in §401.3, replace (b) of the basic clause with the following paragraphs (1) and (2):

(b) Allocation of principal rights. (1) The Contractor may retain the entire right, title, and interest throughout the world to each subject invention subject to the provisions of this clause, including (2) below, and 35 U.S.C. 203. With respect to any subject invention in which the Contractor retains title, the Federal Government shall have a nonexclusive, nontransferable, irrevocable, paid-up license to practice or have practiced for or on behalf of the United States the subject invention throughout the world.

(2) If the Contractor performs services at a Government owned and operated laboratory or at a Government owned and contractor operated laboratory directed by the Government to fulfill the Government's obligations under a Cooperative Research and Development Agreement (CRADA) authorized by 15 U.S.C. 3710a, the Government may require the Contractor to negotiate an agreement with the CRADA collaborating party or parties regarding the allocation of rights to any subject invention the Contractor makes, solely or jointly, under the CRADA. The agreement shall be negotiated prior to the Contractor undertaking the CRADA work or, with the permission of the Government, upon the identification of a subject invention. In the absence of such an agreement, the Contractor agrees to grant the collaborating party or parties an option for a license in its inventions of the same scope and terms set forth in the CRADA for inventions made by the Government.

[52 FR 8554, Mar. 18, 1987, as amended at 69 FR 17301, Apr. 2, 2004]

Procurement of Recovered Materials

a) In accordance with Section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act, the Contractor shall procure items designated in guidelines of the Environmental Protection Agency (EPA) at 40 CFR Part 247 that contain the highest percentage of recovered materials practicable, consistent with maintaining a satisfactory level of competition. The Contractor shall procure items designated in the EPA guidelines that contain the highest percentage of recovered materials practicable unless the Contractor determines that such items: (1) are not reasonably available in a reasonable period of time; (2) fail to meet reasonable performance standards, which shall be determined on the basis of the guidelines of the National Institute of Standards and Technology, if applicable to the item; or (3) are only available at an unreasonable price.

b) Paragraph (a) of this clause shall apply to items purchased under this contract where: (1) the Contractor purchases in excess of \$10,000 of the item under this contract; or (2) during the preceding Federal fiscal year, the Contractor: (i) purchased any amount of the items for use under a contract that was funded with Federal appropriations and was with a Federal agency or a State agency or agency of a political subdivision of a State; and (ii) purchased a total of in excess of \$10,000 of the item both under and outside that contract.

Source: form HUD-5370-C

EXCERPT FROM TITLE 24-HOUSING AND URBAN DEVELOPMENT
PART 135-EMPLOYMENT OPPORTUNITIES FOR BUSINESS AND LOWER INCOME
PERSONS IN CONNECTION WITH ASSISTED PROJECTS

(m) "Section 3 covered project" means any nonexempt project assisted by any program administered by the Secretary in which loans, grants, subsidies, or other financial assistance are provided in aid of housing, urban planning, development, redevelopment, or renewal, public or community facilities, and new community development (except where the financial assistance available under such program is solely in the form of insurance or guaranty). Projects, contracts, and subcontracts, connected with programs administered by the Secretary under section 235 and 236 of the National Housing Act as well as any Public Housing program and which do not exceed \$500,000 in estimated cost are exempted from the requirements of this part, as is any subcontract of \$50,000 or under on such projects or contracts in excess of \$500,000.

Section 135.20 Assurance of compliance with regulations.

(a) Every contract or agreement for a grant, loan, subsidy, or other direct financial assistance in aid of housing, urban planning, development, redevelopment, or renewal, public or community facilities, and new community development, entered into by the Department of Housing and Urban Development with respect to a section 3 covered project shall contain provisions requiring the applicant or recipient to carry out the provisions of section 3, the regulations set forth in this part, and any applicable rules and orders of the Department issued there under prior to approval of its application for assistance for a section 3 covered project.

(b) Every applicant, recipient, contracting party, contractor, and subcontractor shall incorporate, or cause to be incorporated, in all contracts for work in connection with a section 3 covered project, the following clause (referred to as a section 3 clause):

A. The work to be performed under this contract is on a project assisted under a program providing direct Federal financial assistance from the Department of Housing and Urban Development and is subject to the requirements of section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u. Section 3 requires that to the greatest extent feasible opportunities for training and employment be given lower income residents of the project area and contracts for work in connection with the project be awarded to business concerns which are located in, or owned in substantial part by persons residing in the area of the project.

B. The parties to this contract will comply with the provisions of said section 3 and the regulations issued pursuant thereto by the Secretary of Housing and Urban Development, and all applicable rules and orders of the Department issued there under prior to the execution of this contract. The parties to this contract certify and agree that they are under no contractual or other disability which would prevent them from complying with these requirements.

C. The contractor will send to each labor organization or representative of workers with which he has a collective bargaining agreement or other contract or understanding, if any, a notice advising the said labor organization or workers' representative of his commitments under this section 3 clause and shall post copies of the notice in conspicuous places available to employees and applicants for employment or training.

D. The contractor will include this section 3 clause in every subcontract for work in connection with the project and will, at the direction of the applicant for or recipient of Federal financial assistance, take appropriate action pursuant to the subcontract upon a finding that the subcontractor is in violation of regulations issued by the Secretary of Housing and Urban Development. The contractor will not subcontract with any subcontractor where it has notice or knowledge that the latter has been found in violation of regulations and will not let any subcontract unless the subcontractor has first provided it with a preliminary statement of ability to comply with the requirements of these regulations.

E. Compliance with the provisions of section 3, the regulations and all applicable rules and orders of the Department issued there under prior to the execution of the contract, shall be a condition of the Federal financial assistance provided to the project, binding upon the applicant or recipient for such assistance, its successors and assigns. Failure to fulfill these requirements shall subject the applicant or recipient, its contractors and subcontractors, its successors, and assigns to those sanctions specified by the grant or loan agreement or contract through which Federal assistance is provided, and to such sanctions as are specified.

Subpart C-Utilization of Lower Income Area Residents as Employees.

Section 135.55 General.

Each applicant, recipient, contractor or subcontractor undertaking work in connection with a section 3 covered project shall fulfill his obligation to utilize lower income project area residents as employees to the greatest extent feasible by:

(a) Identifying the number of positions in the various occupational categories including skilled, semiskilled and unskilled labor, needed to perform each phase of the section 3 covered project;

(b) Identifying, of the positions identified in paragraph (a) of this section, the number of positions in the various occupational categories which are currently occupied by regular, permanent employees;

(c) Identifying, of the positions identified in paragraph (a) of this section, the number of positions in the various occupational categories which are not currently occupied by regular, permanent employees;

(d) Establishing, of the positions identified in paragraph (a) of this section, a goal which is consistent with the purpose of this subpart within each occupational category of the number of positions to be filled by lower income residents of the section 3 covered project area; and

(e) Making a good faith effort to fill all of the positions identified in paragraph (d) of this section with lower income project area residents.

Section 135.60 Good faith effort.

(a) Each applicant, recipient, contractor, or subcontractor seeking to establish that a good faith effort as required by paragraph (e) of section 135.55 has been made to fill all employment positions identified in paragraph (d) of Section 135.55 with lower income project area residents shall, as a minimum, set forth evidence acceptable to the Secretary that it has:

(1) Ascertained from the Department's Regional Administrator, Area Office Director, or FHA Insuring Office Director having jurisdiction over the section 3 covered project the boundaries of the section 3 covered project area; and

(2) Attempted to recruit from the appropriate areas the necessary number of lower income residents through: Local advertising media, signs placed at the proposed site for the project, and community organizations and public or private institutions operating within or serving the project area such as Project Area Committees (PAC) in urban renewal areas, Model Cities citizen advisory boards, Service Employment and Redevelopment (SER), Opportunities Industrialization Center (OIC), Urban League, Concentrated Employment Program, or the U.S. Employment Service.

(b) Any applicant, recipient, contractor or subcontractor which fills vacant Section 135.55 (d) employment positions in its organization immediately prior to undertaking work pursuant to a section 3 covered contract shall set forth evidence acceptable to the Secretary that its actions were not an attempt to circumvent these regulations.

(c) When lower income resident workers apply, either on their own initiative or on referral from any source, the recipient, contractor, or subcontractor shall determine the qualifications of such persons and shall employ such persons if their qualifications are satisfactory and the contractor has openings. If the recipient, contractor, or subcontractor is unable to employ the workers, such persons shall be listed for the first available opening.

Subpart D-Utilization of Business Located in or Owned in Substantial Part by Persons Residing in the Area.

Section 135.65 General.

Each applicant, recipient, contractor or subcontractor undertaking work on a section 3 covered project shall assure that to the greatest extent feasible, contracts for work to be performed in connection with the project are awarded to business concerns located within the section 3 covered project area or business concerns owned in substantial part by persons residing in the section 3 covered area. The Department, in consultation with the Small Business Administration will establish for the section 3 covered project area a registry of business concerns which meet the definition contained in section 135.5 (b) and (c). Each applicant,

recipient, contractor, or subcontractor undertaking work in connection with a section 3 covered project shall fulfill his obligations to utilize business concerns located within or owned in substantial part by persons residing in the section 3 covered project area by developing and implementing an affirmative action plan.

SECTION 3 REQUIREMENTS

1. Policy

The Department of Housing and Urban Development (HUD) requires that any contract let under the Community Development Block Grant Program be in accordance with the regulations of 24 CFR 135 and Section 3 of the Housing and Urban Development Act of 1968, 12 U.S.C. 1701 u. These regulations state that preference must be given in employment and training opportunities and in contracts to be let to lower-income project area residents and eligible Section 3 businesses, respectively.

2. Section 3 Business

An "eligible Section 3 business" means any business concern which meets one of the following standards:

(a) The business is located in the project area and qualifies as a small business using SBA standards.

(b) The business is located outside the project area and qualifies as small using SBA standards. In addition, at least 51 percent of the business is owned by persons who reside in the project area and who qualify under SBA standards as socially or economically disadvantaged.

SBA standards for qualification as a small business are as follows:

(a) Wholesale - annual receipts no more than \$5 million to \$15 million depending on the industry.

(b) Retail or Service - annual receipts no more than \$1 million to \$5 million depending on industry.

(c) Construction - annual receipts not more than \$5 million averaged over the last 3 years.

(d) Manufacturing - no more than 250 to 1,500 employees, depending on the industry.

Precise criteria may be found in Part 121, Title 13 of the Code of Federal Regulations.

Qualifications as an "economically or socially disadvantaged Person" may be achieved by meeting any one of the following SBA standards:

(a) Member of a minority group which has been deprived of access to normal economic financial resources.

(b) An identifiable physically handicapped person, where the handicap severely limits that person's ability to obtain financial assistance to enter or to improve a business.

(c) Any person whose residence and business are located in an area where the local banking community is unable or unwilling to provide small business financing.

(d) Any honorable discharged Vietnam-era veteran (since August 5, 1964).

3. Bidding Procedure

All successful bidders must submit prior to contract award their Section 3 plan. This plan will contain a preliminary Statement of Workforce Needs (attachment A1, 2) outlining goal for utilization of lower-income project area residents, and an Affirmative Action Plan (Attachment B) for Section 3 Businesses outlining goals for award of subcontracts to eligible Section 3 businesses. This plan will be evaluated for its consistency with the overall goals of the municipality, and whether the affirmative action proposed by the contractor will achieve the goal. Failure to submit an acceptable Section 3 Plan shall result in bid rejection.

§ 135.38 Section 3 Clause.

All section 3 covered contracts shall include the following clause (referred to as the section 3 clause):

A. The work to be performed under this contract is subject to the requirements of section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u (section 3). The purpose of section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD-assisted projects covered by section 3, shall, to the greatest extent feasible, be directed to low- and very low-income persons, particularly persons who are recipients of HUD assistance for housing.

B. The parties to this contract agree to comply with HUD's regulations in 24 CFR part 135, which implement section 3. As evidenced by their execution of this contract, the parties to this contract certify that they are under no contractual or other impediment that would prevent them from complying with the part 135 regulations.

C. The contractor agrees to send to each labor organization or representative of workers with which the contractor has a collective bargaining agreement or other understanding, if any, a notice advising the labor organization or workers' representative of the contractor's commitments under this section 3 clause, and will post copies of the notice in conspicuous places at the work site where both employees and applicants for training and employment positions can see the notice. The notice shall describe the section 3 preference, shall set forth minimum number and job titles subject to hire, availability of apprenticeship and training positions, the qualifications for each; and the name and location of the person(s) taking applications for each of the positions; and the anticipated date the work shall begin.

D. The contractor agrees to include this section 3 clause in every subcontract subject to compliance with regulations in 24 CFR part 135, and agrees to take appropriate action, as provided in an applicable provision of the subcontract or in this section 3 clause, upon a finding that the subcontractor is in violation of the regulations in 24 CFR part 135. The contractor will not subcontract with any subcontractor where the contractor has notice or knowledge that the subcontractor has been found in violation of the regulations in 24 CFR part 135.

E. The contractor will certify that any vacant employment positions, including training positions, that are filled (1) after the contractor is selected but before the contract is executed, and (2) with persons other than those to whom the regulations of 24 CFR part 135 require employment opportunities to be directed, were not filled to circumvent the contractor's obligations under 24 CFR part 135.

F. Noncompliance with HUD's regulations in 24 CFR part 135 may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD assisted contracts.

G. With respect to work performed in connection with section 3 covered Indian housing assistance, section 7(b) of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450e) also applies to the work to be performed under this contract. Section 7(b) requires that to the greatest extent feasible (i) preference and opportunities for training and employment shall be given to Indians, and (ii) preference in the award of contracts and subcontracts shall be given to Indian organizations and Indian-owned Economic Enterprises. Parties to this contract that are subject to the provisions of section 3 and section 7(b) agree to comply with section 3 to the maximum extent feasible, but not in derogation of compliance with section 7(b).

Instructions

The Contractor shall submit a preliminary statement of work force needs (skilled, semi-skilled, unskilled labor and trainees by category) where known with the bid (Contractor Compliance Form). As evidence of compliance with the regulations in 24 CFR 135, the contractor shall provide the City with the following information prior to the awarding of the contract:

1. A list of all positions required for the completion of the contract.
2. A list of all positions which are presently vacant or which will be new positions which will become available under the Contract.
3. A list of the maximum number of training positions which may be utilized under the program.
4. A list of training positions which are currently vacant or which are new positions to become available under the Contract.
5. Goals for filling available positions for employment and training with lower income Warwick residents and the methods to be used to recruit lower income Warwick residents pursuant to the regulations in 24 CFR 135, Subparts B and C.
6. A list of all subcontracts and/or work to be let out in connection with the project including the type of businesses to be used and the dollar value of all work or contracts.
7. A goal and affirmative action plan for utilizing Warwick businesses pursuant to the regulations in 24 CFR 135, Subpart D.

8. Compliance Reports

The contractor and all subcontractors shall be monitored through compliance reports submitted monthly to the Chief Executive Officer of the municipality, or to his designee: **William R. Facente**. Failure to make a good faith effort to implement this Section 3 Plan shall result in termination for cause of the contract.

9. Certification as a Lower-Income Person

As you will note from the example Section 3 Plan, you are required to maintain a list of qualified lower-income persons who apply for work with your business as a result of award of this contract. It is your responsibility to determine if such an applicant for employment does in fact qualify as a lower-income person residing in the project area. This requirement can be satisfied by using an application and certification form which will be provided to the applicant when he/she applies.

Contractor Compliance Form

Section 3

THIS FORM MUST BE COMPLETED BY ALL GENERAL CONTRACTORS AND SUBCONTRACTORS PROVIDING BIDS

Property Owner's Name

Property Owner's Address

SECTION I. CONTRACTOR INFORMATION

Name

Address

Type of Business

RI License No.

SECTION 3 BUSINESS

YES No

WOMEN BUSINESS ENTERPRISE (WBE)

YES No

MINORITY BUSINESS ENTERPRISE (MBE)

YES No

Bidding as a:

General Contractor

Sub-Contractor, indicate General Contractor name

Current number of employees

Current number of women employees

Current number of minority employees

If minority employees enter racial/ethnic code from below:

Code

1
Number:

2

3

4

5

6

RACIAL/ETHNIC CODES

1. White

2. Black/African American

3. American Indian/Alaskan Native

4. Asian

5. Native Hawaiian/Pacific Islander

6. Hispanic/Latino

Total Dollar amount of Bid \$

(if exceeds \$100,000, complete Section II)

SECTION II. New Hires when Bid exceeds \$100,000 (must comply with Section 3 requirements)

	Number of New Hires	Number of new hires that are Section 3 Residents
Number of employees to be hired for this contract	<input type="text"/>	<input type="text"/>
Number of professionals to be hired for this contract	<input type="text"/>	<input type="text"/>
List Professional trade hired	<input type="text"/>	<input type="text"/>
Number of technicians to be hired for this contract	<input type="text"/>	<input type="text"/>
List Technician trade hired	<input type="text"/>	<input type="text"/>
Number of Office/Clerical to be hired for this contract	<input type="text"/>	<input type="text"/>
Number of Construction by trade to be hired for this contract	<input type="text"/>	<input type="text"/>
List below each type of trade for which there were new hires. Add Trades as necessary		
Plumber	<input type="text"/>	<input type="text"/>
Electrician	<input type="text"/>	<input type="text"/>
Carpenter	<input type="text"/>	<input type="text"/>
Masonry	<input type="text"/>	<input type="text"/>
Laborers	<input type="text"/>	<input type="text"/>
Other (specify) _____	<input type="text"/>	<input type="text"/>
Total number of Section 3 trainees to be hired	<input type="text"/>	<input type="text"/>
Number of Low-Income Project Area Residents (L.I.P.A.R.) to be hired	<input type="text"/>	<input type="text"/>

1. Construction Contracts

- A. Total dollar amount of all contracts awarded on the project
- B. Total dollar amount of contracts awarded to Section 3 businesses
- C. Percentage of the total dollar amount that was awarded to Section 3 businesses
- D. Total number of Section 3 businesses receiving contracts

\$

\$

\$

\$

2. Non-Construction Contracts

- A. Total dollar amount of all contracts awarded on the project
- B. Total dollar amount of contracts awarded to Section 3 businesses
- C. Percentage of the total dollar amount that was awarded to Section 3 businesses
- D. Total number of Section 3 businesses receiving contracts

\$

\$

\$

\$

SECTION III. SUMMARY

Indicate the efforts made to direct the employment and other economic opportunities generated by HUD financial assistance for housing and community development programs, to the greatest extent feasible, toward low-and very low-income persons, particularly those who are recipients of government assistance for housing. (Check **ALL** that apply)

- Attempted to recruit low-income residents through: local advertising media, signs prominently displayed at the project site, contracts with the community organizations and public or private agencies operating within the metropolitan area (or Nonmetropolitan County) in which the Section 3 covered program or project is located or similar methods.
- Participated in a HUD program or other program which promotes the training or employment of Section 3 residents.
- Participated in a HUD program or other program which promotes the award of contracts to business concerns which meet the definition of Section 3 business concerns.
- Coordinated with Youthbuild Programs administered in the metropolitan area in which the Section 3 covered project is located.
- Other; describe below

I hereby certify that it is the policy of the undersigned to comply with all existing laws prohibiting discrimination in all aspects of employment due to race, color, creed, sex, age, religion, national origin, marital status, receipt of public assistance or disability.

This shall be accomplished substantially by the following actions: Nondiscrimination in RECRUITING, HIRING, TRAINING, PROMOTING, SUBCONTRACTING, DEMOTION, LAYOFF, and/or TERMINATION.

General Contractor/Subcontractor Signature

Date

Contractor/Subcontractor Section 3 Compliance Plan

- A. The undersigned Contractor/Subcontractor for the _____ project hereby agrees to implement at least the following steps directed at increasing the utilization of Section 3 residents and Section 3 business in accordance with 24 CFR Subpart A Part 135.1 to attempt to recruit from within the project area Section 3 residents through; local advertising media, signs placed at the proposed site for the project and community organizations and public or private institutions operating within or serving the project area.
- B. To seek the assistance, where necessary, in implementing a Section 3 compliance plan.
- C. To maintain a list of all Section 3 area residents who have made application for employment either on their own or on referral from any source, and to employ such persons, if otherwise eligible and if a vacancy exists.
- D. To maintain and provide the information requested on the Section 3 Summary Report (HUD 60002) related to employment and training records of Section 3 residents.
- E. To include this Section 3 compliance in all bid documents and to require all bidders to submit a Section 3 compliance plan including utilization goals and the specific steps planned to accomplish these goals.
- F. In the case of a general contractor, to insure that all Section 3 business concerns within the project area are notified of pending sub-contractual opportunities.
- G. To require all subcontractors to complete the Contractor Compliance Form before awarding any contracts.
- H. To maintain records, including copies of correspondence, memoranda, etc., which documents all steps taken to recruit Section 3 residents and Section 3 subcontractors from within the project area.
- I. To provide the information requested on Contract Compliance Activity Report related to contractors and subcontractors Notified and selected and the number of women and minority employees, the number of vacant positions and the Positions filled with lower income project area residents.

As officers and representatives of _____

Name of Contractor/Subcontractor

We the undersigned, have read and fully agree to this Section 3 Compliance Plan, and become a party to the full implementation of this program.

Print Name

Title

Date

Print Name

Title

Date

Section 3 Clause

All Section 3 covered contracts shall include the following Section 3 clause:

- A. The work to be performed under this contract is subject to the requirements of Section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u (Section 3). The purpose of Section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD Assisted projects covered by Section 3, shall, to the greatest extent feasible, be directed to low – and very low-income persons, particularly persons who are recipients of HUD assistance for housing.
- B. The parties to this contract agree to comply with HUD’s regulations in 24 CFR part 135, which implement Section 3. As evidenced by their execution of this contract, the parties to this contract certify that they are under no contractual or other impediment that would prevent them from complying with the part 135 regulations.
- C. The contractor agrees to send to each labor organization or representative of workers with which the Contractor has a collective bargaining agreement or other understanding, if any, a notice of advising the labor organization or worker’s representative of the contractor’s commitments under this Section 3 clause, and will post copies of the notice in conspicuous places at the work site where both employees and applicants for training and employment positions can see the notice. The notice shall describe the Section 3 preference, shall set forth minimum number and job titles subject to hire, availability of apprenticeship and training positions, the qualifications for each; and the name and location of the person(s) taking applications for each of the positions; and the anticipated date the work shall begin.
- D. The contractor agrees to include this Section 3 clause in every subcontract subject to compliance with regulations in 24 CFR part 135, and agrees to take appropriate action, as provided in an applicable provision of the subcontract Or in this Section 3 clause, upon a finding that the subcontractor is in violation of the regulations in 24 CFR part 135. The contractor will not subcontract with any subcontractor where the contractor has notice or knowledge that the Subcontractor has been found in violation of the regulations in 24 CFR part 135.
- E. The contractor will certify that any vacant employment positions, including training positions, that are filled (1) after the contractor is selected but before the contract is executed, and (2) with persons other than those to whom the regulations of 24 CFR part 135 require employment opportunities to be directed, were not filled to circumvent the contractor’s obligations under 24 CFR part 135.
- F. Noncompliance with HUD’s regulations in 24 CFR part 135 may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD assisted contracts.

F. With respect to work performed in connection with Section 3 covered Indian housing assistance, Section 7 (b) of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450e) also applies to the work to be performed under this contract Section 7 (b) requires that to the greatest extent feasible (i) preference and opportunities for training and employment shall be given to Indians, and (ii) preference in the award of contracts and subcontracts shall be given to Indian organizations and Indian-owned Economic Enterprises. Parties to this contract that are subject to the provisions of Section 3 and Section 7(b) agree to comply with Section 3 to the maximum extent feasible, but not in derogation of compliance with Section 7(b).

Print Name

Title

Date

Print Name

Title

Date

Section 3, Women, Minority Business Concern Questionnaire

Business Name

Business Contact Person

Address

Phone Number

1. Is your business a Section 3 Business Concern? Yes No
2. Is your business a Women-Owned business concern? Yes No
2. (a) Please list any self-certifications, agency certifications, and/or program certifications your Business holds: _____
3. Is your business a Disadvantaged/Minority-owned business concern? Yes No

What is a Section 3 business concern? (Adapted from <http://www.hud.gov/offices/fheo/section3/Section3.pdf>)

A business that:

- Is 51 percent or more owned by Section 3 residents;
- Employs Section 3 residents for at least 30 percent of its full-time, permanent staff; or
- Provide evidence of a commitment to subcontract to Section 3 business concerns, 25 percent or More of the dollar amount of the awarded contract.

Who are Section 3 residents?

(HUD Income Limits available online <http://hud.gov/offices/cpd/affordablehousing/programs/home/limits/income/index.cfm>)

Section 3 residents are:

- Public housing residents or,
- Persons who live in the area where a HUD-assisted project is located and who have a household income that falls below HUD's income limits

Determining Income Levels

- Low income is defined as 80% or below the median income of that area
- Very low income is defined as 50% or below the median income of that area

How is a "woman-owned small business" defined? (Adapted from <http://www.vwbc.org/documents/wobCERT.pdf>)

The Federal Acquisition Regulations (FAR) defines a "woman-owned small business concern" in Part 19.001 Definitions, as follows: "Woman-owned small business concern means a small business concern –(a) which is at least 51 percent owned by one or more women; or, in case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more women; and (b) whose management and daily business operations are controlled by one or more women."

How is a "minority-owned business" defined?

Although definitions vary, in general a minority-owned business is a for-profit enterprise, physically located in the United States or its trust territories, which is owned, operated, and controlled by minority group member(s). "Minority group members" most often identified are US Citizens who are Asian, African-American, Hispanic, and Native American (for a complete listing, see <http://www.sba.gov/library/cfrs/13cfr124.html>). Ownership by minority individuals means the business is at least 51 percent owned by such individuals, or, in case of a publicly-owned business, at least 51 percent of the stock is owned by one or more such individuals. Further, the management and daily operations are controlled by those minority group members.

Certification – The information above is true and complete to the best of my knowledge and belief.

Signature

Date

**CERTIFICATION OF BIDDER REGARDING SECTION 3 AND SEGREGATED
FACILITIES**

Name of Prime Contractor

Project Name & Number

The undersigned hereby certifies that:

1. Section 3 provisions are included in the Contract.
2. A written Section 3 plan was prepared and submitted as part of the bid proceedings (if bid equals or exceeds \$100,000).
3. No segregated facilities will be maintained.

Name & Title of Signer (Print or Type):

Signature Date

Section 3 Summary Report

Economic Opportunities for
Low – and Very Low-Income Persons

U.S. Department of Housing
and Urban Development
Office of Fair Housing
And Equal Opportunity

OMB Approval No: 2529-0043
(exp. 11/30/2010)

HUD Field Office:

Section back of page for Public Reporting Burden statement

1. Recipient Name & Address: (street, city, state, zip)	2. Federal Identification: (grant no.)	3. Total Amount of Award:
	4. Contact Person	5. Phone: (include area code)
	6. Length of Grant:	7. Reporting Period:
8. Date Report Submitted:	9. Program Code: (Use separate sheet for each program code)	10. Program Name:

Part I: Employment and Training (Columns B, C and F are mandatory fields. Include New Hires in E &F)**

A Job Category	B Number of New Hires	C Number of New Hires that are Sec. 3 Residents	D % of Aggregate Number of Staff Hours of New Hires that are Sec. 3 Residents	E % of Total Staff Hours for Section 3 Employees and Trainees	F Number of Section 3 Trainees
Professionals					
Technicians					
Office/Clerical					
Construction by Trade (List Trade					
Trade					
Trade					
Trade					
Trade					
Other (List)					
Total					

* Program Codes
1 = Flexible Subsidy
2 = Section 202/811

3 = Public/Indian Housing
A = Development,
B = Operation
C = Modernization

4 = Homeless Assistance
5 = HOME
6 = HOME State Administered
7 = CDBG Entitlement

8 = CDBG State Administered
9 = Other CD Programs
10 = Other Housing Programs

Form HUD-60002, Section 3 Summary Report, Economic Opportunities for Low- and Very Low-Income Persons.

Instructions: This form is to be used to report annual accomplishments regarding employment and other economic opportunities provided to low- and very low-income persons under Section 3 of the Housing and Urban Development Act of 1968. The Section 3 regulations apply to any *public and Indian housing programs* that receive: (1) development assistance pursuant to Section 5 of the U.S. Housing Act of 1937; (2) operating assistance pursuant to Section 9 of the U.S. Housing Act of 1937; or (3) modernization grants pursuant to Section 14 of the U.S. Housing Act of 1937 and to recipients of housing and community development assistance in excess of \$200,000 expended for: (1) housing rehabilitation (including reduction and abatement of lead-based paint hazards); (2) housing construction; or (3) other public construction projects; and to *contracts and subcontracts in excess of \$100,000* awarded in connection with the Section-3-covered activity.

Form HUD-60002 has three parts, which are to be completed for all programs covered by Section 3. Part I relates to *employment and training*. The recipient has the option to determine numerical employment/training goals either on the basis of the number of hours worked by new hires (columns B, D, E and F). Part II of the form relates to *contracting*, and Part III summarizes recipients' *efforts* to comply with Section 3.

Recipients or contractors subject to Section 3 requirements must maintain appropriate documentation to establish that HUD financial assistance for housing and community development programs were directed toward low- and very low-income persons.* A recipient of Section 3 covered assistance shall submit one copy of this report to HUD Headquarters, Office of Fair Housing and Equal Opportunity. Where the program providing assistance requires an annual performance report, this Section 3 report is to be submitted at the same time the program performance report is submitted. Where an annual performance report is not required, this Section 3 report is to be submitted by January 10 and, if the project ends before December 31, within 10 days of project completion. *Only Prime Recipients are required to report to HUD. The report must include accomplishments of all recipients and their Section 3 covered contractors and subcontractors.*

HUD Field Office: Enter the Field Office name .

1. Recipient: Enter the name and address of the recipient submitting this report.
2. Federal Identification: Enter the number that appears on the award form (with dashes). The award may be a grant, cooperative agreement or contract.
3. Dollar Amount of Award: Enter the dollar amount, rounded to the nearest dollar, received by the recipient.
- 4 & 5. Contact Person/Phone: Enter the name and telephone number of the person with knowledge of the award and the recipient's implementation of Section 3.
6. Reporting Period: Indicate the time period (months and year) this report covers.
7. Date Report Submitted: Enter the appropriate date.

8. Program Code: Enter the appropriate program code as listed at the bottom of the page.
9. Program Name: Enter the name of HUD Program corresponding with the "Program Code" in number 8.

Part I: Employment and Training Opportunities

Column A: Contains various job categories. Professionals are defined as people who have special knowledge of an occupation (i.e. supervisors, architects, surveyors, planners, and computer programmers). For construction positions, list each trade and provide data in columns B through F for each trade where persons were employed. The category of "Other" includes occupations such as service workers.

Column B: (Mandatory Field) Enter the number of new hires for each category of workers identified in Column A in connection with this award. New hire refers to a person who is not on the contractor's or recipient's payroll for employment at the time of selection for the Section 3 covered award or at the time of receipt of Section 3 covered assistance.

Column C: (Mandatory Field) Enter the number of Section 3 new hires for each category of workers identified in Column A in connection with this award. Section 3 new hire refers to a Section 3 resident who is not on the contractor's or recipient's payroll for employment at the time of selection for the Section 3 covered award or at the time of receipt of Section 3 covered assistance.

Column D: Enter the percentage of all the staff hours of new hires (Section 3 residents) in connection with this award.

Column E: Enter the percentage of the total staff hours worked for Section 3 employees and trainees (including new hires) connected with this award. Include staff hours for part-time and full-time positions.

Column F: (Mandatory Field) Enter the number of Section 3 residents that were trained in connection with this award.

Part II: Contract Opportunities

Block 1: Construction Contracts

Item A: Enter the total dollar amount of all contracts awarded on the project/program.

Item B: Enter the total dollar amount of contracts connected with this project/program that were awarded to Section 3 businesses.

Item C: Enter the percentage of the total dollar amount of contracts connected with this project/program awarded to Section 3 businesses.

Item D: Enter the number of Section 3 businesses receiving awards.

Block 2: Non-Construction Contracts

Item A: Enter the total dollar amount of all contracts awarded on the project/program.

Item B: Enter the total dollar amount of contracts connected with this project awarded to Section 3 businesses.

Item C: Enter the percentage of the total dollar amount of contracts connected with this project/program awarded to Section 3 businesses.

Item D: Enter the number of Section 3 businesses receiving awards.

Part III: Summary of Efforts -- Self-explanatory

Submit one (1) copy of this report to the HUD Headquarters Office of Fair Housing and Equal Opportunity, at the same time the performance report is submitted to the program office. The Section 3 report is submitted by January 10. Include only contracts executed during the period specified in item 8. PHAs/IHAs are to report all contracts/subcontracts.

* The terms "low-income persons" and very low-income persons" have the same meanings given the terms in section 3 (b) (2) of the United States Housing Act of 1937. *Low-income persons* mean families (including single persons) whose incomes do not exceed 80 percent of the median income for the area, as determined by the Secretary, with adjustments for smaller and larger families, except that

The Secretary may establish income ceilings higher or lower than 80 percent of the median for the area on the basis of the Secretary's findings such that variations are necessary because of prevailing levels of construction costs or unusually high- or low-income families. *Very low-income persons* mean low-income families (including single persons) whose incomes do not exceed 50 percent of the median family income area, as determined by the Secretary with adjustments or smaller and larger families, except that the Secretary may establish income ceilings higher or lower than 50 percent of the median for the area on the basis of the Secretary's findings that such variations are necessary because of unusually high or low family incomes.

Part II: Contracts Awarded

1. Construction Contracts:

A. Total dollar amount of all contracts awarded on the project	\$
B. Total dollar amount of contracts awarded to Section 3 businesses	\$
C. Percentage of the total dollar amount that was awarded to Section 3 businesses	%
D. Total number of Section 3 businesses receiving contracts	

2. Non-Construction Contracts:

A. Total dollar amount all non-construction contracts awarded on the project/activity	\$
B. Total dollar amount of non-construction contracts awarded to Section 3 businesses	\$
C. Percentage of the total dollar amount that was awarded to Section 3 businesses	%
D. Total number of Section 3 businesses receiving non-construction contracts	

Part III: Summary

Indicate the efforts made to direct the employment and other economic opportunities generated by HUD financial assistance for housing and community development programs, to the greatest extent feasible, toward low- and very low-income persons, particularly those who are recipients of government assistance for housing. (Check all that apply.)

- Attempted to recruit low-income residents through: local advertising media, signs prominently displayed at the project site, contracts with the community organizations and public or private agencies operating within the metropolitan area (or nonmetropolitan county) in which the Section 3 covered program or project is located, or similar methods.
- Participated in a HUD program or other program which promotes the training or employment of Section 3 residents.
- Participated in a HUD program or other program which promotes the award of contracts to business concerns which meet the definition of Section 3 business concerns.
- Coordinated with Youthbuild Programs administered in the metropolitan area in which the Section 3 covered project is located.
- Other; describe below.

Public reporting for this collection of information is estimated to average 2 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. This agency may not collect this information, and you are not required to complete this form, unless it displays a currently valid OMB number.

Section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u, mandates that the Department ensures that employment and other economic opportunities generated by its housing and community development assistance programs are directed toward low- and very-low income persons, particularly those who are recipients of government assistance housing. The regulations are found at 24 CFR Part 135. The information will be used by the Department to monitor program recipients' compliance with Section 3, to assess the results of the Department's efforts to meet the statutory objectives of Section 3, to prepare reports to Congress, and by recipients as self-monitoring tool. The data is entered into a database and will be analyzed and distributed. The collection of information involves recipients receiving Federal financial assistance for housing and community development programs covered by Section 3. The information will be collected annually to assist HUD in meeting its reporting requirements under Section 808(e)(6) of the Fair Housing Act and Section 916 of the HCDA of 1992. An assurance of confidentiality is not applicable to this form. The Privacy Act of 1974 and OMB Circular A-108 are not applicable. The reporting requirements do not contain sensitive questions. Data is cumulative; personal identifying information is not included.

City of Warwick
Community Development Program

Affirmative Action Plan
for
Utilizing Local Businesses

This plan sets forth the procedures by which the City of Warwick will assure that to the greatest extent feasible contracts for work in connection with the City's Community Development Program will be awarded to business concerns which are located in or owned in substantial part by persons residing in the City of Warwick. These procedures are set forth in compliance with the rules and regulations in Part 135 of Title 24 of the Code of Federal Regulations entitled "Employment Opportunities for Businesses and Lower Income Persons in Connection with Assisted Projects" published on August 3, 1973. It is the intent of this plan that the City and its contractors follow these procedures in awarding any work financed under the City's Community Development Program.

1. At the beginning of each Community Development Program Year the City will prepare and make available to the public a list of contracts expected to be awarded and a description of the professional category or classification of each type of service or supplied to be provided in order to carry out the Community Development Program.
2. The City will prepare a list of businesses known to be located within the City which appear to be eligible to provide the services, supplies or construction work in order to determine the availability of local businesses for each contract listed in compliance with No. 1 above.
3. The City and its contractors shall, where feasible, award all contracts to local businesses. Reasons for awarding contracts to other firms shall be documented. Sufficient reason for awarding contracts to firms outside the City shall include non-competitive bids or the unavailability of local firms or individuals who can provide the services or supplies required.
4. The City and its contractors shall comply with the following procedures in order to assure that local businesses are afforded the opportunity to contract with the City or other contractors under the Community Development Program:
 - (a) The Community Development Program's Affirmative Action Plan for Utilizing Local Businesses shall be inserted into all bid documents for work funded under the Community Development Program.
 - (b) Local businesses for the purpose of complying with these procedures shall be those located within the entire City of Warwick or owned in substantial part by residents of Warwick.
 - (c) All contractors and subcontractors shall certify their intent to comply with the objectives and procedures of this plan prior to signing a contract with the City. All contracts and subcontracts will be awarded in compliance with this plan and must be approved by the City of Warwick in writing.

(d) Opportunities or contracts under the Community Development Program shall be advertised in the metropolitan and local newspapers. A notice of the pending contract shall be posted on the site, where applicable, or in the City Hall. Notification of pending contractual opportunities shall be sent to the City's Purchasing Agent.

(e) All contracts for more than \$1,000 shall be awarded on the basis of competitive bids in conformance with City and Federal procedures.

(f) All bids or proposals must be accompanied by a list of all positions for employment or training by occupational category and a list of all subcontracts necessary to fulfill the contract. In addition, each bidder shall submit with the bid, a certification adopting this plan for utilizing local businesses.

I, _____, certify that I have
(Contractor)

read and understand the Community Development Program's Affirmative Action Plan for Utilizing Local Businesses and further certify that all work let out under this contract shall be in conformance with its objectives and procedures. I understand that I am certifying that to the greatest extent feasible all sub-contracts or other work let out under this contract will be awarded to businesses located in Warwick or businesses which are owned in substantial part by residents of Warwick.

Witness: _____

By: _____
(Contractor)

Title: _____

Business Address: _____

Date: _____

Affirmative Action Requirements
for
Rhode Island

Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity
(Executive Order 11246)

1. The Officer's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.
2. The goals and timetables for minority and female participation, expressed percentage terms for the contractor's work force in each trade on all construction work in the covered area are as follows:

Female: 4-1-78 to 3-31-79 3.1%
 4-1-79 to 3-31-80 5.0%
 4-1-80 to 3-31-81 6.9%

Minorities: ALL TRADES 3.0%

These goals are applicable to all contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area.

The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR-4.3(a) and its efforts to meet the goals established for the geographical area where the contract resulting from this solicitation is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order, and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any other construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address and telephone number of the subcontractor; employer identification number, estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the contract is to be performed.

4. As used in this Notice, and in the contract resulting from this solicitation, the "covered area" is:

Female: Nation-wide

Minorities: State-wide

The contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

AFFIRMATIVE ACTION STEPS TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY

1. Ensure and maintain a working environment free of harassment, intimidation and coercion at all sites and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working as such sites or in such facilities.
2. Establish and maintain a current list of minority and female recruitment sources provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available and maintain a record of the organization's responses.
3. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefore, along with whatever additional actions the Contractor may have taken.
4. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.
5. Develop on-the-job training opportunity and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under Step #2.

6. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc. by specific review of the policy with all management personnel and with all minority and female employees at least once a year, and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction is performed.

7. Review, at least annually the company's EEO policy and affirmative obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these terms with on-site supervisory personnel such as Superintendents, General foremen, etc. prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

8. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's and Subcontractors with whom the Contractor does or anticipate doing business.

9. Direct its recruitment efforts, both oral and written to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures and tests to be used in the selection process.

10. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's workforce.

11. Validate all test and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.

12. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc. such opportunities.

13. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

14. Ensure that all facilities and company activities are non-segregated except that separate or single-user and necessary changing facilities shall be provided to assure privacy between the sexes.

15. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers including circulation of solicitations to minority and female contractor associations.

16. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

**Equal Employment
Opportunity Certification**
Excerpt From 41 CFR §60-1.4(b)

U.S. Department of Housing
and Urban Development
Office of Housing
Federal Housing Commissioner

Department of Veterans Affairs
OMB Control No. 2502-0029
(exp. 9/30/2016)

The applicant hereby agrees that it will incorporate or cause to be incorporated into any contract for construction work, or modification thereof, as defined in the regulations of the Secretary of Labor at 41 CFR Chapter 60, which is paid for in whole or in part with funds obtained from the Federal Government or borrowed on the credit of the Federal Government pursuant to a grant, contract, loan insurance, or guarantee, or undertaken pursuant to any Federal program involving such grant, contract, loan, insurance, or guarantee, the following equal opportunity clause:

During the performance of this contract, the contractor agrees as follows:

- (1) The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, or national origin, such action shall include, but not be limited to the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.
- (2) The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive considerations for employment without regard to race, color, religion, sex, or national origin.
- (3) The contractor will send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- (4) The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations and relevant orders of the Secretary of Labor.
- (5) The contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to its books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(6) In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(7) The contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance: **Provided, however,** That in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency the contractor may request the United States to enter into such litigation to protect the interests of the United States.

The applicant further agrees that it will be bound by the above equal opportunity clause with respect to its own employment practices when it participates in federally assisted construction work:

Provided, That if the applicant so participating is a State or local government, the above equal opportunity clause is not applicable to any agency, instrumentality or subdivision of such government which does not participate in work on or under the contract.

The applicant agrees that it will assist and cooperate actively with the administering agency and the Secretary of Labor in obtaining the compliance of contractors and subcontractors with the equal opportunity clause and the rules, regulations, and relevant orders of the Secretary of Labor, that it will furnish the administering agency and the Secretary of Labor such information as they may require for the supervision of such compliance, and that it will otherwise assist the administering agency in the discharge of the agency's primary responsibility for securing compliance.

The applicant further agrees that it will refrain from entering into any contract or contract modification subject to Executive Order 11246 of September 24, 1965, with a contractor debarred from, or who has not demonstrated eligibility for, Government contracts and Federally-assisted construction contracts pursuant to the Executive order and will carry out such sanctions and penalties for violation of the equal opportunity clause as may be imposed

Firm Name and Address

By

Title

upon contractors and subcontractors by the administering agency or the Secretary of Labor pursuant to Part II, Subpart D of the Executive order. In addition, the applicant agrees that if it fails or refuses to comply with these undertakings, the administering agency may take any or all of the following actions: Cancel, terminate, or suspend in whole or in part this grant (contract, loan, insurance, guarantee); refrain from extending any further assistance to the applicant under the program with respect to which the failure or refund occurred until satisfactory assurance of future compliance has been received from such applicant; and refer the case to the Department of Justice for appropriate legal proceedings.

Excerpt from HUD Regulations

200.410 Definition of term "applicant".

- (a) In multifamily housing transactions where controls over the mortgagor are exercised by the Commissioner either through the ownership of corporate stock or under the provisions of a regulatory agreement, the term "applicant" as used in this subpart shall mean the mortgagor.
- (b) In transactions other than those specified in paragraph(a) of this section, the term "applicant" as used in this subpart shall mean the builder, dealer or contractor performing the construction, repair or rehabilitation work for the mortgagor or other borrower.

200.420 Equal Opportunity Clause to be included in contracts and subcontracts.

- (a) The following equal opportunity clause shall be included in each contract and subcontract which is not exempt:

During the performance of this contract, the contractor agrees as follows:

- (1) The contractor will not discriminate against any employee or applicant for employment because of race, creed, color, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, creed, color, or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of the nondiscrimination clause.

- (2) The contractor will in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard race, creed, color, or national origin.

- (3) The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice, to be provided, advising the said labor union or workers' representative of the contractor's commitments under this section, and shall post copies of the notices in conspicuous places available to employees and applicants for employment.

- (4) The contractor will comply with all provisions of Executive Order 10925 of March 6 1961, as amended, and of the regulations, and relevant orders of the President's Committee on Equal Employment Opportunity created thereby.

- (5) The contractor will furnish all information and reports required by Executive Order 10925 of March 6, 1961, as amended, and by the regulations, and orders of the said Committee, or pursuant thereto, and will permit access to his books, records, and accounts by HUD and the Committee for purposes of investigation to ascertain compliance with such regulations, and orders.

- (6) In the event of the contractor's non-compliance with the nondiscrimination clause of this contract or with any of the said regulations, or orders, this contract may be cancelled, terminated or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts or Federally-assisted construction contracts in accordance with procedures authorized in Executive Order 10925 of March 6, 1961, as amended, and such other sanctions may be imposed and remedies invoked provided in the said Executive Order or by regulations, or order of the President's Committee on Equal Employment Opportunity, or as otherwise provided by law.

- (7) The contractor will include the provisions of Paragraphs(1) through (7) in every subcontract or purchase order unless exempted by regulations, or orders of the President's Committee on Equal Employment Opportunity issued pursuant to Section 303 of Executive Order 10925 of March 6, 1961, as amended, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase orders as HUD may direct as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, that in the event the contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by HUD, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

- (b) Except in subcontracts for the performance of construction work at the site of construction, the clause is not required to be inserted in subcontracts below the second tier. Subcontracts may incorporate by reference to the equal opportunity clause.

200.425 Modification in and exemptions from the regulations in this subpart.

- (a) The following transactions and contracts are exempt from the regulations in this subpart:

- (1) Loans, mortgages, contracts and subcontracts not exceeding \$10,000.

- (2) Contract and subcontracts not exceeding \$100,000 for standard commercial supplies or raw material;

- (3) Contracts and subcontracts under which work is to be or has been performed outside the United States and where no recruitment of workers within the United States is involved. To the extent that work pursuant to such contracts is done within the United States, the equal opportunity clause shall be applicable;

- (4) Contracts for the sale of Government property where no appreciable amount of work is involved; and

- (5) Contracts and subcontracts for an indefinite quantity which are not to extend for more than one year if the purchaser determines that the amounts to be ordered under any such contract or subcontract are not reasonably expected to exceed \$100,000 in the case of contracts or subcontracts for standard commercial supplies and raw materials, or \$10,000 in the case of all other contracts and subcontracts.

Standard Federal Equal Employment
Opportunity Construction Specifications

(Executive Order 11246)

1. As used in these specifications:

a. "Covered area" means the geographical area described in the solicitation from which this contract resulted

b. "Director" means director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority.

c. "Employer Identification Number" means the Federal Social Security number used on the Employers Quarterly Federal Tax Return, U.S. Treasury Department Form 941.

d. "Minority" includes: Black (all persons having origins in any of the Black African racial groups not of Hispanic origin); Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish culture or origin, regardless of race; Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent or the Pacific Islands) and American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portions of the work involving any construction trade it shall physically include in each subcontracts in excess of \$10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which the contract resulted.

3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to make good faith efforts to achieve the Plan goals and timetables.

4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7a through p of these specifications. the goals set forth in the solicitation from which

this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. The Contractor is expected to make substantially uniform progress toward its goal in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.

6. In order for the non-working training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunity. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the follows:

- a. Ensure and maintain a working environment free of harassment, intimidation and coercion at all sites and in all facilities at which the contractor's employees are assigned to work. The contractor where possible, will assign two or more women to each construction project. The contractor shall specifically ensure that all foremen, superintendents and other on-site supervisory personnel are aware of and carry out the contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.
- b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the contractor or its unions have employment opportunities available, and maintain a record of the organization's responses.
- c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual.

If such individual was sent to the union hiring hall for referral and was not referred back to the contractor by the union or, if referred, not employed by the contractor, this shall be documented in the file with the reason therefore, along with whatever additional actions the contractor may have taken.

- d. Provide immediate written notification to the Director when the union or unions with which the contractor has a collective bargaining agreement has not referred to the contractor a minority person or women sent by the contractor has other information that the union referral process has impeded the contractor's efforts to meet its obligations.
- e. Develop on-the-job training opportunity and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the source complied under 7b above.
- f. Disseminate the contractor's EEO policy by providing notice of the policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc. by specific review of the policy with all management personnel and with all minority and female employees at least once a year, and by posting the company EEO policy bulletin boards accessible to all employees at each location where construction work is performed.
- g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these terms with on-site supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed and disposition of the subject matter.
- h. Disseminate the contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media and providing written notification to and discussing the contractor's EEO policy with other contractors and subcontractors with whom the contractor does or anticipates doing business.

- i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the contractor shall send written notification to organizations such as the above, describing the openings, screening procedures and tests to be used in the selection process.
- j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a contractor's workforce.
- k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.
- l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, thorough appropriate training, etc. such opportunities.
- m. Ensure that seniority practices, job classification, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the contractor's obligations under these specifications are being carried out.
- n. Ensure that all facilities and company activities are non-segregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.
- o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female contractors and suppliers including circulation of solicitations to minority and female contractor associations.
- p. Conduct a review, at least annually, of all supervisors' adherence to and performance under the contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the contractor is a member and a participant, may be asserted as fulfilling any one or more of its obligations under 7a through p of these specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the contractor. The obligation to comply, however, is the contractor's and failure of such a group to fulfill an obligation shall to be a defense for the contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the contractor has achieved its goals for women generally, the contractor may also be in violation of the Executive Order if a specific minority group of women is under-utilized).

10. The contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex or national origin.

11. The contractor shall not enter into any subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

12. The contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications, and Executive Order 11246, as amended.

13. The contractor, in fulfilling its obligations under these specifications shall implement affirmative action steps at least as extensive as those standards prescribed in paragraph 7 of these specifications so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4-3.

14. The contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out to the provisions hereof as may be required by the Government and to keep records which shall at least include for each employee the name, address, telephone numbers, contraction trade, union affiliation, if any, employee identification number when assigned, social security number, race, sex, status, i.e. mechanic, apprentice, trainee, helper or laborer, dates of changes in status, hours worked per week in the indicated trade, rate of pay and locations at which the work was performed. Records shall be maintained in an easily understandable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g. those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

MINORITY CONTRACTOR PARTICIPATION

Name of Prime Bidder

Indicate whether or not you will be subcontracting a portion of this contract to a minority business Yes No

If yes, list the names of minority subcontractors who will be performing work for you.

Type of Work (Electrical, Paving, etc.) and Name of Contract items

Minority Contractor	Address	Parts thereof to be performed	Agreed Price

NOTE: Minority person means an individual who is Black, Hispanic, Asian American, American Indian, Alaskan Native or a woman regardless of race or ethnicity.

Minority contractor means a contractor which is:
1) an individual, who is a Minority Person, 2) a partnership or joint venture controlled by minority persons and in which at least 51 percent of the beneficial ownership interests are held by minority persons, or 3) a corporation or other entity controlled by Minority Persons in which at least 51 percent of voting interest and beneficial ownership interests are held by Minority Persons.

**REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS**

- I. General
- II. Nondiscrimination
- III. Nonsegregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Compliance with Governmentwide Suspension and Debarment Requirements
- XI. Certification Regarding Use of Contract Funds for Lobbying

ATTACHMENTS

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under Title 23 (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services). The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in bid proposal or request for proposal documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 are applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding \$10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR 230, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. **Equal Employment Opportunity:** Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under

this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. **EEO Officer:** The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. **Dissemination of Policy:** All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. **Recruitment:** When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. **Personnel Actions:** Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. **Training and Promotion:**

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are

applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants / Employees with Disabilities: The contractor must be familiar

with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurance Required by 49 CFR 26.13(b):

a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.

b. The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the contracting agency deems appropriate.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form FHWA-1391. The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor

will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more.

The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding \$2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. Minimum wages

a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions

of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b.(1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or

will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. Payrolls and basic records

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-

Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b.(1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency..

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and trainees

a. Apprentices (programs of the USDOL).

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly

rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

6. Subcontracts. The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

7. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility.

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The following clauses apply to any Federal-aid construction contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.

3. Withholding for unpaid wages and liquidated damages. The FHWA or the contacting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term "perform work with its own organization" refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:

- (1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
- (2) the prime contractor remains responsible for the quality of the work of the leased employees;
- (3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and
- (4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is

evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.
2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200.

1. Instructions for Certification – First Tier Participants:

- a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.
- b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this

covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contractor). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration,

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. Instructions for Certification - Lower Tier Participants:

(Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which

this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the

department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

* * * * *

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000 (49 CFR 20).

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

**ATTACHMENT A - EMPLOYMENT AND MATERIALS
PREFERENCE FOR APPALACHIAN DEVELOPMENT
HIGHWAY SYSTEM OR APPALACHIAN LOCAL ACCESS
ROAD CONTRACTS**

This provision is applicable to all Federal-aid projects funded under the Appalachian Regional Development Act of 1965.

1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:

a. To the extent that qualified persons regularly residing in the area are not available.

b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.

c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph (1c) shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph (4) below.

2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which the participant estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, the participant shall promptly notify the State Employment Service.

3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.

4. If, within one week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph (1c) above.

5. The provisions of 23 CFR 633.207(e) allow the contracting agency to provide a contractual preference for the use of mineral resource materials native to the Appalachian region.

6. The contractor shall include the provisions of Sections 1 through 4 of this Attachment A in every subcontract for work which is, or reasonably may be, done as on-site work.

Civil Rights, Employment and Contracting Opportunities, and Other Federal Requirements

Americans with Disabilities Act of 1990 (ADA): This Act modifies and expands the Rehabilitation Act of 1973 to prohibit discrimination against “a qualified individual with a disability” in employment and public accommodations. The ADA requires that an individual with a physical or mental impairment who is otherwise qualified to perform the essential functions of a job, with or without reasonable accommodation, be afforded equal employment opportunity in all phases of employment.

Architectural Barriers Act of 1968 (ABA) - (42 U.S.C. 4151-4157): This Act requires that certain buildings financed with Federal funds must be designed, constructed, or altered in accordance with standards that ensure accessibility for persons with physical disabilities. The ABA covers any building or facility financed in whole or in part with Federal funds, except privately owned residential structures. Covered buildings and facilities designed, constructed, or altered with CDBG funds are subject to the ABA and must comply with the Uniform Federal Accessibility Standards.

Disadvantaged Business Enterprises (DBE): It is the policy of HUD to encourage the award of prime contracts valued at \$100,000 or more to small disadvantaged business (SDB) concerns (other than certified 8(a) firms) that are at least 51 percent owned and controlled by socially and economically disadvantaged individuals.

Fair Labor Standards Act (FLSA) [as amended] - 29 U.S.C. 201 et seq.: The U.S. Department of Labor (DOL) administers and enforces the minimum wage, overtime pay, recordkeeping, and youth employment standards affecting employees in the private sector and in Federal, State, and local governments.

Immigration Reform and Control Act (IRCA) of 1986: Employers may hire only persons who may legally work in the U.S., i.e., citizens and nationals of the U.S. and aliens authorized to work in the U.S. The employer must verify the identity and employment eligibility of anyone to be hired, which includes completing the Employment Eligibility Verification Form (I-9).

Minority and Women-Owned Business Enterprises (MBE/WBE) - 24CFR Part 85.36 (e) (1): It is the policy of HUD to actively encourage contractors to take all necessary affirmative steps to assure that small and minority firms, Women’s business enterprise and labor surplus area firms as used as subcontractors when possible. A minority or women-owned small business concern is defined as owned by at least 51 percent minority group members or women.

Section 109 of Title 1 of the Housing and Community Development Act of 1974, as amended (42 U.S.C. 5301 et. seq., particularly 42 U.S.C. 6101 et. seq., and 29 U.S.C. 794): This section provides that no person shall be excluded from participation (including employment), denied program benefits, or subject to discrimination on the

basis of race, color, national origin, or sex under any program or activity funded in whole or in part under Title 1 of the Act.

Section 504 of the Rehabilitation Act of 1973, as amended (implemented at 24 CFR Part 135): It is unlawful to discriminate based on disability in federally assisted programs. This section provides that no otherwise qualified individual shall, solely by reason of his or her disability, be excluded from participation (including employment), denied program benefits, or subjected to discrimination under any program or activity receiving Federal funding assistance. Section 504 also contains design and construction accessibility provisions for multi-family dwellings developed or substantially rehabilitated for first occupancy on or after March 13, 1991.

Uniform Guidelines on Employee Selection Procedures adopted by the Equal Employment Opportunity Commission in 1978: This manual applies to employee selection procedures in the areas of hiring, retention, promotions, transfer, demotions, dismissal, and referral. It is designed to assist employers, labor organizations, employment agencies, licensing and certification boards in complying with the requirements of Federal laws prohibiting discriminatory employment.

Vietnam Era Veterans' Readjustment Act of 1974 (revised Jobs for Veterans Act of 2002): This Act was passed to ensure equal employment opportunity for qualified disabled veterans and veterans of the Vietnam War. Affirmative action is required in the hiring and promotion of veterans.

Violation or Breach of Contract: Contracts for more than the simplified acquisition threshold currently set at \$150,000, which is the inflation adjusted amount determined by the Civilian Agency Acquisition Council and the Defense Acquisition Regulations Council (Councils) as authorized by 41 U.S.C. 1908, must address administrative, contractual, or legal remedies in instances where contractors violate or breach contract terms, and provide for such sanctions and penalties as appropriate.

Termination for Cause and for Convenience: All contracts in excess of \$10,000 must address termination for cause and for convenience by the non-Federal entity including the manner by which it will be effected and the basis for settlement.

Rights to Inventions Made Under a Contract or Agreement: If the agreement with the contractor is for the performance of experimental, developmental, or research work, including any assignment, substitution of parties, or subcontract of any type entered into for such purpose, the recipient or subrecipient must comply with the requirements of 37 CFR Part 401, "Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements," and any implementing regulations issued by the awarding agency.

Clean Air Act (42 U.S.C. 7401-7671q.) and the Federal Water Pollution Control Act (33 U.S.C. 1251-1387), as amended: Contracts and subgrants of amounts in excess of \$150,000 must contain a provision that requires the non-Federal award to agree to

comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401-7671q) and the Federal Water Pollution Control Act as amended (33 U.S.C. 1251-1387). Violations must be reported to the Federal awarding agency and the Regional Office of the Environmental Protection Agency (EPA).

Procurement of Recovered Materials: A non-Federal entity that is a state agency or agency of a political subdivision of a state and its contractors must comply with section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act. The requirements of Section 6002 include procuring only items designated in guidelines of the Environmental Protection Agency (EPA) at 40 CFR part 247 that contain the highest percentage of recovered materials practicable, consistent with maintaining a satisfactory level of competition, where the purchase price of the item exceeds \$10,000 or the value of the quantity acquired during the preceding fiscal year exceeded \$10,000; procuring solid waste management services in a manner that maximizes energy and resource recovery; and establishing an affirmative procurement program for procurement of recovered materials identified in the EPA guidelines.

HUD Lead-Based Paint Regulations, 24 CFR Part 35

Flood Disaster Protection Act of 1973 (P.L. 93-243)

Nondiscrimination under Title VI of the Civil Rights Act of 1964 (as Amended)

Acknowledgment of Bidding Firm to comply with the above referenced Federal Regulations where applicable:

Print Name: (Contractor)

Date

SECTION 01010

SUMMARY OF WORK

PART 1 GENERAL

1.01 SUMMARY:

A. The Work of this Contract includes furnishing all materials, equipment, tools and labor necessary to complete the upgrades to three (3) wastewater pump stations as described below and as shown on the Drawings. The three (3) pump stations include the following:

1. East Natick I Pump Station located on 75 Riverdale Court, Warwick, RI
2. East Natick II Pump Station located on 2 West Pontiac Street, Warwick, RI
3. Knight Street Pump Station located on 176 Knight Street, Warwick, RI

All three (3) wastewater pump stations are owned and operated by the City of Warwick Sewer Authority (WSA) and are located on City of Warwick-owned properties.

B. Work Includes:

1. The Work at East Natick I Pump Station includes, but is not limited to, the following major items:
 - a. Replacement of an existing 27" x 33" intake air louver and motorized damper with a new 36" x 24" louver and motorized damper.
 - b. Relocating an existing 18" x 18" exhaust fan and associated louver.
 - c. Patching existing openings within exterior masonry and interior concrete walls left from removing existing intake and exhaust louvers, and cutting new openings within existing interior concrete and exterior masonry walls to accommodate the new louver and relocated exhaust fan.
 - d. Extending electrical connections for power and control to new motorized damper and relocated exhaust fan as required.
 - e. Installing a new gas detector and connecting alarm outputs to the existing SCADA panel within the station. Programming of new alarm outputs at the SCADA panel including upgrades and final terminations will be performed by the Owner's instrumentation system integrator.
 - f. Relocating the existing electrical meter and disconnect switch mounted on the east exterior wall of the station to the east interior wall of the station, and providing a new primary overhead service into the existing pump station to the relocated meter as shown. Coordinate with NGRID as needed.
 - g. Installing a new modular flood-tight barrier for the existing station entrance door with channels mounted directly to the exterior masonry wall on either side of the entrance door.
 - h. Installing new check/flap valve on the outlet of the existing floor drain located within the existing wet well.
 - i. Replacing the existing asphalt roof shingles and drip edge for the pump station along with re-painting the existing wood fascia and soffits, wood siding on the gable ends and related wood trim.

SUMMARY OF WORK

- j. Restoration of all disturbed areas and utilities as indicated on the Drawings.
 - k. Operator training and start-up of mechanical, instrumentation and electrical equipment.
2. The Work at East Natick II Pump Station includes, but is not limited to, the following major items:
- a. Demolition of the existing Gorman-Rupp sewage lift station and appurtenances including: the removal and disposal of the above-grade skid mounted 6' long x 6' wide x 5' high fiberglass enclosure with two (2) 3 HP pumps, VFDs and control panel; 4" DI suction and discharge piping and associated fittings; electrical and control systems; and other miscellaneous items. Existing skid-mounted pumps, control panel and enclosure shall be returned back to the Owner. All other equipment and materials demolished and/or removed shall be disposed off-site by the Contractor.
 - b. Demolition of the existing above-grade electrical enclosure (60" long x 18" wide by 72" high) including housekeeping pad and appurtenances. Existing meter socket, manual transfer switch and portable generator receptacle to be relocated to the new above-grade enclosure. Existing electrical enclosure and related equipment shall be returned back to the Owner. All other equipment and materials demolished and/or removed shall be disposed off-site by the Contractor.
 - c. Removal and relocation of the existing meter socket assembly, manual transfer switch and portable generator receptacle from the existing above-grade electrical enclosure designated to be demolished to the new above-ground electrical enclosure as shown. Coordinate with NSTAR as needed.
 - d. Demolition of the existing above-grade SCADA panel (36" long x 12" wide x 42" high) including concrete housekeeping pad and appurtenances. Existing control and radio communication components within the panel to be relocated to the new above-grade enclosure along with the existing radio mast and antenna. Existing enclosure shall be returned back to the Owner. All other equipment and materials demolished and/or removed shall be disposed off-site by the Contractor.
 - e. Removal and relocation of the existing PLC, modules, rack, termination strip, hardware, radio antenna and mast, UPS and other relate components from the existing above-grade SCADA panel designated to be demolished to the new above-ground electrical enclosure. Existing SCADA, control and communication equipment shall be provided within a new NEMA 4 control panel. Coordinate with Owner's instrumentation system integrator as needed. Upgrades to the existing SCADA and radio components including final terminations of new control wiring will be completed by the Owner's instrumentation system integrator.
 - f. Replacement of the existing 36" x 30" wet well access hatch and frame with a new 60" x 30" wet well access water-tight hatch and frame.
 - g. Replacement of the existing 6" diameter aluminum wet well vent with a new 6" diameter PVC wet well vent.
 - h. Concrete work including patching of existing holes and openings within the concrete top of the wet well left from removing the items noted herein,

- providing a 1" skim coat over the top of the wet well and footings for the new steel elevated platform.
- i. Two (2) new 3 HP submersible pumps with guide rail system, 4" DI pipe, fittings and valves to be installed within the existing 10' long x 6' wide by 14'-6" deep concrete wet well as shown on the Drawings. New pump control panel to be installed within the new above-ground electrical enclosure.
 - j. Removal and replacement of a portion of the existing chain link fence as shown on the Drawings.
 - k. Structural work including new galvanized steel elevated platform with stairs, rails and associated footings for supporting the new above-ground electrical enclosure.
 - l. New above-ground NEMA 3R electrical enclosure to house the new pump control panel, new power panel, relocated meter socket assembly, relocated manual transfer switch and portable generator receptacle, relocated SCADA equipment and associated items as shown on the Drawings.
 - m. Site work including excavation, backfill and grading for new underground electrical and control conduits, grounding system, new fencing, new landscaping and restoration of all disturbed areas to match existing.
 - n. Operator training and start-up of the new pumps, controls and related systems as specified.
 - o. Coordination and installation of the temporary by-pass pumping system as shown on the Drawings. The Owner will furnish the temporary pumps and controls for use by the Contractor and will maintain the temporary bypass pumping system during the construction of the work.
3. The Work at Knight Street Pump Station includes, but is not limited to, the following major items:
- a. Removal of three (3) existing louvers (2 @ 1'-6" x 2'-3" and 1 @ 2'-3" x 2'-6") from the existing concrete intake air cupola located on the roof and filling the wall openings to match the existing concrete structure.
 - b. Installing new 3-foot concrete riser section on the existing intake air cupola with three (3) new fixed louvers of the same size (2 @ 1'-6" x 2'-3" and 1 @ 2'-3" x 2'-6").
 - c. Removal of an existing 2'-3" x 2'-3" exhaust fan with motorized damper and louver from the existing concrete exhaust air cupola located on the roof and filling the wall opening to match the existing concrete structure.
 - d. Installing new 3-foot concrete riser section on the existing concrete exhaust air cupola with a new roof top exhaust fan. Existing 3" plumbing vent, 4" and 6" exhaust ducts will be extended as shown on the Drawings.
 - e. Installing new fluid applied roof membrane system for the top and side surfaces of the extended and existing concrete cupolas.
 - f. Patching existing flashing between the bottom of the lower cupola walls and station roof where existing flashing has been disturbed. New flashing shall match existing.

- g. Extending the electrical service for the existing exhaust fan to the new roof exhaust fan.
 - h. Installing new by-pass system including 8" x 6" tapping sleeve & valve, 6-foot diameter pre-cast concrete manhole, 6" DI pipe and cap assembly.
 - i. Installing new level sensors and bubbler tube within the existing wet well including underground conduit, mounting brackets and related items as shown on the Drawings.
 - j. Installing a new 2' x 2' access hatch within the concrete top slab of the existing wet well.
 - k. Replacing the existing 8" DI flanged gooseneck vent for the existing wet well, and replacing the existing 6" DI flanged gooseneck vent for the existing macerator chamber as shown on the Drawings.
 - l. Operator training and start-up of mechanical, instrumentation and electrical equipment.
- C. During the installation and testing of the work, the Contractor shall take all necessary precautions to minimize disturbance to the normal operations of the existing pumping stations and wastewater system.
- D. The Contractor is responsible for all coordination to complete the scope of work of the project as shown in the drawings and specified herein.

1.03 CONSTRUCTION SEQUENCE AND CONSTRAINTS:

- A. The Contractor shall be responsible for scheduling his activities and the activities of any subcontractors involved, to meet the time duration established for the contract. Scheduling of the work shall be coordinated with the Owner and Engineer as determined at the Pre-Construction Conference.
- B. Specific components of the work that may impact normal system operations shall not commence without the prior approval of the Engineer. Any interruption in service shall be limited in duration, and approved by and coordinated with the Owner.
- C. The work to be performed at the East Natick II Pump Station shall be sequential so that the new elevated steel platform, new above-ground electrical enclosure, new conduit and new wet well access hatch are furnished and installed prior to taking the existing pump station out of service.
- 1. The Owner will furnish the temporary by-pass pumps and controls for use by the Contractor to complete the work. The Contractor shall furnish 900 feet of lay flat hose needed for the temporary by-pass system. The Contractor shall install the temporary by-pass pump system as shown on the drawings and as specified which will be maintained by Owner personnel.
 - 2. Temporary electrical service and connections necessary to complete the work as shown on the drawings within the sequence described herein, and maintain station capacity shall be furnished and installed by the Contractor prior to commencing the work.
- D. The work to be performed at the East Natick I Pump Station shall be sequential so that the new electrical overhead service, cable, conduit, building penetrations and related components

are furnished and installed prior to taking the existing electrical meter socket and related components out of service.

1. Temporary electrical service and connections necessary to complete the work as shown on the drawings within the sequence described herein, and maintain station capacity shall be furnished and installed by the Contractor prior to commencing the work.
- E. The Contractor shall submit a work plan as specified in Section 01300 indicating the proposed sequence of construction to complete the major items of work at each station, and methods to be employed to maintain station capacities during the construction.
- F. The Contractor shall coordinate the operation of existing valves, timing and duration of shutdown of existing force mains, markouts, and reactivation of force mains with the Engineer and Owner and provide at least 24 hours notification to the Engineer and Owner prior to the stated work.

1.04 PROJECT/SITE CONDITIONS:

A. Existing Conditions:

1. Use of Premises and Offsite Work:
 - a. Limits of construction shall be confined within actual work areas as shown on the Drawings.
 - b. Contractor shall coordinate with the Warwick Sewer Authority (WSA) for use of pump station property for staging areas and temporary construction facilities. Construction operations and storage of materials shall be confined to the areas agreed to by the WSA, and shall not interfere with the normal operating functions of the facility.
 - c. Contractor shall dispose of materials from excavations that are unsuitable for use as backfill, as specified in Section 02221, and material to be demolished as specified in Section 02050 where applicable. Contractor shall provide for disposal of unsuitable and waste materials off site in accordance with all applicable laws.
2. In advance of shop drawing submittals for connecting buried pipe, couplings, and fittings, the Contractor shall confirm via test pitting the pipe depth, horizontal and vertical alignment, actual outside diameter and ovality of the pipe. The Contractor shall backfill and compact each test pit excavation in accordance with Section 02221.
3. Equipment protection and dust control:
 - a. Contractor shall provide ventilated enclosures to house equipment (pumps, control panels, VFD) within the existing pump stations when necessary to protect the equipment from dust and debris. The enclosures shall allow access by Owner staff for operations and maintenance activities.
 - b. Contractor shall clean up dust and dirt in construction area at the end of every working day.
 - c. Contractor shall maintain filtered ventilation to all operating motors and equipment so that dust protection measures do not cause an increase in the ambient air temperature around operating motors and equipment.

- d. Contractor shall vacuum existing motors, equipment and areas surrounding them to eliminate visible deposition of dust at the end of each working day, and not less than once per week, during construction activities in the building.
- 4. The Contractor shall maintain uninterrupted electrical power and lighting service during the Work.
- 5. Wetlands Resource and Riverfront Areas
 - a. A portion of the work is located with buffer zones of regulated wetland resource and riverfront areas. Contractor shall conduct his activities as necessary to minimize disturbances to the existing resource areas.

END OF SECTION

SECTION 01011

GENERAL PROJECT REQUIREMENTS

PART 1 GENERAL

1.01 WATER FOR CONSTRUCTION PURPOSES:

- A. The Contractor may be allowed to use water available at the site without the charge for jetting backfill and other construction purposes. The express approval of the Owner shall be obtained before water is used. Waste of water by the Contractor shall be sufficient cause for withdrawing the privilege of unrestricted use.

1.02 CONTRACTOR'S EMERGENCY SERVICE:

- A. Any Contractor whose place of business is located beyond the vicinity of the site of the work and who does not maintain local headquarters 24 hours a day must make satisfactory arrangements with the Owner to service emergencies or complaints which may occur at night, over the weekend, or when the job is shutdown. If he does not, the Owner may make arrangements and the cost will be charged to the Contractor.
- B. Before the final estimate is certified for payment, the Contractor shall make similar arrangements to cover the guarantee period.

1.03 WORK AREA:

- A. In general, the limit of work lines will be the street lines and/or property and easement lines as defined on the Drawings or in these Specifications, and represent the bounds within which the Contractor shall perform all construction operations. Rights to occupy or use additional lands which may be desired or required by the Contractor for access to the work area or for erection of temporary structures, storage of materials or additional working space shall be obtained by the Contractor at no additional cost to the Owner. Approval to use or store materials on land of the Owner shall be obtained from the Owner.

1.04 WORK IN FREEZING WEATHER:

- A. Unless written permission is given, work liable to be affected by frost shall be suspended during freezing weather. When work proceeds in such a condition, the Contractor shall provide approved facilities for heating the materials and for protecting the finish work.
- B. In placing concrete or brick masonry during freezing weather, the Contractor shall take all necessary precautions for removing the ice and frost from materials, and shall thoroughly heat the water, sand and gravel or crushed stone used, so that mortar and concrete shall be warm throughout when placed in the work; shall provide satisfactory covering for the newly-laid masonry by tarpaulin, wood and building paper shelters, or other approved means; and shall provide approved artificial means for keeping the air warm and moist beneath said covering for protecting newly laid masonry from freezing, and for securing work satisfactory in all respects. The Engineer may, however, prohibit the laying of masonry or placing of concrete at any time when in his judgment, the conditions are unsuitable or the proper precautions are not being taken, whatever the weather may be, in any season.
- C. Temporary heating apparatus shall be installed and operated in such manner that the finished work will not be damaged thereby.

1.05 PIPE LOCATION:

- A. Pipelines will be located substantially as indicated on the drawings, but the right is reserved to the Owner, acting through the Engineer, to make such modifications in location as may be found desirable to avoid interference with existing structures or for other reasons. Where fittings, etc., are noted on the Drawings, such notation is for the Contractor's convenience and does not relieve him from laying and jointing different or additional items where required.

1.06 HAULING, HANDLING AND STORAGE OF MATERIALS:

- A. The Contractor shall, at his own expense, handle and haul all materials furnished by him and shall remove any of his surplus materials at the completion of the work.
- B. The Contractor shall be responsible for obtaining offsite land to provide suitable and adequate storage for equipment and materials furnished by him that are liable to injury and shall be responsible for any loss of or damage to any equipment or materials by theft, breakage, or otherwise.
- C. All excavated materials and equipment to be incorporated in the Work shall be placed so as not to injure any part of the Work or existing facilities and so that free access can be had at all times to all parts of the Work and to all public utility installations in the vicinity of the work. Materials and equipment shall be kept neatly piled and compactly stored in such location as will cause a minimum of inconvenience to public travel and adjoining owners, tenants and occupants.
- D. The Contractor shall be responsible for all damages to the work under construction during its progress and until final completion and acceptance even though partial payments have been made under the Contract.

1.07 OPEN EXCAVATIONS:

- A. All open excavations shall be adequately safeguarded by providing temporary barricades, caution signs, lights and other means to prevent accidents to persons, and damage to property. The Contractor shall, at his own expense, provide suitable and safe means for completely covering all open excavations and for accommodating travel when work is not in progress.
- B. Bridges provided during construction shall be removed when no longer required.
- C. The length of open trench will be controlled by the particular surrounding conditions but shall always be confined to the limits prescribed by the Engineer.
- D. If the excavation becomes a hazard, or if it excessively restricts traffic at any point, then special construction procedures shall be taken, such as limiting the length of trench and prohibiting stocking excavated material in the street.
- E. All street excavations shall be completely closed at the end of each work day. The use of steel plates of adequate strength to carry traffic shall be used.

1.08 CARE AND PROTECTION OF PROPERTY:

- A. The Contractor shall be responsible for the preservation of all public and private property, and shall use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work on the part of the

Contractor, such property shall be promptly restored by the Contractor, at his expense, to a condition similar or equal to that existing before the damage was done, to the satisfaction of the Engineer.

1.09 DIMENSIONS OF EXISTING STRUCTURES:

- A. Where the dimensions and locations of existing structures are of critical importance in the installation or connections of new work, the Contractor shall verify such dimensions and locations in the field before the fabrication of any material or equipment which is dependent on the correctness of such information.

1.10 COORDINATION OF WORK:

- A. The Contractor shall be responsible for coordinating his own work as well as that of any subcontractors. He shall be responsible for notification of the Engineer when each phase of work is expected to begin and the approximate completion date.

1.11 COMPLIANCE WITH PERMITS:

- A. The Contractor shall perform all work in conformance with requirements of the Permits as described in Section 01067 - PERMITS.

1.12 CONNECTIONS TO EXISTING SEWER SYSTEMS:

- A. Connections to the existing sewer system shall be made as shown on the drawings and/or as approved by the Owner.
- B. The Contractor will be required to make test excavations to ascertain that the proposed position of the connections will be clear of joints, fittings, or other obstructions.

1.13 CONTRACTOR'S REPRESENTATIVE:

- A. The Contractor shall designate a representative who will be available to respond to emergency calls by the Owner at any time day and night and on weekends and holidays should such a situation arise.

1.14 HOURS OF CONSTRUCTION ACTIVITY:

- A. The Contractor shall conduct all construction activity between 7:00 a.m. and 5:00 p.m., Monday through Friday. No construction work shall be allowed on Weekends (Saturdays and Sundays), nights or Holidays without written authorization from the Owner.
- B. The Owner will provide personnel for assistance in locating and operating valves at no cost to the Contractor during the Owner's normal working hours (Monday through Friday 7:00 a.m. to 3:00 p.m.). When assistance is required by the Contractor outside of the Owner's normal working hours, the cost shall be incurred by the Contractor at the prevailing overtime rate of pay for the WSA personnel providing the assistance. The Owner shall bill the Contractor directly.
- C. The Contractor shall provide 72 hours notice to the Owner when assistance is required outside of the Owner's normal working hours.

1.15 MAINTENANCE OF FLOW:

- A. The Contractor shall at his own cost, provide for the flow of sewers and drains interrupted during the progress of the work, and shall immediately cart away and dispose of all offensive matter. The entire procedure of maintaining existing flow shall be fully discussed with the Engineer well in advance of the interruption of any flow.
- B. All existing drainage facilities including, but not limited to; brooks, streams, canals, channels, ditches, culverts, catch basins and drainage piping shall be adequately safeguarded so as not to impede drainage or to cause siltation of downstream areas in any manner whatsoever. If the Contractor damages or impairs any of the aforesaid drainage facilities, he shall repair the same within the same day.
- C. At the conclusion of the work, the Contractor shall remove all silt in drainage structures caused by his operations as described in Section 01770 PROJECT CLOSEOUT.

1.16 REJECTED MATERIALS AND DEFECTIVE WORK:

- A. Materials furnished by the Contractor that are unsuitable or not in conformity with the specifications shall forthwith be removed from the work by the Contractor, and shall not be made use of elsewhere in the work.
- B. Any errors, defects or omissions in the execution of the work or in the materials furnished by the Contractor shall be forthwith rectified and made good by and at the expense of the Contractor.
- C. The Contractor shall reimburse the Owner for any expense, losses or damages incurred in consequence of any defect, error, omission or act of the Contractor or his employees, occurring previous to the final payment.

1.17 SANITARY REGULATIONS:

- A. Sanitary conveniences for the use of all persons employed on the work, properly screened from public observation, shall be provided in sufficient numbers in such manner and at such locations as may be approved. The contents shall be removed and disposed of in a satisfactory manner as the occasion requires. The Contractor shall rigorously prohibit the committance of nuisances within, on or about the work. Any employees found violating these provisions shall be discharged and not again employed on the work without the written consent of the Engineer. The sanitary conveniences specified above shall be the obligation and responsibility of the Contractor.

1.18 SAFETY AND HEALTH REGULATIONS:

- A. This project is subject to the Safety and Health regulations of the U.S. Department of Labor set forth in 29 CFR, Part 1926, and to the Rhode Island Department of Health, Division of Occupational Health (RIGL Title 23 Health and Safety). Contractors shall be familiar with the requirements of these regulations.

1.19 SITE INVESTIGATION:

- A. The Contractor acknowledges that he has satisfied himself as to the conditions existing at the site of the work, the type of equipment required to perform this work, the quality and quantity of the materials furnished insofar as this information is reasonably ascertainable from an inspection of the site, as well as from information presented by the drawings and specifications made a part of this contract. Any failure of the Contractor to acquaint himself with available information will not relieve him from the responsibility for

estimating properly the difficulty or cost of successfully performing the work. The Owner assumes no responsibility for any conclusion or interpretation made by the Contractor on the basis of the information made available by the Owner.

1.20 OCCUPYING PRIVATE PROPERTY:

- A. The Contractor shall not enter upon nor occupy with men, equipment or materials any property outside of the public highways or Owner's easements, except with the written consent of the property owner or property owner's agent.

1.21 HAZARDOUS WASTE:

- A. Should the Contractor, while performing work under this contract, uncover hazardous materials as defined in RIDEM Hazardous Waste Regulations DEM OWM-HW-01-16, he shall immediately notify the Engineer. The Contractor is not, and has no authority to act as, a handler, generator, operator or disposer of hazardous or toxic substances found or identified at the site, and the Owner shall undertake all such functions.

1.22 ROOF PROTECTION:

- A. Where work must be performed over completed roofing, the roofing shall be protected by 2 layers of 1/2-inch thick plywood, laid with joints in the second layer offset 1/2 sheet width and length from joints in the first layer. No material shall be stored or work performed on areas of roof which are not so protected.

1.23 WEATHER PROTECTION:

- A. The Contractor shall install weather protection and shall furnish adequate heat in the area so protected during the months of November through March.

1.24 ELECTRICAL SERVICES:

- A. The Contractor shall make all necessary applications and arrangements and pay for all fees and charges for electrical energy for power and light necessary for the proper completion of this contract during its entire process. The Contractor shall provide and pay for all temporary wiring, switches, connections, and meters

1.25 HANGERS, PADS AND SUPPORTS:

- A. Unless otherwise indicated, hangers and supports shall be by the trade providing the supported item.
- B. Except where detailed or specified, design of hangers and supports shall be the responsibility of the Contractor. All parts of such hangers or supports shall be designed in accordance with accepted engineering practice, using a factor of safety of at least 2.5.
- C. When proprietary hangers, etc., are supplied, satisfactory evidence of the strength of such items shall be furnished.
- D. Hangers for items hung from steel and concrete shall be centered on the vertical center of gravity of the beam.
- E. Locations and sizes of openings, sleeves, concrete pads, steel frames, and other equipment supports are indicated on the drawings for bidding purposes only. Final sizes and locations of such items shall be obtained from the shop drawings.

1.26 SLEEVES, HOLES, HANGERS, INSERTS, ETC.:

- A. Except where holes and openings are dimensioned, and hangers, inserts, and supports are fully called for on the architectural and structural drawings (or reference is made thereon to drawings containing such information) to accommodate mechanical or electrical items, they shall be by the mechanical or electrical trade concerned.
- B. Sleeves, inserts, anchors, etc., supplied under the mechanical and electrical contracts in sufficient time to so permit, shall be set in concrete, masonry, etc., or fastened to steel deck, etc., by the respective architectural or structural trade. Where not supplied in sufficient time, installation of such items shall be the responsibility of the mechanical or electrical trade involved.
- C. Nailers and other wood members attached to steel or masonry, for which fasteners are not indicated on the design drawings or in the specification, shall be fastened with the equivalent of 1/2-inch diameter bolts at 3 feet o.c.
- D. Openings for mechanical and electrical items in finished areas of the building shall be closed off with near escutcheon plates or similar closures. These closures shall be by the mechanical or electrical trade involved.

1.27 REFERENCES:

- A. Where references are made in the Contract Documents to Publications and Standards issued by Associations or Societies, the intent shall be understood to specify the current edition of such Publication or Standards (including tentative revisions) in effect on the date of the Contract advertisement notwithstanding any reference to a particular date.
- B. There shall be sufficient electric lighting so that all work may be done in a workmanlike manner where there is not sufficient daylight.

1.28 WORK PLANS:

- A. The Contractor shall submit a work plan for each significant phase of construction associated with the work as described in Section 01300.

1.29 CONSTRUCTION CREWS:

- A. The Contractor shall not increase the number of construction crews assigned to the work area without providing one week advance notice to the Engineer.

1.30 ACTIONS BY THE ENGINEER - EMERGENCY:

- A. The intention of any other Sections of this Contract relative to actions by the Engineer in an emergency is not to relieve the Contractor from acting, but to provide for consultations between the Engineer and Contractor in an emergency which permits time for such consultation.

1.31 CHANGES BY THE CONTRACTOR:

- A. Changes in the plans and specifications requested by the Contractor and/or his subcontractors or suppliers must be in writing to the Engineer by the Contractor and approved by the Engineer. Such approved changes shall be acted upon by the Engineer as change orders or minor changes in accordance with the requirements of the Contract. Unless approved to be incorporated into change orders by the Engineer, the cost of Contractor requested changes shall be borne by the Contractor.

1.32 CONSTRUCTION SCHEDULES AND METHODS DESCRIPTIONS:

- A. Schedules and methods descriptions submitted are subject to the approval of the Engineer. Form and content should be sufficient to convey a clear and complete picture in adequate detail. Additional or new submissions may be required by the Engineer if form, content or detail is inadequate, in the Engineer's opinion. Schedules shall be by the Critical Path Method (CPM) submitted, for the Engineer's approval, in six (6) copies at least one (1) week before the Preconstruction Conference.
- B. Construction schedules should, as a minimum, show:
 - 1. Start and finish dates for all significant activities and portions of the work.
 - 2. Clear indication of the intended sequence, time duration and activity levels of Contractor's operations arranged to show completion within the contract time.
 - 3. The added and aggregate value of work completed for each successive monthly period over the contract time.
 - 4. Construction schedules shall be updated monthly and submitted with payment applications.
- C. If the Contractor's activities differ substantially from the approved schedule, in the Engineer's opinion, or if it is necessary to coordinate the work with that of other Contractors, the Engineer may direct or request and the Contractor will provide a revised schedule consistent with actual progress or as necessary to provide the required coordination.
- D. The cost of all submissions under these requirements, whether initial or in response to the Engineer's request for additional or revised information, shall be provided for in the Contractor's bid. No additional compensation shall be paid.

1.33 SEQUENCE OF CONSTRUCTION:

- A. The order or sequence of execution of the work, the methods of construction, the general conduct of the work, and the general arrangement of the construction plans to be installed shall be in accordance with Section 01010 SUMMARY OF WORK and shall at all times be subject to the review of the Engineer. This includes the requirement that clearing, grading and excavation activities be effectively coordinated with the construction schedule.

1.34 LINES, GRADES, AND MEASUREMENTS:

- A. The Contractor shall be responsible for laying out the work including all lines, grades, elevations and measurements necessary for the proper completion of the work as described in Section 01010. The Contractor shall employ a competent civil engineer, registered in Rhode Island as a Professional Engineer or Land Surveyor to conduct all layout and survey work as required, and shall be subject to the approval of the Engineer. The Contractor shall require said engineer to establish all lines, elevations, reference marks, batter boards, etc., as needed by the Contractor during the progress of the Work, and from time to time to verify such marks by instrument or other appropriate means.
- B. The Engineer shall be permitted at all times to check the lines, elevations, reference marks, batter boards, etc., set by the Contractor, who shall correct any errors in lines, elevations, reference marks, batter boards, etc., disclosed by such check. Such a check shall not be construed to be an approval of the Contractor's work and shall not relieve or

diminish in any way the responsibility of the Contractor for the accurate and satisfactory construction and completion of the entire Work.

- C. The Contractor shall make, check, and be responsible for all measurements and dimensions necessary for the proper construction of and the prevention of misfittings in the work.

1.35 WORK TO CONFORM:

- A. During its progress and on its completion, the Work shall conform truly to the lines, levels, and grades indicated on the Drawings and shall be built in a workmanlike manner, in strict accordance with the Drawings, Specifications, and other Contract Documents and the directions given from time to time by the Engineer.
- B. All work done without instructions having been given therefore by the Engineer, without proper lines or grades shall not be estimated or paid for except when such work is authorized by the Engineer in writing. Work so done may be ordered uncovered or taken down, removed, and replaced at the Contractor's expense, if found not to be in accordance with the Contract lines and grades and Contract Specifications.

1.36 SAFETY REGULATIONS:

- A. The Contractor shall take all necessary precautions and provide all necessary safeguards to prevent personal injury and property damage. The Contractor shall provide protection for all persons including but not limited to his employees and employees of other contractors or subcontractors; members of the public; and employees, agents, and representatives of the Owner, Engineer, and regulatory agencies that may be on or about the Work. The Contractor shall provide protection for all public and private property including, but not limited to, structures, pipes, and utilities, above and below ground.
- B. The Contractor shall provide and maintain all necessary safety equipment such as fences, barriers, signs, lights, walkways, guards and fire prevention and fire fighting equipment and shall take such other action as is required to fulfill his obligations under this subsection.
- C. The Contractor shall comply with all applicable Federal, State, and local laws, ordinances, rules, and regulations and lawful orders of all authorities having jurisdiction for the safety of persons and protection of property.

1.37 CONTROL OF POLLUTION DUE TO CONSTRUCTION:

- A. During construction, the Contractor shall take all necessary provisions specified in Section 01500 and as required by local, state and federal requirements.

END OF SECTION

SECTION 01150

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.01 DESCRIPTION:

- A. The following sections describe the measurement and payment for all the Work to be done under the respective items listed in the BID FORM.
- B. Each lump sum or unit price stated in the BID FORM shall constitute full compensation as herein specified, for all of the work completed in accordance with the drawings and specifications. All other activities required in connection with performance of the work, including all work required under Division 1, GENERAL REQUIREMENTS, whether described in the contract documents or mandated by applicable codes, permits and laws, will not be separately paid for unless specifically provided for in the BID FORM, but will be considered to be incidental to performance of the Work.
- C. Payment for all work shall be in compliance with the Contract Documents, and shall be in accordance with the lump sum and unit prices bid, and the accepted Schedule of Values, as described in Section 01370.
- D. All estimated quantities stipulated in the BID FORM are approximate and are to be used as a basis for estimating the probable cost of the work and for the purpose of comparing bids submitted for the work. The actual amount of work performed and materials furnished under the unit price bid items may differ from the estimated quantities. The basis of payment for work and materials shall be for the actual amount of work performed and materials furnished.
- E. If changes are made in the design that were shown on the drawings and specifications in the original contract and should such changes increase or decrease the quantity of work to be performed, adjustments to the contract amount shall be determined in accordance with the Contract Documents, the unit prices bid and the accepted Schedule of Values.

1.02 BID ITEM 1 – DEMOLITION & UPGRADES AT THE EAST NATICK I PUMP STATION:

- A. The lump sum price for Bid Item 1 shall constitute full compensation for furnishing all mobilization and demobilization, labor, supervision, materials, tools, supplies, and equipment required to complete all Work at the East Natick I Pump Station site as shown on the drawings and called for in the specifications.
- B. Measurement for the work performed under Bid Item 1 shall be on a percent completion basis for each activity in accordance with the detailed cost breakdown of the lump sum price shown in the Schedule of Values as approved by the Owner.
- C. Payment for the work performed shall be in accordance with the Schedule of Values and the approved percent completion.
- D. The cost of work by NGRID related to relocating and/or upgrading the metering equipment and primary electrical service for the existing pumping station as shown on the drawings and as specified in Section 01010 shall not be included in the lump sum price, but shall be measured and paid for under the separate bid item.
- E. The cost of work by the Owner's independent instrumentation system integrator related to terminating and programming the alarm outputs for the new gas detector at the existing SCADA alarm panel as shown on the drawings and as specified in Section 01010 shall not be

included in the lump sum price, but shall be measured and paid for under the separate bid item for this work.

1.03 BID ITEM 2 – DEMOLITION & UPGRADES AT THE EAST NATICK II PUMP STATION:

- A. Payment of the lump sum price for Bid Item 2 shall constitute full compensation for all mobilization and demobilization, labor, supervision, materials, tools, supplies, and equipment required to complete all Work at the East Natick II Pump Station site as shown on the drawings and called for in the specifications.
- B. Measurement for the work performed under Bid Item 2 shall be on a percent completion basis for each activity in accordance with the detailed cost breakdown of the lump sum price shown in the Schedule of Values as approved by the Owner.
- C. Payment for the work performed shall be in accordance with the Schedule of Values and the approved percent completion.
- D. The cost of work by NGRID related to relocating and/or upgrading the metering equipment and primary electrical service for the existing pumping station as shown on the drawings and as specified in Section 01010 shall not be included in the lump sum price, but shall be measured and paid for under the separate bid item.
- E. The cost of work by the Owner's independent instrumentation system integrator related to the existing SCADA and radio components being relocated to the new above-ground electrical enclosure, including terminations from the new pump control panel, as shown on the drawings and as specified in Section 01010 shall not be included in the lump sum price, but shall be measured and paid for under the separate bid item for this work.

1.04 BID ITEM 3 – DEMOLITION & UPGRADES AT THE KNIGHT STREET PUMP STATION:

- A. Payment of the lump sum price for Bid Item 3 shall constitute full compensation for all mobilization and demobilization, labor, supervision, materials, tools, supplies, and equipment required to complete all Work at the Knight Street Pump Station site as shown on the drawings and called for in the specifications.
- B. Measurement for the work performed under Bid Item 3 shall be on a percent completion basis for each activity in accordance with the detailed cost breakdown of the lump sum price shown in the Schedule of Values as approved by the Owner.
- C. Payment for the work performed shall be in accordance with the Schedule of Values and the approved percent completion.

1.05 BID ITEM 4 - BUILDING PERMITS:

- A. An allowance for the building permits expected to be required for this project is included in the BID FORM. This allowance is approximate and the actual amount to be paid may be more or less. The Contractor will be reimbursed by the Owner for the actual amount invoiced to the Contractor without overhead or profit applied. The Contractor will submit to the Owner a statement documenting the building permits obtained and the cost for each including a copy of the invoice.
- B. The Contractor shall obtain and pay for the building permits required for the completion of the work at the wastewater pump stations. If the actual building permit costs exceed the allowance, the contract will be adjusted so that the Contractor will be reimbursed for the actual cost invoiced.

- C. Payment for building permits shall be in accordance with the contract allowance as specified herein.

1.05 BID ITEM 5 – WORK BY NGRID:

- A. An allowance for the work to be billed by the electric utility serving this project, National Grid, to the Contractor to furnish and install materials, equipment, labor and incidentals necessary to relocate and reconnect the existing metering equipment and primary service at the East Natick I and East Natick II Pump Stations is included in the Bid Schedule. This allowance is approximate and the actual amount to be paid may be more or less. The Contractor will be reimbursed by the Owner for the actual amount invoiced to the Contractor without overhead or profit applied. The Contractor will submit to the Owner a statement documenting the work completed and the cost of the service including a copy of the invoice from National Grid.
- B. The Contractor shall coordinate, arrange and pay for the services of National Grid to relocate and reconnect the existing metering equipment and primary service at the East Natick I and East Natick II Pump Stations as shown on the drawings and called for in the specifications. If the actual cost for the services provided by National Grid exceeds the allowance, the contract will be adjusted so that the Contractor will be reimbursed for the actual cost invoiced.
- C. Payment for the electrical utility services to be provided shall be in accordance with the contract allowance as specified herein.

1.06 BID ITEM 6 – WORK ASSOCIATED WITH UPGRADING OWNER’S EXISTING SCADA AND RADIO COMMUNICATION EQUIPMENT:

- A. An allowance for the work to be completed by the Owner’s independent instrumentation system integrator to upgrade the Owner’s existing SCADA panels and radio communication equipment at the East Natick I and East Natick II Pump Stations is included in the Bid Schedule. This allowance is approximate and the actual amount to be paid may be more or less. The Contractor will be reimbursed by the Owner for the actual amount invoiced to the Contractor without overhead or profit applied. The Contractor will submit to the Owner a statement documenting the work completed and the cost of the service including a copy of the invoice from the security system company.
- B. The Contractor shall coordinate, arrange and pay for the services to upgrade the existing SCADA and radio communication equipment at the East Natick I and East Natick II Pump Stations including final terminations of new control and signal wiring as shown on the drawings and called for in the specifications. If the actual cost for the services exceeds the stipulated sum, the contract will be adjusted so that the Contractor will be reimbursed for the actual cost invoiced.
- C. Payment for the services to be provided to upgrade the Owner’s existing SCADA and radio communication equipment shall be in accordance with the contract allowance as specified herein.

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This section includes the procedures, general methods and requirements for submitting shop or working drawings, engineering data, samples, operation and maintenance manual and other required submissions as noted in the specifications.
- B. The Contractor shall submit a preliminary schedule of all required shop drawings to the Engineer for approval within 15 days after notification to proceed.

1.02 DEFINITIONS:

- A. Shop drawings will be returned, stamped with the following classifications:
 - 1. REVIEWED NO EXCEPTIONS: No corrections or marks.
 - 2. REVIEWED EXCEPTIONS NOTED: Few minor corrections. All items may be fabricated as marked up without further resubmission. Resubmit record corrected copy to Engineer.
 - 3. REVISE & RESUBMIT: Revisions or corrections required. Items not noted to be revised and corrected may be fabricated at Contractor's option. Resubmit drawings with corrections noted.
 - 4. REJECTED: Major corrections or not in accordance with Contract Documents. No items shall be fabricated. Correct and resubmit shop drawings as per original submission.
 - 5. INFORMATION ONLY: Items not reviewed or for which submittals are not required.

1.03 SHOP OR WORKING DRAWINGS:

- A. The Contractor shall submit six (6) copies each of shop drawings and engineering data required as noted in the specifications, covering all systems, equipment, structural details and fabricated materials that will become a permanent part of the work under this Contract.
- B. Each submittal shall include drawings and descriptive information in sufficient detail to show kind, size, arrangement, and operation of component materials and devices; external connections, anchorages, and supports required; performance characteristics; and dimensions needed for installation and correlation with other materials and equipment. Refer to detailed equipment specification for more specific submittal requirements.
- C. Shop drawings shall include certificates of conformance or affidavits from the manufacturers and shall include complete manufacturer's handling and installation instructions. When required in other sections of the specifications, shop drawings including design calculations shall be stamped by a Professional Engineer registered in the State of Rhode Island and shall indicate details and methods of construction.

- D. Shop drawings prepared by subcontractors shall be submitted through the Contractor's office only, and shall be checked by the Contractor before being forwarded to the Engineer and so noted in writing by the Contractor. It will be the Contractor's responsibility to coordinate the work of the various subcontractors.
- E. Submit 6 copies (max. size 26 x 40 inches) of each drawing and required data to the Engineer. All submittals shall be clear and legible.
 - 1. Engineer will only accept submittals from Contractor.
 - 2. Three copies of all shop drawings will be returned to the Contractor.
 - 3. Fax copies may be used to assist in exchange of information during the submittal process but will not be acceptable as shop drawings.

1.04 SAMPLES:

- A. Samples specified in individual Sections include, but are not necessarily limited to, physical examples of the work such as sections of manufactured or fabricated work, small cuts or containers of materials, complete units of repetitively-used products, color/texture/pattern swatches and range sets, specimens for coordination of visual effect, graphic symbols, and units of work to be used by the Engineer or Owner for independent inspection and testing, as applicable to the work.
- B. The number of samples submitted shall be as specified in the respective sections of the specifications. Submittal and processing of samples shall follow the procedures outlined for shop and working drawings unless the specifications call for a field submittal or mock-up.
- C. Acceptance of samples will be acknowledged via a copy of the transmittal noting status. When samples are not acceptable, prompt resubmittal will be required.

1.05 OPERATING AND MAINTENANCE MANUALS AND SPARE PARTS LISTS:

- A. Where reference is made in technical specification sections to operating and maintenance manuals and/or spare parts lists, the Contractor shall submit six copies in accordance with the instructions furnished under "Shop and Working Drawings." If the submittal is complete and does not require any changes, an acknowledgment (copy of transmittal) will be returned noting status. If the submittal is incomplete or does require changes, corrections, additions, etc., two copies of the submittal will be returned with a copy of transmittal noting status.
- B. Six copies of the final operating and maintenance manuals and/or spare parts list shall be delivered to the Engineer prior to or with the equipment when it is delivered to the job site. For systems requiring field adjustment and balancing, such as heating and ventilating, the Contractor shall submit separate test results and adjustment data on completion of the work, to be incorporated into the system manual.
- C. The information included in the manual shall be as described in the specification sections, but as a minimum shall contain clear and concise instructions for operating, adjusting, lubricating and maintaining the equipment, an exploded assembly drawing identifying each part by number and a listing of all parts of the equipment, with part numbers and descriptions required for ordering spare parts. Spare parts lists shall include recommended quantity and price.
- D. Operating and maintenance manuals shall be in durable loose leaf binders, on 8-1/2 inch by 11 inch paper, with diagrams and illustrations either on 8-1/2 inch by 11 inch or multiple foldouts. The instructions shall be annotated to indicate only the specific equipment furnished.

Reference to other sizes or models of similar requirement shall be deleted or neatly lined out.

1.06 CONSTRUCTION SCHEDULES:

- A. Within 15 days after notification to proceed, the Contractor shall submit a preliminary progress schedule and schedule of values to the Engineer for review at the preconstruction conference.
- B. The progress schedule shall include, as a minimum, the times for starting and completing the various stages of the work, including any milestones specified in the Contract Documents.

1.07 CONTRACTOR'S WORK PLANS:

- A. The Contractor shall submit a work plan for each major phase of construction associated with the work including, but not limited to, the following:
 - 1. Sequence of Construction
 - 2. Support of Excavation/Dewatering
 - 3. East Natick I Pump Station Upgrades
 - 4. East Natick II Pump Station Upgrades
 - 5. Knight Street Pump Station Upgrades
 - 5. Startup/Testing of New Pumps, Controls, HVAC and Related Equipment
 - 6. Temporary Connections.
- B. The work plans shall be submitted to the Owner for review a minimum of ten (10) working days prior to the starting a particular phase of construction. The work shall not proceed without the Owner's approval of the work plan.
- C. The work plans shall include, but not limited to, the following information to accurately describe the proposed work for each major phase of construction:
 - 1. Scope of Work
 - 2. Schedule and Sequence of work
 - 3. Methods of Construction
 - 4. Proposed manpower and equipment
 - 5. Back-up equipment
 - 6. Temporary Pump Bypass System
 - 7. Staging area
 - 8. Soil Management
 - 9. Dewatering Requirements

1.08 SEQUENCING AND SCHEDULING:

- A. Allow fourteen (14) days for Engineer's review of all submittals and resubmittals.
- B. Ensure that resubmittals are made within 30 days of date of letter returning material to be modified or corrected.
 - 1. For extension of time period, submit request within 14 days of date above listing reasons resubmittal cannot be completed within stipulated time period.
- C. Any need for more than one resubmission, or any other delay in obtaining Engineer's approval of submittals, will not extend Contract Time unless delay of work is directly caused by:
 - 1. Change in work authorized by Change Order.

2. Failure of Engineer to return any submittal within 14 days after its receipt in the Engineer's office.

PART 2 - PRODUCTS - NOT APPLICABLE

PART 3 - EXECUTION

3.01 PREPARATION:

A. General:

1. Each shipment of submittals shall be complete and shall be accompanied by a standard shop drawing transmittal which shall include a list of the drawings, descriptions and numbers and the names as specified herein.
2. Submittals shall be consecutively numbered in direct sequence of submittal without division by subcontracts or trades.
3. All submittals shall be stamped, regardless of origin, with approval and identified with:
 - a. Owner's name
 - b. Name and number of this contract.
 - c. Contractor's name.
 - d. Manufacturer's/supplier's name.
 - e. References to applicable specification paragraphs and drawings.
4. Clearly identify applicable items and manufacturer's name when catalog pages are submitted and indicate current revision, issue number, and date on all drawings and other descriptive data.
5. Clearly identify all deviations from Contract Documents on each submittal and tabulate in letter of transmittal. Indicate essential details of all proposed changes (including modifications to other facilities that may result from deviation) as pertinent to deviation.
6. Provide vacant space approximately 4 inches high by 4 inches wide adjacent to identification data for Engineer's status stamp.

B. Contractor's Review:

1. All submittals, whether originating from Contractor or subcontractors, shall be stamped by Contractor indicating to Engineer that all quantities, dimensions, field construction criteria, materials, catalog numbers, and similar data have been determined and verified, and that each submittal has been reviewed or coordinated with requirements of work and Contract Documents.
2. No portion of work requiring shop drawings shall be started or any materials be fabricated, delivered to site, or installed prior to approval of such items. Fabrication performed, materials purchased or on-site construction accomplished which does not

conform to approved shop drawings and data shall be at Contractor's risk. Owner will not be liable for any expense or delay due to corrections or remedies required to accomplish conformity.

3. Project work, materials, fabrications, and installation shall conform to approved shop drawings.

C. Engineer's Review:

1. Engineer's review of submitted drawings and data will cover only general conformity to drawings and specification, external connections, and dimensions which affect layout.
2. Engineer's review does not indicate thorough review of all dimensions.
3. Engineer's review of submittals does not relieve responsibility for errors, omissions, or deviations, nor responsibility for compliance with Contract Documents.

D. Resubmittals:

1. Make correction to drawings and data returned marked REVIEWED EXCEPTIONS NOTED, or REVISE AND RESUBMIT as noted thereon and as instructed by Engineer.
 - a. When drawings and data are returned marked REVIEWED NO EXCEPTIONS, no additional copies need be furnished.
2. Resubmit 6 corrected copies (or one corrected reproducible copy).
 - a. Indicate sequence of resubmittals by using a letter (A, B, etc.). Provide submittal number of previous submittal for subject item.
3. When corrected copies are resubmitted, direct specific attention to all revisions and separately list any revisions made other than those called for by Engineer on previous submissions.
4. Verify that all exceptions previously noted by Engineer have been taken into account.

END OF SECTION

SECTION 01370
SCHEDULE OF VALUES

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. The section includes the furnishing of a complete schedule of values, including quantities and unit cost, of the various portions of the work in sufficient detail to reflect the major components of each trade, and in the order as outlined in the Table of Contents.

1.02. RELATED SECTIONS:

- A. Section 01150, MEASUREMENT AND PAYMENT
- B. Section 01300, SUBMITTALS

1.03 CONTENT:

- A. For each bid item, provide a separate material and labor cost. Each listed item in the schedule of values shall include its proper share of overhead and profit.
- B. The sum of the item costs listed in the schedule of values shall equal the total contract price and shall be detailed so as to facilitate payments for work under each Section in accordance with the Contract Documents.
- C. The schedule of values shall be prepared in such form as specified or as the Engineer may approve, and it shall include sufficient data as required to substantiate its accuracy.
- D. An unbalanced schedule of values will not be accepted.
- E. As a minimum, the following work items shall be separately listed and detailed for Lump Sum Item No. 1:
 - 1. Mobilization/demobilization (not to exceed 5% of the total contract price).
 - 2. Intake and Exhaust Louvers, per item.
 - 3. Electrical Work, per item.
 - 4. Modular flood-tight barrier.
 - 5. Demolition work, per item.
 - 6. Concrete repair and patching work, per item.
 - 7. Masonry repair work, per item.
 - 8. Finish work, per item.
 - 9. Start-up and training services, per system.

- F. As a minimum, the following work items shall be separately listed and detailed for Lump Sum Item No. 2:
1. Mobilization/demobilization (not to exceed 5% of the total contract price).
 2. Environmental protection and erosion control.
 3. Site work, per item.
 4. Submersible pump system, per item.
 5. Gate valves and appurtenances, per item.
 6. Water-tight hatch and frame.
 7. Structural platform, per item.
 8. Electrical Work, per item.
 9. SCADA and controls, per item.
 10. Demolition work, per item.
 11. Concrete repair and patching work, per item.
 12. Surface Restoration, per item.
 13. Start-up and training services, per system.
- G. As a minimum, the following work items shall be separately listed and detailed for Lump Sum Item No. 3:
1. Mobilization/demobilization (not to exceed 5% of the total contract price).
 2. Environmental protection and erosion control.
 3. Site work per item.
 4. Bypass manhole, piping, tapping sleeve and valve.
 5. Intake Louvers.
 6. Exhaust Fan and motorized damper.
 7. Electrical Work, per item.
 8. Mechanical piping, per item.
 9. Demolition work, per item.
 10. Concrete work for intake and exhaust cupola extension, per item.
 11. Concrete repair and patching work, per item.

12. Finish work, per item.
13. Start-up and training services, per system.

1.04 SUBMITTALS:

- A. Prepare and submit to the Engineer at Pre-construction conference a preliminary schedule of values breaking down the components of each lump sum bid item by specification section, work item, and trade, and showing for each component the related material, labor, equipment, overhead, and profit costs.
- B. No application for payment shall be submitted prior to approval by the Engineer and the Owner of the schedule of values showing the value of each kind of work. The Contractor shall make any changes requested by the Engineer and Owner within ten (10) days after receiving comments.
- C. Final acceptance by Engineer and Owner of the schedule of values indicates only consent to the schedule of values as a basis for preparation of application for progress payments, and does not constitute an agreement as to value of each indicated item.

END OF SECTION

SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 TEMPORARY FACILITIES:

- A. All temporary facilities required by the Contractor shall be furnished by him for the use of all Subcontractors except that which is specifically required to be provided by the Subcontractor themselves, and shall meet all local codes and requirements for such temporary installations. All temporary facilities shall be provided and maintained so as not to create fire hazards or safety hazards. All temporary facilities shall be entirely removed upon completion of the work and the site shall be left in a satisfactory condition. All costs for temporary facilities shall be borne by the Contractor unless specifically stated otherwise.

1.02 WEATHER PROTECTION:

- A. "Weather Protection" shall mean the temporary protection of the work adversely affected by moisture, wind and cold, by covering, enclosing and/or heating. This protection shall provide adequate working areas throughout the year and consistent with the approved construction schedule to permit the continuous progress of all the work necessary to maintain an orderly and efficient sequence of construction operations. The Contractor shall furnish and install all "Weather Protection" materials which shall be stored and protected in a manner specified by requirements set forth by the manufacturer. This provision does not supersede any specific requirements for methods of construction, curing of materials or the application general conditions set forth in the technical specifications with added regard to performance obligations of the Contractor.

1.03 TEMPORARY LIGHT AND POWER:

- A. The Contractor shall provide temporary power and lighting for the completion of this contract by himself and by all of his subcontractors during its entire progress. Temporary wiring and conduit to provide light and power shall be furnished and installed by the Electrical Subcontractor.
- B. There shall be sufficient electric lighting so that all work may be done in a workmanlike manner where there is not sufficient daylight.

1.04 HOISTING EQUIPMENT AND MACHINERY:

- A. All hoisting equipment and machinery required for the proper and expeditious prosecution and progress of the work shall be furnished, installed, operated and maintained in safe condition by the Contractor for the use of all Subcontractors' material and/or equipment delivered to the designated hoisting area, except that which is specifically required to be provided by the Subcontractors themselves, and as so stated in each appropriately related section of the specifications.
- B. All costs for hoisting operating services shall be borne by the Contractor unless specifically accepted in the Contract Documents.

1.05 BARRIERS AND BARRICADES:

- A. Barricades, safety signs, fences and safety warning devices shall be provided to prevent unauthorized entry to construction areas and to protect excavations, trenches, structures and equipment.
- B. Provide and maintain guard lights at all barricades.

1.06 SITE ACCESS:

- A. The Contractor shall restrict his work to the areas shown on the Drawings and those areas owned by the Owner. Areas outside the limits shown and needed for the Contractor's convenience shall be negotiated by the Contractor with the particular landowners involved.

1.07 SPECIAL CONTROLS:

- A. Sufficient precautions shall be taken during construction to minimize the run-off of polluting substances such as silt, clay, fuels, oils, bitumens, calcium chloride, or other polluting materials harmful to humans, fish and other life, into the supplies and surface waters of the State. Control measures must be adequate to assure that turbidity in the receiving water will not be increased more than 10 j.t.u., or as otherwise required by the State or other controlling body, in waters used for public water supply or fish unless limits have been established for the particular water. In surface water used for other purposes, the turbidity must not exceed 25 j.t.u. unless otherwise permitted. Precautions shall be taken in the use of construction equipment to prevent operations which promote erosion.
- B. The provisions for control of erosion and sedimentation shall pertain to all areas of construction through wetlands, floodplains, or any other area where dewatering is required.
- C. Cofferdams, conduits, flumes, bulkheads or any other temporary diversion structure approved by the Engineer shall be used when crossing a stream, brook, or other body of water.
- D. When excavating in wetlands or floodplain, where no temporary diversion structure is required, the excavated material shall be placed on the uphill side of the trench so that the trench serves as a barrier between the excavated material and the wetland or floodplain.
- E. All material removed, including the temporary diversion structures shall remain the property of the Contractor and shall be disposed of by him off the site of the work at a site approved by the Engineer. Backfill material shall be as specified in SECTION 02221 - EARTHWORK.
- F. Dewatering shall be done such that all water pumped shall be directed to some type of stilling basin to allow for settling of solids and to eliminate erosion at the pump discharge. All material settled shall be excavated prior to removal of the stilling basin.
- G. All local and state environmental permits issued for this project as listed in Section 01067 shall be adhered to throughout this construction project. Any deviation from these permits shall be addressed in writing to the Engineer and shall be approved by the authorized representatives prior to any implementation of these changes.
- H. The Contractor shall submit in writing to the Engineer his method(s) for dewatering, control of erosion, construction methods and temporary diversion structures prior to construction to provide adequate time to review and approve these methods by the required agencies

involved. Such methods shall bear the stamp and signature of a Professional Registered Geotechnical Engineer registered in the State of Rhode Island.

1.08 DISPOSAL OF DEBRIS:

- A. Debris shall not be permitted to accumulate and the work shall at all times be kept satisfactorily clear. All debris shall be removed from the site by the Contractor and subcontractors at no expense to the Owner.

1.09 INSPECTION OF WORK AWAY FROM THE SITE:

- A. If work to be done away from the construction site is to be inspected on behalf of the Owner during its fabrication, manufacture, or testing, or before shipment, the Contractor shall give notice to the Engineer of the place and time where such fabrication, manufacture, testing, or shipping is to be done. Such notice shall be in writing and delivered to the Engineer in ample time so that the necessary arrangements for the inspection can be made if required.

END OF SECTION

SECTION 01710

CLEANING UP

PART 1 - GENERAL

1.01 DESCRIPTION:

- 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 direction by the Engineer provide adequate material, equipment and labor to cleanup and make safe any and all areas deemed necessary by the Engineer.

1.02 RELATED SECTIONS:

- A. Section 01011, GENERAL PROJECT REQUIREMENTS
- B. Section 01770, PROJECT CLOSEOUT

1.03. DAILY CLEANUP:

- A. The Contractor shall clean up, at least daily, all refuse, rubbish, scrap and surplus material, debris and unneeded construction equipment resulting from the construction operations and sweep the area. The site of the work and the adjacent areas affected thereby shall at all times present a neat, orderly and workmanlike appearance.
- B. Upon written notification by the Engineer, the Contractor shall within 24 hours clean up those areas which in the Engineer's opinion are in violation of this section and the above referenced sections of the specifications.
- C. If in the opinion of the Engineer, the referenced areas are not satisfactorily cleaned up, all other work on the project shall stop until the cleanup is satisfactory.

1.04. MATERIAL OR DEBRIS IN DRAINAGE FACILITIES:

- A. Where material or debris has washed or flowed into or has been placed in existing watercourses, ditches, gutters, drains, pipes, structures, such material or debris shall be entirely removed and satisfactorily disposed of during progress of the work, and the ditches, channels, drains, pipes, structures, and work shall, upon completion of the work, be left in a clean and neat condition.

1.05. REMOVAL OF TEMPORARY BUILDINGS, STRUCTURES AND EQUIPMENT:

- A. On or before completion of the work, the Contractor shall, unless otherwise specifically directed or permitted in writing, tear down and remove all temporary buildings and structures built by him; shall remove all temporary works, tools and machinery or other construction equipment furnished by him; shall remove all rubbish from any grounds which he has occupied; shall remove silt fences, straw bales and filter socks 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.

1.06. RESTORATION OF DAMAGED PROPERTY:

- A. The Contractor shall restore or replace, when and as directed, any property damaged by his work, equipment or employees, to a condition at least equal to that existing immediately prior to the beginning of operations. To this end the Contractor shall do as required all necessary highway or driveway, walk and landscaping work. Materials, equipment, and methods for such restoration shall be as approved by the Engineer.

1.07 FINAL CLEANUP:

- A. Before acceptance of Substantial Completion 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.

END OF SECTION

SECTION 01735

CUTTING, CORING AND PATCHING

PART 1 - GENERAL

1.01 SUMMARY OF WORK:

- A. This Section covers the cutting, coring, fitting, rough and finished patching of holes and openings in existing and new structures.
- B. Provide all cutting, fitting, coring and patching required to complete the Work or to:
 - 1. Make its several parts fit together properly.
 - 2. Uncover portions of the Work to provide for installations of ill-timed work.
 - 3. Remove and replace defective work.
 - 4. Remove and replace work not conforming to requirements of Contract Documents.
 - 5. Remove samples of installed work as specified for testing.
 - 6. Provide routine penetrations of non-structural surfaces and materials for installation of piping, equipment and conduit.

1.02 RELATED WORK

- A. Section 01010 – SUMMARY OF WORK

1.03 SUBMITTALS

- A. Submit plan for cutting, coring or alteration work which affects or requires:
 - 1. Work of any separate contractor.
 - 2. Structural value or integrity of any element of the Project.
 - 3. Integrity or effectiveness of weather-exposed or moisture-resistant elements or systems.
 - 4. Efficiency, operational life, maintenance, or safety of operational elements.
 - 5. Visual qualities of sight-exposed elements.
 - 6. Cutting structural members
 - 7. Holes drilled in beams, structural members, or concrete.
- B. Submit written notice to the Engineer indicating the date and time that the work will take place.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Provide materials for finish patching equal to those of adjacent construction. Use materials identical with the original materials. If existing materials are no longer available, use materials with equivalent properties to provide the same appearance.
- B. Comply with specifications and standards for each specific product involved.

2.02 MECHANICAL SEALS:

- A. Mechanical seals for holes and penetrations shall be modular, adjustable, bolted, mechanical type consisting of interlocking synthetic rubber links shaped to continuously fill the annular space between the pipe and sleeve. The seal shall be rated by the manufacturer for 40 feet of head or 20 psig. Mechanical seals shall be Link-Seal, manufactured by Thunderline Corp., Wayne, MI., MetraSeal, manufactured by The Metraflex Co., Chicago IL, Pipe Seal, by BWM Company, Forest City, NC, or equal.

2.03 FIRE STOP SEALANTS:

- A. Sealant shall be a two part foamed silicone elastomer as manufactured by Dow Corning Co., product No. 3-6548 silicone R.T.V.; 3M brand fire barrier products caulk C.P. 25 and 3M brand putty 303; Flame-Safe fire stop systems Fig. No. FS-500 by Thomas & Betts Corporation, or equal. Packing shall be a fire retardant pliable material, Fig. 310 by Sealtite Co.; White Oakum W.S.-600 by American Manufacturing Co., or Equal. Sealant bead configuration, depth and width shall be in accordance with manufacturer's recommendations.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Inspect existing conditions of Project, including elements subject to damage or to movement during cutting and patching.
- B. After uncovering work, inspect conditions affecting installation of products, or performance of work.
- C. Report unsatisfactory or questionable conditions to the Engineer in writing; do not proceed with work until the Engineer has provided further instructions.

3.02 PREPARATION

- A. Provide devices and methods to protect other portions of Work from damage.
- B. Provide protection from elements for that portion of the Project which may be exposed by cutting and patching work.
- C. Provide temporary support to maintain structural value or integrity of affected portion of the Work.

3.03 PERFORMANCE

- A. Execute cutting and patching to prevent damage to other work.

1. Where mechanical cutting is required, cut work with sawing and grinding tools, not with hammering and chopping tools. Core drill openings through masonry construction and concrete work.
 2. No structural members shall be cut without the approval of the Engineer. No holes may be drilled in beams or other structural members without approval of Engineer.
- B. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances, and finishes.
- C. Restore work which has been cut or removed; install new products to provide completed Work in accordance with requirements of Contract Documents.
- D. Restore exposed finishes of patched areas, and where necessary, extend finish restoration onto retained work adjoining, in a manner which will eliminate evidence of patching.
1. Where patch occurs in a smooth painted surface, extend final paint coat over the entire unbroken surface containing the patch.
- E. Refinish entire surfaces as necessary to provide an even finish to match adjacent finishes:
1. For continuous surfaces, refinish to nearest intersection.
 2. For an assembly, refinish entire unit.
- 3.04 CORING:
- A. Coring shall be performed to the minimum size to accommodate pipe, conduit, sleeves, equipment or mechanical seals to be installed.
- B. If holes are cored through floor slabs they shall be drilled from below.
- C. Slurry or tailings resulting from coring operations shall be removed from the area immediately following drilling.
- 3.05 CUTTING:
- A. Control slurry generated by sawing operation on both sides of wall.
- B. When cutting a reinforced concrete wall, the cutting shall be done so as not to damage bond between the concrete and reinforcing steel left in the structure. Cut shall be made so that steel neither protrudes nor is recessed from the face of the cut.
- C. Bracing of area to be cut shall be installed prior to start of cutting. Check area during sawing operations for partial cracking and provide additional bracing to prevent a partial release of cut area during sawing operations.
- 3.06 PROTECTION
- A. Protect other portions of Work from damage.
- B. Protect existing equipment, utilities and adjacent areas from damage during cutting and patching work.

3.07 PATCHING:

- A. Rough patching shall be such as to bring the cut or cored area flush with existing construction. Finish patching shall match existing surfaces.

END OF SECTION

SECTION 01736

AS-BUILT DRAWINGS

PART 1 - GENERAL

1.01 SUMMARY:

A. Section Includes:

1. Providing and maintaining redlined as-built drawings and related documents on site.
2. Submitting final redlined as-built drawings.

1.02 RELATED WORK:

A. Section 01300 - Submittals

1.03 DESCRIPTION:

A. Project Record Documents:

1. The Contractor and each subcontractor shall maintain one copy of the following documents at the site at all times:
 - a) Drawings.
 - b) Specifications.
 - c) Addenda.
 - d) Shop drawings, product data, test records, and miscellaneous requested submittal data.
 - e) Change orders and other modifications to Contract.
 - f) Field orders and/or written instructions.
 - g) Photographs.
2. The record documents shall be maintained in a clean, dry, legible condition, and shall be kept current.

B. As-Built Drawings:

1. The Contractor shall obtain a complete set of prints of all Contract Drawings on which to keep accurate redlined drawings showing the as-built locations of materials and installations covered by this Contract, including buried or concealed construction and utility features which are revealed during the course of construction.
2. The Contractor shall record the as-built Work as the work is performed. Red-lined drawings shall be updated on a daily basis.
3. Indicate graphically and by dimension, installed location of equipment, wiring, piping, valves and appurtenant devices, and other such work. Record the horizontal and

vertical location of all buried utilities that differ from the locations indicated, or which were not indicated on the Contract Drawings.

4. Indicate changes made to Contract by change order.
5. Red-lined drawings showing the as-built Work shall be accessible to the Engineer at all times. Failure to maintain red-lined drawings of the as-built Work as indicated above will result in withholding from the monthly pay estimate.

1.04 SUBMITTALS:

- A. Submit monthly red-lined drawings with each payment requisition.
- B. Contract Closeout Submittals:
 1. Deliver a complete set of As-Built drawings with plotted information overlaid in red to the Engineer. The information submitted by the Contractor shall be correct and free of errors or omissions.
 2. The Contractor shall certify that the As-Builts are complete and correct.
 3. Submission of the As-Built drawings shall be a prerequisite to scheduling a final inspection of the work.

PART 2 - PRODUCTS - NOT APPLICABLE

PART 3 - EXECUTION - NOT APPLICABLE

END OF SECTION

SECTION 01770

PROJECT CLOSEOUT

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This Section covers administrative and procedural requirements for closing out the project, including, but not limited to:
 - 1. Project record documents
 - 2. Checkout and Certification
 - 3. Final Cleaning
 - 4. Substantial Completion
 - 5. Closeout Procedures
 - 6. Final Completion
 - 7. Correction/Warranty Period

1.02 RELATED SECTIONS:

- A. General Requirements in their entirety.
- B. Division 2 through Division 16.

1.03 RECORD DOCUMENTS:

- A. Refer to Section 01736 for requirements regarding as-built drawings.
- B. The completed set of as-built drawings shall be submitted to the Engineer with the final Application for Payment.

1.04 FINAL CLEANING:

- A. Complete the following cleaning operations before requesting inspection for Certification of Substantial Completion.
 - 1. Clean the site, including landscape development areas of rubbish, litter and other foreign substances. Sweep paved areas broom clean; remove stains, spills and other foreign deposits. Rake grounds that are neither paved nor planted, to smooth, even textured surfaces.
 - 2. Remove waste and surplus materials, rubbish, fencing equipment, temporary utilities and construction facilities from the site, unless otherwise directed by the Engineer.

1.05 SUBSTANTIAL COMPLETION:

- A. Substantial Completion is officially defined in the General and Supplementary Conditions. The date of substantial completion will be certified by the Engineer. This date will not be certified until the following requirements have been satisfied by the Contractor:
1. All Contract requirements are coordinated into a fully operational system. All individual units of equipment and treatment are fully operative and performing at specified efficiencies. Where efficiencies are not specified, performance shall meet acceptable standards for the particular unit.
 2. All field tests have been satisfactorily completed and reports forwarded to the Engineer.
 3. All final training has been completed by the manufacturers' representatives.
 4. All spare parts and lubricants have been satisfactorily delivered to the Owner. Spare parts are for the exclusive use of the Owner when the facility has been turned over. Contractor is responsible for all maintenance and repair materials required until the facility is accepted by the Owner.

1.06 CLOSEOUT PROCEDURES:

- A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and is complete in accordance with Contract Documents and ready for Engineer's and Owner's inspection.
- B. Accompany Engineer and Owner on inspection to verify conformance with the Contract Documents. Prepare a punch list of work items that have been determined by inspection to not conform with Contract Documents. Punch list items shall include work items that are missing, incomplete, damaged, incorrect items, or improperly installed or constructed. The Contractor shall correct the punch list deficiencies by re-work, modifications, or replacement, as appropriate, until the items conform to the Contract Documents. The initial punch list shall be produced by the Contractor, with copies to the Engineer and Owner. When the Contractor has reduced the number of deficient items to a reasonable level, the Engineer will develop a definitive punch list for the use of the Contractor.
- C. Provide submittals to Engineer that are required by governing or other authorities.
- D. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due. The Contractor shall submit the following documents with or prior to Final Application for Payment: Set of as-built documents, Contract Completion and Acceptance Certificate, Consent of Surety to Final Payment, Release and Waiver of Liens and Claims, Affidavit of Payment of Debts and Claims, and remaining releases, waivers, warranties/guarantees, and all other data required by the Contract Documents.

1.07 FINAL COMPLETION:

- A. Prior to final completion, the following tasks shall be completed:
1. All items in the punch list shall be completed.
 2. All Contract closeout documentation shall be submitted to and accepted by the Engineer.

1.08 CORRECTION/WARRANTY PERIOD:

- A. During the correction period, the Contractor shall correct all deficiencies in equipment and materials.
- B. During the warranty period, the Contractor shall perform all corrective work on warranty deficiencies.
- C. Corrective work will be identified by the Engineer or Owner, as appropriate. The Contractor will be notified of the item(s) requiring corrective work.
- D. The Contractor shall begin work on all corrective work within ten days of being notified of the deficiency by the Engineer and shall then work continuously until the deficiency is corrected. Upon completion of the corrective work, the Contractor shall submit a letter report to the Engineer describing the deficiency and the corrective action that was taken.
- E. The Contractor shall coordinate all corrective work with the Engineer and/or the Owner.

END OF SECTION

SECTION 02050

DEMOLITION AND ALTERATIONS

PART 1 - GENERAL

1.01 SUMMARY OF WORK:

- A. Furnish labor, materials, equipment to demolish, alter, remove and dispose of designated structures, piping and equipment within the existing East Natick I, East Natick II and Knight Street Pump Stations and outside of each pump station as indicated on the Contract Drawings and as required to install new Work.
- B. Work included under this Section:
 - 1. East Natick I Pump Station:
 - a. Removal of one 27" x 33" intake louver and motorized damper.
 - b. Removal and relocation of one 18" x 18" exhaust louver with motorized damper and exhaust fan.
 - c. Cutting and removal of exterior brick, interior concrete and rebar as required for new exhaust and intake louver openings.
 - d. Disconnection, removal and relocation of existing electrical meter assembly.
 - e. Removal and legal disposal of demolished materials off site.
 - 2. East Natick II Pump Station:
 - a. Disconnection and removal of existing sewage lift station including: above-grade skid mounted 6' long x 6' wide x 5' high fiberglass enclosure with two (2) 3 HP pumps, VFDs and control panel; 4" DI piping and associated fittings; and other miscellaneous items.
 - b. Removal of existing 36" x 30" wet well access hatch and frame, and 6" diameter aluminum wet well vent.
 - c. Disconnection, removal and relocation of the existing meter socket assembly, manual transfer switch and portable generator receptacle from the existing above-grade electrical enclosure designated to be demolished to the new above-ground electrical enclosure.
 - d. Disconnection, removal and relocation of the existing PLC, modules, rack, termination strip, hardware, radio antenna and mast, UPS and other relate components from the existing above-grade SCADA panel designated to be demolished to the new above-ground electrical enclosure.
 - e. Removal of the existing above-grade electrical enclosure (60" long x 18" wide by 72" high), existing above-grade SCADA panel (36" long x 12" wide x 42" high), concrete housekeeping pads and appurtenances.

- f. Removal of approximately 15 feet of existing chain link fence as required to install new work shown on the drawings.
 - g. Removal of existing fill concrete at the bottom of the wet well vault as shown on the drawings to allow for installation of new submersible pumps.
 - h. Cutting and removal of section of concrete wet well top as required to install new water-tight access hatch and frame.
 - i. Disconnection, removal and disposal of designated electrical and control equipment as shown on the Drawings.
 - j. Removal and legal disposal of demolished materials off site.
3. Knight Street Pump Station:
- a. Removal of two 18" x 27" louvers and one 27" x 30" louver from the existing concrete intake air cupola located on the roof.
 - b. Removal of one 27" x 27" louver with exhaust fan and motorized damper from the existing concrete exhaust air cupola located on the roof.
 - c. Cutting and removal of top 8" of existing concrete intake air cupola (2'-8" long x 3'-8" wide) including stone ballast roof system and flashing.
 - d. Cutting and removal of top 8" of existing concrete exhaust air cupola (3'-2" long x 3'-8" wide) including stone ballast roof system and flashing.
 - e. Removal of existing 36" x 36" roof access hatch and frame.
 - f. Cutting and removal of mechanical piping within the existing exhaust air cupola as indicated.
 - g. Cutting and removal of section of concrete wet well top as required to install new water-tight access hatch and frame.
 - h. Removal of existing 8" DI and 6" DI flanged gooseneck vents from the wet well and macerator chamber.
 - i. Disconnection, removal and disposal of designated electrical and control equipment as shown on the Drawings.
 - j. Removal and legal disposal of demolished materials off site.
- C. Remaining voids from the removal of the two concrete housekeeping pads at the East Natick II Pump Station shall be backfilled with gravel borrow in accordance with Section 02221, EARTHWORK. Top 6-inches of disturbed area shall be restored as shown on the drawings.
- D. All materials and equipment removed and dismantled shall be stored and disposed of by the Contractor as specified herein.

1.02 REGULATORY REQUIREMENTS:

- A. Conform to applicable codes and requirements for demolition of structure, safety of adjacent structure, dust control, service utilities, and discovered hazards.
- B. Dispose or recycle all demolition debris in accordance with all applicable regulations.

1.03 RELATED WORK:

- A. Section 01010, SUMMARY OF WORK
- B. Section 01011, GENERAL PROJECT REQUIREMENTS
- C. Section 02221, EARTHWORK
- D. Section 03300, CAST-IN-PLACE CONCRETE

1.04 SUBMITTALS:

- A. Submit demolition plan and procedures to the Owner according to Section 01300 prior to the start of demolition work, describing the proposed sequence, methods, and equipment required for the demolition and disposal. Also, indicate measures to be taken to protect new work, and structures and facilities to remain.

1.05 QUALITY ASSURANCE:

- A. Demolish and remove existing construction, utilities, equipment, and appurtenances without damaging the integrity of new and/or existing structures, equipment and appurtenances that are to remain.
- B. Obtain the Owner's permission before beginning demolition work and before removing existing structures, materials, equipment and appurtenances.

1.06 DELIVERY, STORAGE AND HANDLING:

- A. Store and protect salvaged items specified or shown to be reused in the work.

1.07 PROTECTION OF EXISTING WORK:

- A. Demolish and remove existing construction, utilities, structures, equipment, and appurtenances without damaging the integrity of new and/or existing structures, equipment and appurtenances that are to remain.
- B. Provide and maintain all protective devices, including fences, barricades, bracing, shoring, planking, guards, warning lights and signs to prevent damage to existing facilities. Structural elements shall not be overloaded. Increase structural support as a result of any cutting, removal, or demolition to protect existing facilities. Remove all temporary protection when the demolition work is complete.

1.08 REPAIR OF DAMAGE:

- A. Promptly repair damage to existing facilities by demolition operation to the satisfaction of, and at no additional cost to the Owner.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 GENERAL:

- A. Perform demolition work so as to not interfere with the operation of the existing facility.
- B. Maintain access to the existing facility by Owner personnel during demolition operations.
- C. Erect and maintain weatherproof airtight closures for exterior openings.
- D. Erect and maintain temporary partitions to prevent spread of dust, odors and noise to permit continued operation and occupancy of the existing facility.
- E. Where new piping is to be connected to existing piping, the existing piping shall be cut square and ends prepared for the connection shown. Repair damage to the lining and coating of the existing piping at no additional cost to the Owner.
- F. Protect existing items which are not indicated to be removed.
- G. Arrange with, pay for all required fees, and perform work required by utility companies and municipal departments for discontinuance or interruptions of utility services due to demolition work.

3.02 SELECTIVE DEMOLITION:

- A. Disconnect, cap, identify and remove designated piping, utilities and conduit.
- B. Demolish and remove building system related components indicated on the Drawings.
- C. Remove concrete equipment pads and supports indicated on the Drawings.
- D. Protect existing supporting structural members and equipment.

3.03 DISPOSAL OF DEMOLISHED MATERIALS:

- A. All existing materials and equipment removed shall become the Contractor's property, shall be removed from the site, hauled and legally disposed of in accordance with all federal, state and local regulations.

3.04 SALVAGE OF MATERIALS AND EQUIPMENT:

- A. Remove all materials and equipment which are to be salvaged, reused, or remain the property of the Owner without damage.
 - 1. Items to be removed, stored and protected, and remain the property of the Owner include the following:
 - a. Existing above-grade skid-mounted sewage lift station including fiberglass enclosure, pumps, VFDs and control panel at the East Natick II Pump Station.
 - b. Existing above-grade electrical and SCADA panels at the East Natick II Pump Station.

3.05 CLEAN UP:

- A. Remove demolished materials from site as work progresses.
- B. Leave areas of work in clean condition.

END OF SECTION

SECTION 02221

EARTHWORK

PART 1 GENERAL

1.01 WORK INCLUDED:

- A. The work under this section shall include furnishing all labor, equipment and materials, and in performing all operations in connection with stripping of topsoil, excavation, trenching, filling, backfilling, compaction and grading as indicated on the Drawings and as specified herein.
- B. The Contractor shall construct embankment fills, do miscellaneous grading and dispose of all unsuitable and surplus materials, as indicated on the Drawings and as specified herein.
- C. The Contractor shall legally dispose off-site all excess generated materials, including but not limited to soil, water, solid waste, and construction debris, that cannot be reused on-site.

1.02 RELATED WORK:

- A. SECTION 01150, MEASUREMENT AND PAYMENT
- B. SECTION 01067, PERMITS AND REGULATORY REQUIREMENTS
- C. SECTION 02223, SHORING/SHEETING
- D. SECTION 02225, SITE DRAINAGE AND DEWATERING
- E. SECTION 02800, LOAMING AND SEEDING

1.03 SITE INVESTIGATION:

- A. The grades and other site information have been compiled by existing records and field surveys. The Contractor acknowledges that he has satisfied himself as to the nature and location of the work, the general and local conditions, particularly those bearing upon transportation, disposal, handling and storage of materials, availability of labor, water, electric power, roads and uncertainties of weather, groundwater table, the conformation and subsurface materials to be encountered, the character of the equipment and facilities needed prior to and during the execution of the work, and all other matters which can in any way effect the work or the cost thereof under this Contract. Any failure by the Contractor to acquaint himself with all available information concerning these conditions will not relieve him from the responsibility for estimating properly the difficulty or cost of successfully performing the work.

1.04 PROTECTION OF PROPERTY AND UTILITIES:

- A. The work shall be executed in such manner as to prevent any damage to facilities at the site and adjacent property and existing improvements, such as but not limited to streets, curbs, paving, service utility lines, structures, monuments, trees, shrubs, fences, bench marks, observation wells, and other public or private property. Protect existing improvements from damage caused by settlement, lateral movements, undermining, washout and other hazards created by earthwork operations.

- B. In case of any damage or injury caused in the performance of the work, the Contractor shall, at its own expense, make good such damage or injury to the satisfaction of, and without cost to, the Owner. Existing roads, sidewalks, and curbs damaged during the project work shall be repaired or replaced to at least the condition that existed at the start of operations. The Contractor shall replace, at his own cost, existing bench marks, observation wells, monuments, and other reference points which are disturbed or destroyed.
- C. Buried drainage structures and pipes, observation wells and piezometers, including those which project less than eighteen inches (18") above grade, which are subject to damage from construction equipment shall be clearly marked to indicate the hazard. Markers shall indicate limits of danger areas, by means which will be clearly visible to operators of trucks and other construction equipment, and shall be maintained at all times until completion of project.
- D. Utility agencies shall be contacted and advised of proposed work prior to the start of excavation by the Contractor. The Contractor shall obtain information from the proper sources and authorities concerning locations of all utilities within the scope of this work.
- E. If and when encountered, utilities shall be supported and protected, and the Engineer shall be notified. 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.
- F. Existing property boundary markers, control points and datum elevation markers or bench marks shall be preserved, and all such established survey points 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.

1.05 PERMITS AND CONTROLS:

- A. Permits - The Contractor shall obtain all local permits for all activities specified in SECTION 01067 and as otherwise required by law.
- B. Controls - The Contractor shall control all pollution due to construction, as specified in SECTION 01500 and otherwise to meet the requirements of the authorities having jurisdiction over such activities.

1.06 REFERENCE STANDARDS:

- A. The Contractor shall comply with the provisions of the following agencies and referenced documents 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."

American Society for Testing and Materials (ASTM)

ASTM C131 Test Method for Resistance to Degradation of Small Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

ASTM C136	Method for Sieve Analysis of Fine and Coarse Aggregates.
ASTM C330	Specification for Lightweight Aggregate for Structural Concrete.
ASTM D1556	Test Method for Density of Soil in Place by the Sand Cone Method.
ASTM D1557	Test Methods for Moisture-density Relations of Soils and Soil Aggregate Mixtures Using Ten-pound (10 Lb.) Hammer and Eighteen-inch (18") Drop.
ASTM D2922	Test Methods for Density of Soil and Soil-aggregate in Place by Nuclear Methods (Shallow Depth).

Rhode Island Department of Transportation Standard Specifications for Road and Bridge Construction.

1.07 SUBMITTALS:

- A. Submit an excavation, backfilling, and filling plan at least two weeks prior to start of any earth moving activities. The review will be only for the information of the Owner and third parties for an overall understanding of the project relating to access, maintenance of existing facilities and proper utilization of the site. The Contractor shall remain responsible for the adequacy and safety of the means, methods and sequencing of construction. The plan shall include, but not be limited to the following items:
 - 1. Detailed sequence of work.
 - 2. General description of construction methods.
 - 3. Numbers, types, and sizes of equipment proposed to perform excavation and compaction.
 - 4. Details of dust control measures.
 - 5. Proposed locations of stockpiled excavation and/or backfill materials.
 - 6. Proposed surplus excavated material off-site disposal areas and required permits.
 - 7. Details of erosion and sedimentation control measures, which shall prevent erosion and sedimentation during the earth moving activities.
- B. Backfill and Bedding Materials: Submit grain size analysis and curve performed in accordance with ASTM D422 and compaction test results (ASTM D1557 Procedure C) for each proposed source of backfill and bedding material for review by the Engineer at least two weeks prior to use of the material. The grain size analysis shall indicate that the backfill and bedding material conforms to the gradation requirements specified.
- C. The Contractor shall submit six copies of the following to the Engineer:
 - 1. Test reports on materials, moisture density tests, in place density tests (ASTM D 1557 and D 1556).
 - 2. Representative backfill and bedding samples and gradation tests.

1.08 DRAINAGE:

- A. The Contractor shall provide, at its own expense, adequate drainage facilities to complete all work items in an acceptable manner. Drainage shall be done in a manner so that runoff will not adversely affect construction procedures nor cause excessive disturbance of underlying natural ground or abutting properties.

1.09 FROST PROTECTION AND SNOW REMOVAL:

- A. The Contractor shall, at its own expense, keep earthwork operations clear and free of accumulations of snow as required to carry out the work.
- B. The Contractor shall protect the subgrade beneath new structures and pipes from frost penetration when freezing temperatures are expected.

PART 2 PRODUCTS

2.01 GENERAL:

- A. Except as specified for bedding and cover materials, refill for rock and unsuitable materials, backfill materials may be as follows:
 - 1. Unless otherwise indicated on Drawings, use job excavated material meeting requirements specified herein for gravel borrow. Gradation of material shall be generally as specified for gravel borrow except that maximum size of stone shall be 3 inches for backfill material. All unsuitable materials shall be disposed of as per Paragraph 3.16.A.
 - 2. Use gravel borrow for compacted backfill where indicated on Drawings and where job excavated material does not meet the requirements for backfill. Unless otherwise indicated on Drawings, use compacted gravel subbase course beneath pavements, driveways, curbs, gutters, walks, or other surface construction or structures. In established lawn areas, finish top portion with at least six inches of topsoil corresponding to that underlying adjoining lawn areas.

2.02 TRENCH BACKFILL, BEDDING AND COVER MATERIALS:

- A. Backfill materials for pipe trenches shall consist of granular soil meeting the approval of the Engineer. Material shall be granular, well graded friable soil, free of rubbish, ice, snow, tree stumps, roots, clay and organic matter meeting the gradation requirements for Gravel Borrow as specified in Section 2.03.
- B. Pipe bedding and cover materials for pipe trenches shall be hard, durable well graded crushed stone or gravel within the limits of ASTM C33 stone size No. 67, and free of rubbish, ice, snow, tree stumps, roots, clay and organic matter, and other deleterious material. Material shall be obtained from an off-site source and shall meet the gradation requirements for Crushed Stone as specified in Section 2.05.
- C. In all pipe trenches, cover material shall be placed over the bedding for the first 12 inches of backfill over the pipe as indicated on the Drawings.
- D. Where ordered by the Engineer to stabilize the trench base, below the pipe bedding, the Contractor shall excavate below grade and place graded screened gravel, crushed stone bank run gravel, or concrete sand as directed and specified in 3.06.

1. Screened gravel and crushed stone shall meet the requirements of ASTM C 33, Size Number 57 and have the following gradation:

ASTM SIZE NUMBER 57

<u>Square Opening Sieve Size</u>	<u>Percent by Weight Passing Through</u>
1-1/2 inch	100
1 inch	95-100
1/2 inch	25-60
No. 4	0-10
No. 8	0-5

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

2.03 GRAVEL BORROW:

- A. Gravel borrow shall be used for backfill over pipe, replacement of rock and unsuitable material, and elsewhere as required by the Engineer.
- B. 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. It shall not contain vegetation, masses of roots, or individual roots. It shall be substantially free from loam and other organic matter, clay, and other fine or harmful substances. Gravel borrow shall meet the following gradation requirements.

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

2.04 PROCESSED GRAVEL SUBBASE:

- A. Unless otherwise shown on the Drawings or permitted by the Owner or Engineer, crushed gravel shall be used as the subbase for trench excavations under pavement for sidewalks, curbing, paved roads, parking areas and driveways, and shall meet the following gradation requirements.

<u>Sieve Size</u>	<u>Percent Passing by Weight</u>
3 inch	100
1-1/2 inch	70-100
¼ inch	50-85
No. 4	30-60
No. 200	0-10

2.05 CRUSHED STONE:

- A. Crushed stone shall consist of hard, durable, angular particles or fragments and free from clay, loam, or deleterious materials, and shall meet the following gradation requirements.

<u>Sieve Size</u>	<u>Percent Passing by Weight</u>
1"	100
3/4"	90-100
1/2"	10-50
3/8"	0-20
#4	0-5

2.06 DENSE-GRADED CRUSHED STONE:

- A. Dense-grade crushed stone shall be a composite material, combining coarse aggregates of crushed stone or gravel, and fine aggregates of natural sand or stone screenings uniformly pre-mixed. Coarse aggregate shall consist of hard, durable particles or fragments of stone. Materials that break up when alternately frozen and thawed or wetted and dried shall not be used. Coarse aggregate shall have a percentage of wear, by the Los Angeles test, or not more than 45. Fine aggregate shall consist of natural or crushed sand. The composite material shall be free from clay, loam or other plastic and deleterious materials, and shall meet the following gradation requirements:

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

2.07 STRUCTURAL FILL:

- A. Structural fill shall be used as bedding to support structures, backfill around structures, and for replacement of unsuitable material where shown on the Drawings.
- B. Structural fill shall consist of hard, durable sand and gravel, free of organic material, loam, clay, snow, ice, frozen soil, and other deleterious materials and shall be well graded to meet the following requirements:

<u>Sieve Size</u>	<u>Percent Passing by Weight</u>
3-inch	100
1-inch	60-100
No. 4	35-95
No. 40	5-60
No. 200	0-7

2.08 SAND BORROW:

- A. Sand borrow shall consist of clean, inert, hard, durable grains of quartz or other hard, durable rock, free from loam and clay, surface coatings, and deleterious materials. The

allowable amount of material passing a No. 200 sieve as determined by ASSHO-T11 shall not exceed 10 percent by weight. The maximum particle size for sand shall be ¼ inch.

2.09 FILTER/DRAINAGE FABRIC:

- A. A filter/drainage fabric shall be used as a wrapping material where screened gravel or crushed stone is required for special bedding in surrounding soils of fine sand, silt or clay. The filter fabric shall be installed on the final graded trench bottom prior to placement of the screened gravel or crushed stone bedding and at other locations shown on the drawings or designated by the Engineer.
- B. The filter fabric in place shall cover the entire trench bottom and trench sides as shown on the drawings. Each width of drainage fabric shall be overlapped in accordance with manufacturer's recommendations, but not less than 2 feet, to prevent intrusion of soil fines into the bedding.
- C. The filter/drainage fabric shall be composed of continuous-filament fibers bonded together to form a sheet. The fabric shall be an average of 20 mils thick and possess the following characteristics:

Grab strength:	120 lbs.
Elongation:	50%
Burst Strength:	210 psi
Puncture Strength:	65 lbs.
Trapezoid Tear:	45 lbs.
Equivalent opening size:	No. 70 to 100 sieve
Coefficient of permeability	0.1 cm/sec.
- D. The filter/drainage fabric shall be Mirafi 140 as manufactured by Mirafi Inc., Charlotte, N.C.; Foss-65 by Foss manufacturing Co., Haverhill, MA; Supac 4NP, by Phillips Fibers Corp., Greenville, S.C.; or approved equal.

PART 3 EXECUTION

3.01 DISTURBANCE OF EXCAVATED AND FILLED AREAS DURING CONSTRUCTION:

- A. Contractor shall take the necessary steps to avoid disturbance of subgrade during excavation and filling operations, including restricting the use of certain types of construction equipment and their movement over sensitive or unstable materials, dewatering and other acceptable control measures.
- B. All excavated or filled areas disturbed during construction, all loose or saturated soil, and other areas that will not meet compaction requirements as specified herein shall be removed and replaced with a minimum 12-inch layer of compacted special bedding materials or crushed stone wrapped all around in non-woven filter fabric. Costs of removal and replacement shall be borne by the Contractor.
- C. The Contractor shall place a minimum of 12-inch layer of special bedding materials or crushed stone wrapped in filter fabric over the natural underlying soil to stabilize areas which may become disturbed as a result of rain, surface water runoff or groundwater seepage pressures, all at no additional cost to the Owner. The Contractor also has the option of drying materials in-place and compacting to specified densities.

3.02 GENERAL EXCAVATION:

- A. The Contractor shall perform all excavation for pipes and appurtenant structures of every description and of whatever substances encountered, to the widths and depths indicated on the Drawings and as otherwise specified.
- B. The Contractor shall make excavations in such manner as will give suitable room for structures and laying and jointing pipe. He shall furnish and place all sheeting, bracing and supports and do all cofferdamming, pumping, draining and rendering the bottoms of the excavation firm and dry and acceptable in all respects.
- C. Unless otherwise specified, excavation shall be open cut, except that short sections of a trench may be tunnelled if, in the opinion of the Engineer, the pipe can be safely and properly installed and backfill can be properly tamped in such tunnel sections.
- D. The program of excavation dewatering, sheeting and bracing as specified in SECTIONS 02223 and 02225 shall be carried out in such manner as to eliminate all possibility of undermining or disturbing the foundations of existing structures or work previously completed under this Contract.
- E. During excavations, material determined by the Engineer to be suitable for backfilling, shall be stockpiled in an orderly manner a sufficient distance from the banks of the trench to avoid overloading and to prevent slides or cave-ins. Unsuitable material shall be disposed of as specified in 3.16 and replaced as ordered by the Engineer with surplus suitable material and bank run gravel to the extent necessary.
- F. Should conditions make it impractical or unsafe to stack material beside 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.
- G. Care shall be taken not to overexcavate below the depths indicated unless authorized by the Engineer. Unauthorized overdepths shall be backfilled at the Contractor's expense with approved granular material and shall be compacted to not less than 95 percent of maximum density as defined in 3.14 of this section.
- H. Grading shall be done as necessary to prevent surface water from flowing into trenches or other excavations, and any water accumulating therein shall be removed by pumping or by other approved methods.
- I. 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 will be controlled by the conditions, but shall always be confined to the limits prescribed by the Engineer. If so ordered by the Engineer, no more than 50 linear feet of trench shall be open during working hours. Under no circumstances shall more than 100 feet of trench be open at any one time.

3.03 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.
- B. Rock or ledge excavation shall comprise of the following: boulders measuring one cubic yard or more in volume; rock material in ledges, bedded deposits, unstratified masses, and conglomerate deposits so firmly cemented that they possess the characteristics of

solid rock that cannot be removed without systematic drilling and blasting; and reinforced concrete structures larger than one (1) cubic yard in volume, excluding sidewalks and paving.

3.04 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. Above this point, sides shall be as near vertical as approved construction procedures and safety requirements permit. Widths of trenches shall provide 12 inches minimum clearance between the sides of the trench and the outside face of the pipe. Trench width to 12 inches above the pipe shall be as shown on the Drawings. Above 12 inches over the pipe, the maximum trench width shall be as close to the above widths as installation requirements allow. The depth of trench shall be a minimum 6 inches below the pipe barrel, or 1/4 of the pipe diameter, whichever is greater.
- B. If the existing soil 6 inches below the bottom of the pipe barrel is found to be not suitable, the Engineer may order Extra Excavation (defined in 3.06 below) below the bedding grade.
- C. Special care shall be taken not to disturb the foundation soil on which gravel bedding is to be placed and the last one foot of excavation shall not be made until just before placing the bedding.

3.05 STRIPPING TOPSOIL:

- A. Topsoil shall be carefully stripped and separately stored to be used again for topsoiling and seeding as directed from off-pavement areas within which excavations are to be made.

3.06 EXTRA EXCAVATION:

- A. Whenever soil that is incapable of properly supporting the pipe or structure, or fine sand or silt, which may work into the bedding material, is encountered below a depth of 6 inches below the bottom of the pipe barrel or below the bottom of a structure, as determined by the Engineer, such soil shall be removed to the full width of the trench and refilled with screened gravel, structural fill, crushed stone or concrete sand at the Engineer's option, placed in 8-inch lifts and thoroughly compacted. Unsuitable material shall be excavated to its full depth or as ordered by the Engineer.
- B. No excavation shall be made below the limits of the excavation called for on the plans or herein specified without prior approval by the Engineer in writing. If the Contractor excavates below grade through error, for his own convenience or through failure to properly dewater the trench, or disturbs the subgrade before dewatering is sufficiently complete, he may be directed by the Engineer to excavate below grade in which case the work of excavating below grade and furnishing and placing the refill shall be performed at his own expense.
- C. Whatever the nature of unsuitable material encountered or the groundwater conditions, trench drainage shall be complete and effective.
- D. 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.

3.07 ROCK EXCAVATION:

- A. Where rock is encountered in the excavation, it shall be removed as required to permit the construction as specified. Rock shall be removed by use of mechanical means. No blasting shall be permitted.
- B. When material is encountered with respect to which the Contractor may claim removal as Rock Excavation, such material shall be uncovered and exposed and the Engineer notified by the Contractor before proceeding with the excavation. The Contractor shall not proceed with the excavation of the material to be removed as rock excavation until this material has been cross-sectioned and classified by the Engineer. Failure on the part of the Contractor to uncover such material, notify the Engineer, and allow time for cross-sectioning the undisturbed surface of such material, will forfeit the Contractor's right of claim to any classification other than that allowed by the Engineer for the areas of work in which the deposits occur.
- C. Rock shall be removed to a depth of 6 inches below the bottom of the pipe barrel within trench width as shown on the Drawings, and 6 inches below structure bottoms within vertical planes one foot outside of structure walls or footings. Backfill materials to replace the excavated rock shall be gravel borrow as specified for backfill in 2.03. If the Contractor finds it convenient to remove additional rock around structures, he shall do so at his own expense. All rock excavation shall be considered unsuitable for backfill and shall be removed from the site. No additional payment will be made to the Contractor to replace excavated rock with backfill materials.
- D. If rock is excavated by the Contractor beyond the limits of payment specified above or as authorized in writing by the Engineer, the excess excavation, whether resulting from overbreakage or other causes, shall be backfilled by the Contractor with gravel borrow, structural fill or crushed stone as specified, all at no additional cost to the Owner. All voids created by removal of rock and boulders shall be backfilled and compacted with approved materials as directed by the Engineer.
- E. Rock and boulders that are shattered or loosened below normal grade by the Contractor's activities and are thus rendered inadequate for support of the pipes or structures shall be removed to the limits required by the Engineer and the voids refilled as specified at no additional cost to the Owner.

3.08 BUILDING AND FOUNDATION EXCAVATION:

- A. Excavations shall not be wider than required to set, brace, and remove forms for concrete, or perform other necessary work.
- B. After the excavation has been made, and before forms are set for footings, mats, slabs, or other structures, and before reinforcing is placed, all loose or disturbed material shall be removed from the subgrade. The bearing surface shall then be compacted to meet the requirements of Section 3.14.E.
- C. If, in the opinion of the Engineer, the existing material at subgrade elevation is unsuitable for structural support, the Contractor shall excavate and dispose of the unsuitable material to the required width and depth as directed by the Engineer. If, in the opinion of the Engineer, filter fabric is required; the Contractor shall place filter fabric, approved by the Engineer, as per manufacturer's recommendations. Crushed stone shall then be placed in lifts and compacted to required densities. Backfill shall be placed to the bottom of the proposed excavation.

3.09 EXCAVATION NEAR EXISTING STRUCTURES AND UTILITIES:

- A. It is called to the attention of the Contractor that there are existing pipes, structures, foundations and other utilities along the course of the work. Information shown on the Drawings as to the location of said utilities, structures 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. Utilities and service connections will 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. 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 structures. 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. 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.
- C. Where determination of the exact location of a pipe or other underground structure is necessary for properly performing the work, the Contractor shall excavate test pits to determine the locations.

3.10 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. 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.
- B. 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. See SECTION 02800.

3.11 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. 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. 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. The Contractor is further reminded of the requirements of the General and Supplementary General Conditions.

3.12 SITE DRAINAGE AND DEWATERING:

- A. The Contractor shall satisfy all dewatering requirements specified in SECTION 02225, SITE DRAINAGE AND DEWATERING.

3.13 BACKFILL PLACEMENT:

- A. Excavated material approved by the Engineer as suitable for reuse or gravel borrow shall be used for backfill in pipeline trenches and around structures. The backfill shall be

compacted in 8-inch lifts or greater at the discretion of the Engineer. Only certified clean material as approved by the Engineer can be used as backfill material. In order to minimize the volume of imported clean fill used on the site, the Contractor shall use soil/fill which has been determined suitable for reuse to the extent possible.

- B. Pipe trenches shall be backfilled as soon as practicable after pipes have been laid and jointed and approved for backfill by the Engineer.
- C. If the material removed from the excavation is suitable for backfill with the exception that it contains stones larger than permitted, the Contractor has the option to remove the oversized stones and use the material for backfill or to provide replacement backfill at no additional cost to the Owner.
- D. The Contractor shall remove loam and topsoil, loose vegetation, stumps, large roots, etc., from areas upon which embankments will be built or areas where material will be placed for grading. The subgrade shall be shaped as indicated on the Drawings and shall be prepared by forking, furrowing, or plowing so that the first layer of the fill material placed on the subgrade will be well bonded to the subgrade.
- E. TRENCHES:
 - 1. Bedding as detailed and specified shall be furnished and installed beneath the pipeline prior to placement of the pipeline. A minimum bedding thickness shall be maintained between the pipe and undisturbed material, as shown on the Drawings.
 - 2. As soon as practicable after pipes have been laid, backfilling shall be started.
 - 3. Unless otherwise indicated on the Drawings, cover material as specified shall be placed by hand shovel in 6-inch thick lifts up to a minimum level of 12-inches above the top of pipe. This area of backfill is considered the zone around pipe and shall be thoroughly compacted before the remainder of the trench is backfilled. Compaction of each lift in the zone around pipe shall be done by use of power-driven tampers weighing at least 20 pounds or by vibratory compactors. Care shall be taken that material close to the bank, as well as in all other portions of the trench, is thoroughly compacted to densities required.
 - 4. Backfill material as specified shall be placed from the top of the cover to the specified material at grade (loam, pavement subbase, etc.). Fill compaction shall meet the density requirements listed in Paragraph 3.14.
 - 5. If, in the opinion of the Engineer, the materials above the trench bottom are unsuitable for backfill, and there is no available backfill material stockpiled, the Contractor shall furnish and place gravel borrow.
 - 6. Should the Engineer order crushed stone for utility supports or for other purposes, the Contractor shall furnish and install the crushed stone as directed.
 - 7. In shoulders of local streets, roads and driveways, the top 12-inch layer of trench backfill shall consist of processed gravel for sub-base, satisfying the requirements specified in Paragraph 2.04.
 - 8. In areas where the finished surface is to be loam, the Contractor may complete the backfilling with the specified material placed in 18 inch layers loose measure instead of 12 inch layers.

9. In areas where the finished surface is to be paved, the Contractor shall install 12 inches of thoroughly compacted gravel subbase material installed in maximum 8 inch layers loose measure to a point 3 inches below the finished surface. Maintenance of surfaces to proper grade shall be done under this Section at no additional cost to the Owner.

F. BACKFILLING UNDER BUILDINGS AND FOUNDATIONS:

1. Material to be used as structural fill under structures shall be special bedding material meeting the requirements of Section 2.07 or as directed by the Engineer. Where special bedding material fill is required to support proposed footings, walls, slabs, and other structures, the material shall be placed in a manner accepted by the Engineer. Compaction of each lift shall meet the densities required in Paragraph 3.14. E.

G. BACKFILLING ADJACENT TO STRUCTURES:

1. The Contractor shall not place backfill against or on structures until they have attained sufficient strength to support the loads to which they will be subjected. Excavated material approved by the Engineer may be used in backfilling around structures. Backfill material shall be thoroughly compacted to meet the requirements listed in Paragraph 3.14.E.
2. Contractor shall use extra care when compacting adjacent to pipes and drainage structures. Backfill and compaction shall proceed along sides of drainage structures so that the difference in top of fill level on any side of the structure shall not exceed two feet (2') at any stage of construction.
3. Where backfill is to be placed on only one side of a structural wall, only hand-operated roller or plate compactors shall be used within a lateral distance of five feet (5') of the wall for walls less than fifteen feet (15') high and within ten feet (10') of the wall for walls more than fifteen feet (15') high.

3.14 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 D 1557) (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 5 satisfactory tests.

2. Moisture-Density Relationship of soil in accordance with ASTM D1557, Method D. A total of 10 satisfactory tests.
 3. In-Place Density Tests of materials in accordance with ASTM D1556. A total of 10 satisfactory tests. 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 meet the density as specified herein for the earthwork involved, then the Contractor shall remove all 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 pay for all costs for such additional testing.

Compaction shall be to the following densities:

<u>Fill and Backfill Location</u>	<u>Modified Proctor Density (Percent)</u>
Below structures and pipes	95
Adjacent to structures	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.

3.15 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. Minimum side slopes shall be two horizontal to one vertical. Fill material shall be from surplus suitable material or bank run gravel 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.
- B. 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.

3.16 DISPOSAL OF SURPLUS AND UNSUITABLE EXCAVATED MATERIAL:

- A. All surplus excavated material and any material unsuitable for use as backfill shall be legally disposed of in accordance with all local, state and federal regulations. It is Contractor's responsibility to dispose of unsuitable excavated material in an approved manner.

- B. Surplus excavated materials which are acceptable to the Engineer shall be used to backfill normal excavations in rock or to replace other materials unacceptable for use as backfill. Upon written approval of the Engineer, surplus excavated materials shall be neatly deposited and graded so as to make or widen fills, flatten side slopes, or fill depressions; or shall be neatly deposited for other purposes as indicated by the Owner, within its jurisdictional limits; all at no additional cost to the Owner.
- C. Surplus excavated material not needed as specified above shall be hauled away and disposed of by the Contractor at no additional cost to the Owner, at appropriate locations, and in accordance with arrangements made by him. Disposal of all rubble shall be in accordance with all applicable local, state and federal regulations.

END OF SECTION

SECTION 02223
SHORING/SHEETING

PART 1 GENERAL

1.01 DESCRIPTION:

- A. This work shall consist of furnishing and placing timber and steel sheeting and shoring of the kinds and dimensions required for support of excavations, complying with the appropriate sections of the Rhode Island Department of Transportation Standard Specifications for Road and Bridge Construction and the Department of Labor Occupational Safety and Health Administration Regulations.
- B. Shoring shall mean the use of a steel trench box or timber shoring braced as required.
- C. Timber sheeting shall mean the use of tongue and groove wood sheeting braced as required.
- D. Shoring and timber sheeting are intended to provide lateral support, safe working conditions, limited trench widths and protection of existing utilities, building and structures.
- E. The Contractor shall furnish, put in place, and maintain such sheeting, and/or shoring, as may be necessary to support the sides of the excavation and to prevent any movement of earth which could in any way diminish the width of the excavation to less than that necessary for safe and proper construction, or could otherwise injure or delay the work, or endanger adjacent structures and human life.

1.02 RELATED WORK:

- A. SECTION 02221 - EARTHWORK
- B. SECTION 02225 - SITE DRAINAGE AND DEWATERING

1.03 QUALITY ASSURANCE:

- A. This project is subject to the Safety and Health regulations of the U.S. Department of Labor set forth in 29 CFR, Part 1926. Contractors shall be familiar with the requirements of these regulations.
- B. The excavation support system shall be of sufficient strength and be provided with adequate bracing to support all loads to which it will be subjected. The excavation support system shall be designed to prevent any movement of earth that would diminish the width of the excavation or damage or endanger adjacent structures.

1.04 SUBMITTALS:

- A. The Contractor shall submit six (6) copies of all required details of the sheeting and shoring systems proposed to be installed, including details of equipment and the methods of bracing, to the Engineer for his information only at least two (2) weeks prior to the start of shoring/sheeting installation. The schedule of sizes and lengths of shoring/sheeting proposed to be used shall be submitted to the Engineer before any work is started. Such submittal and comment shall in no way relieve the Contractor of full

responsibility for providing adequate shoring/sheeting at all locations, in accordance with conditions found in the field throughout the construction period.

- B. All submittals shall contain the stamp and signature of a Professional Structural Engineer registered in the State of Rhode Island.

PART 2 PRODUCTS

2.01 TIMBER SHEETING:

- A. Lumber for Wood Sheeting and shoring shall be sound Spruce, Douglas Fir, white or yellow Lodgepole or Ponderosa pine, or western hemlock plank, planed on one (1) side and either tongue and grooved or splined. Dimensions of timber sheeting, shoring, and bracing shall be as required by the field conditions or as required by the authorities specified in Subsection 1.02. In no case shall wood sheeting be less than nominal 3 inches thick.
- B. Portable steel trench boxes or sliding trench shields may be used at locations where, in the judgement of the Engineer, job conditions warrant such use.

PART 3 EXECUTION

3.01 INSTALLATION:

- A. Furnish, put in place, and maintain such bracing, shoring and sheeting as may be required to support the sides of the excavations, to prevent any movement which could in any way diminish the width of the excavation below that necessary for proper construction, and to protect adjacent structures from being undermined or other damage. Care shall be taken to prevent voids outside of the sheeting, but if voids are formed, they shall be immediately filled and compacted.
- B. The sheeting shall be securely and satisfactorily braced to withstand all pressures to which it may be subjected and be sufficiently tight to minimize lowering of the groundwater level outside the excavation, as required in Section 02225, SITE DRAINAGE AND DEWATERING.
- C. The sheeting shall be driven by approved means to the design elevation. No sheeting may be left so as to create a possible hazard to safety of the public or a hindrance to traffic of any kind.
- D. Sheeting shall be left in place, when required for the purpose of preventing injury to structures, utilities or other property, as ordered by the Engineer in writing. Unless otherwise directed by the Engineer, all sheeting left in place shall be cut-off 4 feet below finished grade.
- E. All sheeting not left in place shall be carefully removed in such manner as to not endanger the construction or other structures, utilities, or property. All voids left or caused by withdrawal shall be immediately refilled with approved material compacted with tools especially adapted to that purpose, or otherwise as may be directed. Vibratory extraction methods shall be used only when it can be demonstrated that settling of pipe and structures will not occur, and if such settling occurs, it shall be corrected at the Contractor's expense.

- F. The right of the Engineer to order sheeting left in place shall not be construed as creating any obligation on his part to issue such orders. His failure to exercise his right to do so shall not relieve the Contractor from liability for damages to persons or property occurring from or upon the work occasioned by negligence or otherwise growing out of a failure, on the part of the Contractor, to leave in place sufficient sheeting to prevent movement of the ground.
- G. Wood sheeting if driven below the bottom of the excavation without agreement by the Engineer, shall be left in place and the cost borne by the Contractor. Wood sheeting to be left in place shall be cut off lower than 1 foot above the top of pipe.
- H. Use of the trench box or shield shall not relieve the Contractor of any liability for damages to persons or property growing out of a failure of the Contractor to leave in place sufficient sheeting and bracing to prevent the caving or moving of the ground or disturbance of the completed work. Care shall be taken, when a trench box or shield is moved ahead, so as not to pull apart the joints of pipe already placed or leave voids around the pipe wall.
- I. When required by the Engineer, the Contractor shall provide an acceptable method of rechecking line, grade and horizontal location of the pipe after the shield has been moved ahead. If the pipe has moved, it shall be reset to the proper line and grade.
- J. The width of the trench shield or box shall be such that a minimum 6 inch horizontal clearance is maintained between the pipe and shield at all times.
- K. At no time shall the portable box or shield be allowed to be positioned below the spring line of the pipe.
- L. Any voids between the trench box or shield and the undisturbed trenchwall within the pipe zone (bottom of trench to top of cover material) shall be filled with crushed stone, bank run gravel, or approved material, immediately after the box or shield is positioned.
- M. When using soldier piles and lagging, where boulders or cobbles are encountered, soldier piles shall be installed in pre-augured holes over the full depth as required to prevent misalignment and damage.
- N. All cut-off will become the property of the Contractor and shall be removed by him from the site.
- O. Responsibility for the satisfactory construction and maintenance of the excavation support system, complete in place, shall rest with the Contractor. Any work done, including incidental construction, which is not acceptable for the intended purpose shall be either repaired or removed and reconstructed by the Contractor at his expense.
- P. The Contractor shall be solely responsible for repairing all damage associated with installation, performance, and removal of the excavation support system.

END OF SECTION

SECTION 02225

SITE DRAINAGE AND DEWATERING

PART 1 GENERAL

1.01 WORK INCLUDED:

- A. This Section specifies designing, furnishing, installing, maintaining, operating and removing temporary dewatering systems as required to lower and control groundwater levels, site drainage and hydrostatic pressures during construction to preserve the undisturbed bearing capacity of subgrade soils, and to maintain stable soil conditions and side slopes to facilitate construction, and to prevent damage to adjacent structures and completed work, and disposing of pumped water.
- B. From available station records, the groundwater level to be encountered at the East Natick II Pump Station and the Knight Street Pump Station sites is expected to be approximately 4 feet below grade.

1.02 RELATED WORK:

- A. SECTION 01067 – PERMITS AND REGULATORY REQUIREMENTS
- B. SECTION 02221 - EARTHWORK
- C. SECTION 02223 - SHORING/SHEETING

1.03 SYSTEM DESCRIPTION:

- A. Dewatering includes lowering the water table and intercepting seepage which would otherwise emerge from the slopes or bottom of the excavation; increasing the stability of excavated slopes; preventing loss of material from beneath the slopes or bottom of the excavation; reducing lateral loads on sheeting and bracing; improving the excavation and hauling characteristics of sandy soil; preventing rupture or heaving of the bottom of any excavation; and disposing of pumped water.
- B. Normal dewatering is defined as using conventional pumps installed in open excavations, ditches, or sumps.
- C. Contractor is responsible for continuous control of water and safety of excavations at all times during course of construction, including weekends and holidays and during periods of work stoppages. Method of control, handling, and disposal of groundwater and surface water from dewatering operations shall be in compliance with all applicable Federal, State, and local laws, regulations and requirements as well as Federal, State, and local discharge turbidity requirements, to be by whatever means necessary and in conformance with all applicable local and state regulations.

1.04 QUALITY ASSURANCE:

- A. The Contractor shall provide all required drainage, pumping and disposal without damage to adjacent property or structures. All water pumped from dewatering operations shall be filtered using sedimentation basins prior to discharge as shown on the drawings.

- B. Intercept and divert surface drainage away from work sites or into excavations by use of dikes, ditches, sumps, or other means. Surface drainage systems shall not cause erosion on or off site. Remove drainage systems when no longer required.
- C. Control groundwater and surface water such that excavation of trenches, placement of bedding, installation of conduits and structures, and placement of backfill will be performed in the dry and hydrostatic uplift will be prevented until backfilling has been completed. Backfill trenches so that water will not accumulate in unfilled or partially filled trenches.
- D. The pumping and dewatering operations shall be executed in a manner which will prevent damage to the Contract work and will result in no loss of ground or damage to subgrades from these operations. The Contractor shall protect new work from flooding due to storms or other causes. Where excavations have been made to subgrades below the site groundwater level, dewatering shall be continuous (24 hours per day, seven days a week) to protect the work and/or to maintain progress of the work.
- E. All pipelines or structures shall be protected against uplift during installation or prior to completion shall be thoroughly braced or otherwise protected.
- F. Pumpage from the excavation or dewatering facilities and drainage from any areas used or occupied by the Contractor for construction or other purposes, shall be disposed of in accordance with these specifications and applicable regulations. The discharge of pumpage into sanitary sewers will not be allowed.
- G. The dewatering systems shall be capable of effectively reducing the hydrostatic pressure and lowering the groundwater levels to a minimum of 2 feet below excavation bottom so that all excavation bottoms are firm and dry.
- H. The dewatering system shall be capable of maintaining a dry and stable subgrade until the structures, pipes and appurtenances to be built therein have been completed to the extent that they will not be floated or otherwise damaged. The Contractor shall not turn the system off until the construction is complete.
- I. The dewatering system and excavation support (see SECTION 02223) shall be designed so that lowering of the groundwater level within the work area does not adversely affect structures, utilities, pavements or wells outside of the work area.
- J. The Contractor shall remove all pumped water away from the work area and provide sedimentation control and discharge in accordance with all applicable local codes and laws. The Contractor is prohibited from discharging fines or sediment into any resource areas including, but not limited to, streams, vernal pools, wetlands, ponds.
- K. The Contractor shall supply the necessary electrical power to operate the dewatering system as specified herein.
- L. The Contractor shall be responsible for the adequacy of his dewatering equipment and system in controlling the water and for protection to adjacent structures and property from damage. Any damage to permanent work or existing property resulting from the failure of the Contractor to provide an adequate dewatering system shall be repaired by the Contractor at his own expense.

1.05 SUBMITTALS:

- A. In compliance with the requirements of this contract, the Contractor shall submit at least two weeks prior to the start of construction six copies of his proposed dewatering plan. The Contractor's methods shall address the dewatering for possible effect on the permanent construction. The submittal shall include as a minimum the following items:
1. The sequence of installation, operation, maintenance, supervision and removal/abandonment in-place of the dewatering system proposed by the Contractor.
 2. Plans and description of the dewatering system, including the number, location and depth of sumps; designs of filters to prevent pumping of fine soil; method and location for filtering and disposal of pumped water; erosion/sedimentation control measures; and flow capacity of proposed system.
 3. The Contractor's proposed contingency plan for additional surface water and groundwater control measures for all systems.
 4. Scheduling requirements with respect to Sedimentation Control and Earthwork
 5. Qualifications of the Contractor's dewatering specialist's or firm's qualifications a minimum of four (4) weeks prior to execution of any dewatering.

PART 2 PRODUCTS – NOT APPLICABLE

PART 3 EXECUTION

3.01 GENERAL:

- A. The Contractor shall implement dewatering measures to lower and maintain the groundwater level and hydrostatic pressures as specified prior to the start of any work. Construction shall not begin until the Contractor has demonstrated the capability of the dewatering system to maintain the levels as specified.
- B. The dewatering system shall be maintained and supervised by the Contractor's personnel qualified to do such work at all times during operation.
- C. The dewatering system shall be operated to maintain groundwater levels at specified locations and levels during all construction specified herein. Where work terminates at the end of a work day and excavations remain open or not completely backfilled as allowed by the plans and specifications, dewatering operations shall continue until such work is complete.
- D. All requirements of local environmental authorities and Conservation Commission Order of Conditions shall be satisfied as needed.

3.02 DEWATERING OPERATIONS:

- A. Prior to excavation, groundwater levels shall be lowered and maintained by the dewatering system to a minimum of 2 feet below the bottom of the final subgrade for the construction of the pipes and associated structures until the excavation has been backfilled. The groundwater levels shall be monitored to ensure conformance with the requirements of these specifications. Construction will not be allowed until the

conditions specified above are met.

- B. All water pumped or drained from the work shall be disposed of in a manner which will not result in undue interference with other work or damage, or excessive settlement or displacement to adjacent properties, pavements and other surfaces, buildings, structures and utilities. Suitable temporary pipes, flumes or channels shall be provided for water that may flow along or across the site of the work.
- C. Dewatering shall be done such that all water pumped shall be directed to a stilling basin to allow for settling of solids and to eliminate erosion at the pump discharge. All material settled shall be excavated prior to removal of the stilling basin. Refer to the detail on Drawing D-1.
- D. Dewatering facilities shall be located where they will not interfere with utilities and construction work to be done by others.
- E. The Contractor shall pitch the ground around the excavation to prevent water from running into excavated areas and to prevent damage to other structures or work on adjacent property.
- F. The Contractor shall remove immediately any surface or seepage water or water from drains, creeks, or other sources, which may accumulate during the excavation and construction work.
- G. Pipe, masonry and concrete shall not be placed in water. Water shall not submerge new masonry or concrete within 8 hours after placement, or as otherwise ordered by the Engineer.
- H. In no event shall water rise to cause unbalanced pressure on the pipe or associated structures. The Contractor shall prevent flotation of the pipe by promptly placing, backfill, or by other means approved by the Engineer.
- I. The Contractor shall be responsible for the adequacy of his dewatering equipment and system in controlling the water and for protection to adjacent public and private property from damage. Any damage to permanent work or existing property resulting from the failure of the Contractor to provide an adequate dewatering system shall be repaired by the Contractor at no additional cost to the Owner.
- J. Where the Contractor proposes to remove groundwater from the bottom of the excavation by sumping, the sump shall be surrounded by a suitable filter and bedding material to prevent removal of soil fines.

3.03 DISPOSAL OF DRAINAGE WATER:

- A. All dewatering systems shall be installed with adequate filters to prevent loss of fine grained soils and to provide for clear discharge of water in accordance with the requirements of the project Order of Conditions or any discharge permit obtained for the work.
- B. All water pumped or drained from the work shall be disposed of in such a manner as to not cause injury to public health, damage to public or private property, interference with other work or other adverse impacts to the adjacent wetlands. Effluent from dewatering operations should not be discharged directly to wetlands or waterways and shall not be discharged to storm drain systems prior to being filtered through a siltation basin as

detailed on the drawings.

- C. Dewatering procedures or equipment which cause, or threaten to cause, damage to new or existing facilities shall be immediately modified or replaced so as to prevent further damage at no additional expense to the Owner. The Contractor shall be responsible for repair of any damage caused by his operations at no cost to the Owner.

3.04 NOISE LEVEL REQUIREMENTS:

- A. All primary dewatering equipment shall be electrically operated and shall run on commercial power. Standby equipment shall be independent of commercial power and shall provide dewatering upon primary pump or power failure.
- B. All equipment utilized by the Contractor shall conform to applicable Federal, State and local air quality control regulations for noise levels.
- C. The Contractor shall construct sound enclosures or utilize other noise reduction techniques if the equipment does not meet the noise level requirements stipulated herein.

END OF SECTION

SECTION 02523

SEWER FLOW BYPASS PUMPING

PART 1- GENERAL

1.01 SUMMARY:

A. Section Includes:

1. Installing and maintaining a temporary bypass pumping system to handle existing sewage flows for completing the Work at the East Natick II Pumping Station as indicated on the Drawings.
2. The Owner shall furnish the temporary bypass pumps, controls and related equipment for the Contractor's use. Contractor shall furnish 900 feet of 6" layflat hose for the temporary bypass system. Contractor shall install and place the temporary bypass pump system into service as shown on the drawings.
3. The Owner shall maintain the temporary bypass pump system as needed until the construction of the new pumps and appurtenant work is completed, accepted by the Owner and placed into service.

1.02 REFERENCES:

- A. ASTM D3350 – Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.
- B. AWWA C906 – Standard for Polyethylene (PE) Pressure Pipe and Fittings.

1.03 SYSTEM DESCRIPTION:

A. System Description:

1. The existing East Natick II Pump Station collects gravity sewer flows from approximately 35 homes and discharges up to a sewer manhole located on Pontiac Street via approximately 800' of 4" PVC force main. The bypass pumping system shall consist of the temporary diversion of flow from this local gravity system into the pump station's wet well. There is an existing manhole directly upstream of the wet well for this purpose.
2. The Contractor shall arrange and coordinate the installation and startup of the temporary bypass pumping system including the equipment to be furnished by the Owner.
3. The Owner's staff shall maintain the operation of the temporary bypass pumping system as needed during the construction.

B. Performance Requirements:

1. There shall be no interruption in the flow of sewage.

2. Coordinate and install the temporary pumping system using equipment furnished by the Owner.

1.04 SUBMITTALS:

- A. Submit the following in accordance with Section 01300:
 1. Six (6) sets of bypass pumping plan and details outlining all provisions and precautions regarding the handling of existing wastewater flows.
 2. The bypass pumping plan shall include the following:
 - a. Staging area for bypass pumps.
 - b. Safety enclosures for suction and discharge manholes.
 - c. Sewer plugging method and types of plugs.
 - d. Method of installation/connection of suction and discharge piping at the manholes.
 - e. Method of protecting discharge manhole from erosion and damage.
 - f. Noise control measure including monitoring and reporting decibel levels before and during operation.
 - g. Odor control mitigation measure to be implemented during bypass pumping.
 - h. Emergency response plan for cleaning up leakage from bypass piping.

1.05 SEQUENCING AND SCHEDULING:

- A. The Contractor shall sequence the work to be completed at the East Natick II Pump Station so as to minimize the duration that the temporary bypass pumping system is needed. Refer to Section 01010 – SUMMARY OF WORK for specific requirements and constraints to be adhered to for completing the work.

1.06 SPARE PARTS:

- A. Spare parts shall include repair clamps, tees, couplings, and flexible hose sufficient to isolate a leak or break in the bypass pumping system and minimize damage to the environment.

PART 2– PRODUCTS – N/A

PART 3- EXECUTION

3.01 INSTALLATION:

- A. Plug or block of wastewater flows using a primary and secondary plugging device. Remove plugs and blocks in a sequence that permits wastewater flow to return to pre-existing conditions.
- B. Wastewater bypass piping:
 - 1. Suction and discharge piping shall be laid above-ground along the roadway shoulder. Crossings over driveways shall be protected by constructing suitable ramps or by trenching under the driveways to provide a minimum depth of bury of 1 foot. Crossings at intersections shall also be trenching under the roadway to provide a minimum depth of bury of 1 foot.
 - 2. Piping connections to manholes shall be established and maintained above grade unless otherwise directed by the Owner.
 - 3. Prior to the start of the bypass pumping operation, the discharge pipe shall be pressure tested for leakage.
- C. Install minimum ½-inch thick plywood collar with foam rubber seal shall be placed around the suction hose and discharge pipe to prevent odors from escaping from the manholes.
- D. Place enclosure or barriers around suction and discharge manholes.
- E. Remove all bypass piping and equipment and restore manholes, structures, and all other features disturbed as a result of bypass operation, including temporary and permanent pavement and curb and sidewalk to pre-construction conditions.

3.02 FIELD QUALITY CONTROL:

- A. Prevent leaks in all bypass pipe and service hoses.
- B. Inspection: The Owner will maintain and inspect the temporary bypass pump system on a routine bases while the system is operating to verify that the bypass system is working as needed.
 - 1. Any leakage detected from the temporary bypass piping shall be immediately eliminated and cleaned up by the Contractor.
- C. The Contractor shall repair any damage that occurs to temporary and existing pipes and structures while maintaining existing flows.
- D. The Contractor shall not allow sanitary flow to discharge into any open excavations or any salt or fresh water body by means of overflow, by-pass pumping, or any other method that may contaminate these water areas.

END OF SECTION

SECTION 02576

DUCTILE IRON PIPE AND FITTINGS

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This Section covers the furnishing, handling, hauling, laying, jointing, and testing of all ductile iron pipe, including fittings and appurtenant work as indicated on the drawings and as specified.

1.02 RELATED WORK:

- A. Section 02221, EARTHWORK
- B. Section 02577, HYDRANTS, VALVES AND APPURTENANCES

1.03 QUALITY ASSURANCE:

- A. All pipe and fittings shall be inspected and tested at the foundry as required by the standard specifications to which the material is manufactured. The Contractor shall furnish in duplicate to the Engineer sworn certificates of such tests.
- B. In addition, the Owner reserves the right to have any or all pipe, fittings and special casting inspected and/or tested by an independent service at either the manufacturer's plant or elsewhere. Such inspection and/or tests shall be at the Owner's expense.

1.04 REFERENCES:

- A. The following standards form a part of this specification as referenced:

American Water Works Association (AWWA)

AWWA C105 Polyethylene Encasement for Ductile-Iron Piping for Water and Other Liquids.

AWWA C110 Ductile-Iron and Gray-Iron Fittings, 3 inches through 48 inches, for Water and Other Liquids

AWWA C111 Rubber Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings

AWWA C150 Thickness Design of Ductile-Iron Pipe

AWWA C151 Ductile-Iron Pipe, Centrifugally Cast for Water or Other Liquids

AWWA C153 Ductile-Iron Compact Fittings, 3 inches through 24 inches, and 54 inches through 64 inches for Water Service.

AWWA C600 Installation of Ductile-Iron Water Mains

1.05 SUBMITTALS:

- A. Six sets of all shop drawings shall be submitted to the Engineer for review.

- B. Shop drawings shall consist of manufacturer's scale drawings, cuts or catalogs including descriptive literature and complete characteristics and specifications, and code requirements. Shop drawings shall be submitted for the ductile iron pipe, type of joint, fittings, couplings, filling rings, and lining and coating in accordance with specifications.
- C. Large scale details of all special castings.
- D. Additional requirements for restrained joints.
 - 1. Piping layout drawings showing both plan and profile of the proposed pipeline. Data to be shown to include curve and deflection data, invert elevations, grades, joint locations, closure locations, joint openings if any, and all other necessary information.
 - 2. Locations and type of restrained joints or devices to prevent joint separation.
- E. Certificates of compliance shall be provided by the manufacturer with each shipment of ductile iron pipe verifying conformance with the specifications and applicable AWWA standards. No pipe or fittings may be installed without such certification.

PART 2 - PRODUCTS

2.01 PIPE:

- A. The Contractor shall use push-on joint type ductile iron pipe unless otherwise indicated on the plans.
- B. All ductile iron pipe shall be designed in accordance with AWWA C150 and shall be manufactured in accordance with AWWA C151.
- C. Unless otherwise indicated or specified, ductile iron pipe shall be Thickness Class 52.
- D. Ductile iron pipe, fittings, and accessories shall be as manufactured by:
 - 1. American Cast Iron Pipe Company
Birmingham, Alabama
 - 2. U.S. Pipe and Foundry Company
Birmingham, Alabama
 - 3. Atlantic States Cast Iron Pipe Co.
Phillipsburg, New Jersey
 - 4. or approved equal.

2.02 JOINTS:

- A. Joints for ductile iron pipe shall conform to AWWA C111.
- B. Where required at all bends, fittings and valves, pipe and fittings shall be furnished with approved joint restraining appurtenances to keep the piping from pulling apart under pressure.
- C. Flexible restrained joints where shown on the drawings shall be T. R. Flex by U. S. Pipe, or approved equal.

2.03 FITTINGS:

- A. Fittings shall conform to the requirements of AWWA C110 or C153 as appropriate and shall be of a pressure classification at least equal to that of the pipe with which they are used.
- B. The Contractor shall use ductile iron fittings.
- C. Restrained joints, in addition to concrete thrust blocks, shall be provided at every tee and bend.
- D. Unless otherwise indicated, fittings shall have all bell mechanical joint ends.

2.04 GASKETS, GLANDS, NUTS AND BOLTS:

- A. Gaskets, glands, nuts, bolts and accessories shall conform to AWWA C111 or C153 as appropriate.
- B. Gaskets shall be of plain tipped rubber, suitable for exposure to the liquid within the pipe.
- C. Glands shall be ductile or cast iron.
- D. Bolts and nuts shall be high strength alloy.

2.05 LINING AND COATING:

- A. The inside of pipe and fittings shall be given a cement lining and asphaltic seal coat in accordance with AWWA C104. The thickness of the lining shall be double that specified in AWWA C104.
- B. The outside of pipe and fittings shall be coated with the standard asphaltic coating specified under the appropriate AWWA Standard Specification for pipe and fittings.
- C. Machined surfaces shall be cleaned and coated with a suitable rust preventative coating at the shop immediately after being machined.

2.06 COUPLINGS:

- A. Unless otherwise noted, all couplings shall be ductile iron, solid sleeve type with mechanical joint ends and shall be of a pressure rating at least equal to that of the pipeline in which they are to be installed.

2.07 JOINT RESTRAINTS:

- A. All joints shall be restrained by mechanical means as follows: “locked” or “anchoring” type.
- B. “Locked” or “anchoring” type pipe and fittings shall consist of locking rings inserted in the bells which engage a welded-on ring on the plain end of the pipe. The joint shall be designed to allow for deflection and limited axial movement, and shall be TR Flex, TR Flex Gripper and Field Lok as manufactured by U.S. Pipe, Flex-Ring as manufactured by American Pipe, Super-Lock as manufactured by Clow, or equal.
- C. Mechanical joints where restrained shall be Megalug Series 1100 as manufactured by EBAA Iron Sales, Inc. or approved equal. Systems using friction clamps and/or retainer glands with set screws will not be accepted.

PART 3 - EXECUTION

3.01 GENERAL:

- A. All water mains, fittings, and appurtenances shall, at a minimum, be installed in accordance with AWWA C-600. Where these specifications or the drawing requirements exceed the requirements of AWWA C-600, these specifications shall govern.
- B. Water mains and appurtenances installed under this Contract will be located substantially as indicated on the Drawings, but the Owner reserves the right to make such modifications in location and grade as may be found desirable or to avoid unsatisfactory locations.

3.02 INSPECTION BEFORE INSTALLATION:

- A. Pipes and fittings shall be subjected to a careful inspection just before being laid or installed.

3.03 HANDLING AND CUTTING:

- A. Any pipe or fitting which has a damaged lining, scratched or marred machine surface and/or abrasion of the pipe coating or lining shall be rejected and removed from the job-site.
- B. Any fitting showing a crack and any fitting or pipe which has received a severe blow that may have caused incipient fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the work.
- C. In any pipe showing a distinct crack and in which it is believed there is no incipient fracture beyond the limits of the visible crack, the cracked portions, if so approved, may be cut off by and at the expense of the Contractor before the pipe is laid so that the pipe used will be perfectly sound. The cut shall be made in the sound barrel at a point at least 12 inches from the visible limits of the crack.
- D. Except as otherwise approved, all cutting shall be done with a machine suitable for cutting ductile iron pipe. Hydraulic squeeze cutters are not acceptable for cutting ductile iron pipe. Travel type cutters or rotary type abrasive saws may be used. All cut ends shall be examined for possible cracks caused by cutting.
- E. The cutting of pipe for valves, fittings, or closure pieces shall be done in a neat workmanlike manner without damage to the pipe or epoxy lining and so as to leave a smooth end at right angles to the axis of the pipe.
- F. Ductile iron pipe shall be cut only as recommended by the manufacturer. Only piping supplied as gauged pipe shall be field cut. Flame cutting of pipe by means of an oxyacetylene torch shall not be allowed.
- G. Lined and coated pipe and fittings shall be assembled and installed with approved packing or gaskets of the type recommended by the pipe manufacturer for the particular lining used.

3.04 INSTALLATION:

A. DEPTH:

1. Unless otherwise noted on the drawings, the pipe shall be installed with a

minimum of 4'-6" of cover.

B. PIPE AND FITTINGS:

1. Every precaution shall be taken to prevent foreign material from entering the pipe while it is being placed in the line. During laying operations, no debris, tools, clothing, or other material shall be placed in the pipe.
2. No defective pipe or fittings shall be laid or placed in the piping, and any piece discovered to be defective after having been laid or placed shall be removed and replaced by a sound and satisfactory piece.
3. Each pipe and fitting shall be cleared of all debris, dirt, etc., before being laid and shall be kept clean until accepted in the complete work.
4. Pipe and fittings shall be laid accurately to the lines and grades indicated on the drawings or as required. Care shall be taken to ensure good alignment both horizontally and vertically.
5. As each length of pipe is placed in the trench, the spigot end shall be centered in the bell and the pipe forced home and brought to correct line and grade. Pipes shall not be pushed home with the back hoe bucket. Each pipe shall have firm bearing along its entire length. Cut pipe shall be rebeveled with a suitable file or pipe lathe. The pipe shall be secured in place with approved backfill material tamped under it except at the bells. After joint inspection, the bells shall have approved bedding placed around them and compacted and the trench progressively backfilled as specified in Section 02221. Precautions shall be taken to prevent dirt from entering the joint space.
6. At times when pipe laying is not in progress, the open ends of pipe shall be kept plugged and watertight with rubber and metal pipe stoppers or other approved means and the Contractor shall have two of each size required on the job. This provision shall apply during the noon hour as well as overnight. If water is in the trench, the seal shall remain in place until the trench is pumped completely dry.
7. Pipe shall be laid with bell ends facing the direction of laying, unless directed otherwise. Where pipe is laid on a grade of 10 percent or greater, the laying shall start at the bottom and shall proceed upward with the bell ends of the pipe upgrade.
8. All fittings shall be provided with Megalug Series 1100 retainer glands.

C. TEMPORARY PLUGS:

1. At all times when pipe laying is not actually in progress, the open ends of pipe shall be closed by temporary watertight plugs or by other approved means. If water is in the trench when work is resumed, the plug shall not be removed until all danger of water entering the pipe has passed.

D. PUSH ON JOINTS:

1. Joining of push-on joint pipe shall conform to AWWA C600.
2. The inside of the bell and the outside of the spigot end shall be thoroughly cleaned to remove oil, grit, excess coating, and other foreign matter. The rubber

gasket shall be flexed inward and inserted in the gasket recess of the bell socket.

3. A thin film of gasket lubricant shall be applied to either the inside surface of the gasket or the spigot end of the pipe or both. Gasket lubricant shall be as supplied by the pipe manufacturer and approved.
4. The spigot end of the pipe shall be entered into the socket and the joint shall then be completed by forcing the plain end to the bottom of the socket with a jack-type tool or other approved device. Pipe that is not furnished with a depth mark shall be marked before assembly to assure that the spigot end is inserted to the full depth of the joints. Field-cut pipe lengths shall be filed or ground to resemble the spigot end of such pipe as manufactured. Complete assembly instructions shall be provided.
5. If effective sealing of the joint is not attained, the joint shall be disassembled, thoroughly cleaned, a new gasket inserted and joint reassembled.
6. Deflection of alignment at a joint shall not exceed the appropriate permissible deflection as specified in AWWA C600. The tables in AWWA C600 indicate the maximum permissible deflection for 18 and 20 foot pipe lengths. Maximum permissible deflections for other lengths shall be in proportion to such lengths.

E. MECHANICAL JOINTS:

1. Assembling of fittings with mechanical joint ends shall conform to AWWA C600.
2. The last 8 inches of the spigot and inside of the bell of mechanical-joint pipe shall be thoroughly cleaned to remove oil, grit, excess coating, and other foreign matter from the joint, and then coated with an approved lubricant. The gland shall then be slipped on the spigot end of the pipe with the lip extension of the gland toward the socket, or bell end. The rubber gasket shall be coated with lubricant.
3. The pipe shall be pushed forward to seat the spigot end in the bell. The gasket shall then be pressed into place within the bell; care shall be taken to locate the gasket evenly around the entire joint. The gland shall be moved along the pipe into position for bolting. All nuts shall be tightened with a suitable (preferably torque-limiting) wrench. The torque for various sizes of bolts shall be as follows:

<u>Size</u> <u>In.</u>	<u>Range of Torque</u> <u>ft. lb.</u>
5/8	40-60
3/4	60-90
1	70-100

4. Nuts spaced 180 degrees apart shall be tightened alternately in order to produce an equal pressure on all parts of the gland.
5. If effective sealing of the joint is not attained at the maximum torque indicated in the above standard, the joint shall be disassembled and thoroughly cleaned, then reassembled. Bolts shall not be overstressed to tighten a leaking joint.
6. The deflection of alignment at a joint shall not exceed the appropriate

permissible deflection as specified in the following table. These values indicate the maximum permissible deflection for 18-foot lengths. Maximum permissible deflections for other lengths shall be in proportion to such lengths.

Pipe Deflection Allowances

Maximum permissible deflection, inches

<u>Diameter of Pipe, Inches</u>	<u>Mechanical-Joint</u>
6	27
8-12	20
16	13.5
20	11
24	9

F. RESTRAINED JOINTS:

1. Assembly of restrained joint piping shall conform to the manufacturer's recommendations.
2. Approved restrained joint systems shall be installed in accordance with the manufacturer's written instructions.
3. "Locked" or "anchoring" type pipe and fitting shall be installed in accordance with the manufacturer's recommended installation procedures as approved.
4. The backs of anchors shall be placed against undisturbed earth. The sides of thrust blocks shall be formed. Minimum bearing area shall be as shown on the plans. Felt roofing paper shall be placed to protect pipe joints. Concrete shall not be placed over bolts or nuts, or to prevent the removal of joints
5. If effective sealing of the joint is not attained, the joint shall be disassembled, thoroughly cleaned, a new gasket inserted and joint reassembled.
6. Deflection of alignment at a joint shall not exceed the appropriate permissible deflection recommended by the manufacturer.

G. SLEEVE-TYPE COUPLINGS:

1. Pipe ends shall be cleaned thoroughly prior to installation. After the bolts have been inserted and all nuts have been made up fingertight, diametrically opposite nuts shall be progressively and uniformly tightened all around the joint, preferable by use of a torque wrench of the appropriate size and torque for the bolts. The correct torque as indicated by a torque wrench shall not exceed 90 foot-lb.

3.05 TESTING:

- A. Prior to the pressure and leakage tests, the piping shall be thoroughly flushed clean of all dirt, dust, oil, grease and other foreign material. This work shall be done with care to avoid damage to linings and coatings.

B. PRESSURE AND LEAKAGE TESTS:

1. Except as otherwise directed, all pipelines shall be given combined pressure and

leakage tests in section of approved length. The Contractor shall furnish and install suitable temporary testing plugs or caps; all necessary pressure pumps, pipe connections, meters, gates, and other necessary equipment; and all labor required. The Owner or Engineer shall have the privilege of using their own gages.

2. Subject to approval and provided that the tests are made within a reasonable time considering the progress of the project as a whole, and the need to put the section into service, the Contractor may make the tests when he desires.
3. Unless it has already been done, the section of pipe to be tested shall be filled with water of approved quality, and all air shall be expelled from the pipe. The Contractor shall follow established procedures for filling the pipe and expelling trapped air to avoid exposing the piping system to water-hammer. If blowoffs are not available at high points for releasing air, the Contractor shall excavate as required and install the necessary taps. After completion of the test, if so directed by the Engineer, he shall remove corporations used for testing, plug the holes and backfill as necessary.
4. The section under test shall be maintained full of water for a period of 24 hours prior to the combined pressure and leakage test being applied.
5. The pressure and leakage test shall consist of first raising the water pressure (based on the elevation of the lowest point of the section under test corrected to the gage location) to a pressure in pounds per square inch numerically equal to the pressure rating of the pipe (normally 150 psi). If the Contractor cannot achieve the specified pressure and maintain it for a period of one hour, the section shall be considered as having failed to pass the pressure test.
6. Following or during the pressure test, the Contractor shall make a leakage test by metering the flow of water into the pipe while maintaining in the section being tested a pressure equal to the pressure rating of the pipe. The maximum allowable leakage for pipelines shall be according to the following formula:

$$L = S \times D \times P^{1/2} / 148,000$$

where:

L = leakage (gallons per hour)

S = length (feet)

D = pipe diameter (inches)

P = test pressure (psi)

7. If the section fails to pass the pressure and leakage test, the Contractor shall do everything necessary to locate, uncover, and repair or replace the defective pipe, fitting, or joint, all at his own expense and without extension of time for completion of the work. Additional tests and repairs shall be made until the section passes the specified test.
8. If, in the judgement of the Engineer, it is impracticable to follow the foregoing procedure exactly for any reason, modifications in the procedure shall be made as required and approved, but in any event the Contractor shall be responsible for the ultimate tightness of the line within the above leakage and pressure requirements.

END OF SECTION

DUCTILE IRON AND FITTINGS

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SECTION 02577

VALVES AND APPURTENANCES

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This Section covers the furnishing and installation of all outside valves and appurtenances as indicated on the drawings and as specified herein.
- B. Pipe and couplings shall be specified under the appropriate pipe sections.

1.02 RELATED WORK:

- A. SECTION 02221, EARTHWORK
- B. SECTION 02576, DUCTILE IRON PIPE AND FITTINGS

1.03 REFERENCES:

- A. The following standards form a part of this specification:

American Society for Testing and Materials (ASTM)

ASTM A48 Gray Iron Castings

ASTM A126 Gray Iron Castings for Valves, Flanges, and Pipe Fittings

ASTM A536 Ductile Iron Castings

ASTM B62 Composition Bronze or Ounce Metal Castings

American Water Works Association (AWWA)

AWWA C500 Gate Valves, 3 through 48 inch NPS, For Water and Sewerage Systems

AWWA C504 Rubber-Seated Butterfly Valves

AWWA C509 Resilient-Seated Gate Valves, 3-through 12-inch NPS, for Water and Sewerage Systems

AWWA C550 Protective Interior Coatings for Valves and Hydrants

Federal Specifications (FS)

FS TT-V-51F Varnish, Asphalt

1.04 SUBMITTALS:

- A. Shop drawings shall be submitted for the valves and appurtenances indicating type of joint, and lining and coating, etc., in accordance with the specifications.
- B. Shop drawings shall consist of manufacturer's scale drawings, cuts or catalogs including

VALVES AND APPURTENANCES

descriptive literature and complete characteristics and specifications, and code requirements.

PART 2 - PRODUCTS

2.01 GENERAL:

- B. All valves and valve boxes shall be American made only.
- C. Valves shall open **right (clockwise)**.

2.02 RESILIENT SEAT GATE VALVES:

- A. Resilient seat, wedge type gate valves shall be manufactured to meet all applicable requirements of AWWA C509. Valves 12 inches and smaller shall be bubble-tight at 200 psi water working pressure, tested in both directions. Valves shall be rated for a working pressure of 250 psi and a test pressure of 500 psi.
- B. Valve bodies shall be of ductile iron and shall have nonrising threaded bronze stems acting through a bronze stem nut. Opening nuts shall be 2 inches square and shall open as specified above. All buried valves shall have mechanical joint ends.
- C. Valve wedges shall be of cast iron with resilient seating surfaces permanently bonded to the wedges in strict accordance with ASTM D429 or attached to the face of the wedges with stainless steel screws. Each valve shall have a smooth, unobstructed water way free from sediment pockets.
- D. Valves shall have low friction, torque-reduction thrust bearings. All O-rings and gaskets shall be removable without taking the valves out of service.
- E. A non-toxic fusion-bonded epoxy coating which is safe for potable water shall be applied to exterior and interior valve surfaces in accordance with AWWA C550.
- F. For purposes of standardization, resilient seat gate valves shall be as manufactured by M&H Valve Co., Kennedy Valve, US Pipe, or American Flow Control.

2.05 TAPPING SLEEVES AND VALVES:

- A. Tapping sleeves and valves shall consist of a split ductile iron sleeve tee with mechanical joint ends on the main and a flange on the branch. Tapping-type gate valves shall have one flange and one mechanical joint end. The valves shall conform to the requirements hereinbefore specified for gate valves and shall be furnished with a 2-inch square operating nut. The Contractor shall be responsible for verifying the outside diameter of the pipe to be tapped.
- B. Oversized valves shall be provided as required to permit the use of full size cutters. Before backfilling, all exposed portions of bolts used to hold the two halves of the sleeve together shall be heavily coated with two coats of bituminous paint comparable to Inertol No. 66, Special Heavy. Sleeves shall be of cast iron furnished with rubber gaskets. Gaskets shall cover the entire area of flange surfaces.
- C. Tapping sleeves and valves shall be as manufactured by Clow Valve Co., Oskaloosa, IA; Mueller Co., Decatur, IL; American Valve and Hydrant, Birmingham, AL; or approved equal.

2.06 VALVE BOXES AND EXTENSIONS:

- A. Valve boxes shall be manufactured in North America. The minimum inside diameter of the boxes shall be 5 1/2 inches and the lengths shall be as necessary to suit the ground elevation and the depth of each valve operator, regardless of the depth of cover.
- B. When there is more than 6 feet of cover, valve operators shall have non-rising extension stems which raise the operating nut to a depth of approximately 4 feet below grade. The extension stem shall have a centering support ring at the upper end. The lower socket shall be tapped with a set screw into the valve nut to prevent the extension stem from lifting off the valve nut.
- C. Each valve shall be provided with a box which has a close fitting 7-1/4-inch diameter cover and is substantially dirt-tight. The top of the cover shall be flush with the top of the box rim. The word "SEWER" shall be cast in the top of the cover.
- D. Valve boxes shall be of cast iron or ductile iron and of the adjustable sliding, heavy pattern type. Boxes shall be tar or asphalt coated inside and out. They shall be so designed and constructed as to prevent direct transmission of traffic loads to the pipe or valve. The upper or sliding section of the box shall be provided with a flange on the top of the section (not on the bottom) having sufficient bearing area to prevent undue settlement. The lower section of the box shall have a minimum inside diameter of 8 inches and shall be designed to enclose the operating nut and stuffing box of the valve and to rest on the backfill. The boxes shall be adjustable through 12 inches vertically with 4 inches minimum lap between sections.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. All valves shall be carefully installed and supported in their respective positions free from distortion and strain. Care shall be taken to prevent damage or injury to the valves and appurtenances during handling and installation.
- B. All material shall be carefully inspected for defects in workmanship and all debris and foreign material cleaned out of valve openings and seats. All mechanisms shall be operated to check for proper functioning, and all nuts and bolts checked for tightness.
- C. Valves and other equipment which do not operate easily or are otherwise defective shall be repaired or replaced at the Contractor's expense.
- D. Valve boxes shall be set plumb and centered directly over the operating nut of the valves. Earth fill shall be carefully tamped around the valve boxes to a distance of 4 feet on all sides of the boxes or to the undisturbed trench face, if less than 4 feet. The top of each valve box shall be set to finished grade with at least 10 inches of overlap remaining between the upper sections for future vertical adjustment. Minimum overlap for lower, extension pieces shall be 4 inches.
- E. Valves, bolts and all other appurtenances not epoxy coated shall be thoroughly cleaned and given a shop coat of asphalt varnish.

END OF SECTION

SECTION 02631

PRECAST MANHOLES

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This Section covers all precast manholes complete, including, but not limited to, bases, walls, cones, mortar, inverts, frames and covers.

1.02 RELATED WORK:

- A. Section 02221, EARTHWORK

1.03 SYSTEM DESCRIPTION:

- A. Precast sections shall conform in shape, size, dimensions, materials, and other respects to the details indicated on the drawings or as ordered by the Engineer.
- B. All manholes shall have concrete bases. Concrete bases shall be precast unless otherwise specified. Invert channels shall be formed of brick and mortar upon the base.
- C. Riser and cone sections shall be precast concrete.

1.04 REFERENCES:

- A. The following standards form a part of this specification as referenced:

American Society for Testing and Materials (ASTM)

ASTM A48 Gray Iron Castings

ASTM C32 Sewer and Manhole Brick

ASTM C144 Aggregate for Masonry Mortar

ASTM C207 Hydrated Lime for Masonry Purposes

ASTM C478 Precast Reinforced Concrete Manhole Sections

ASTM C923 Specification for Resilient Connectors Between Reinforced
Concrete Manhole Structures and Pipes

ASTMC1244 Standard Test Method for Concrete Sewer Manholes by the
Negative Air Pressure (Vacuum) Test.

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO M198 Joints for Circular Concrete Sewer and Culvert Pipe Using
Flexible Watertight Gaskets

Occupational Safety and Health Administration

OSHA 29 CFR 1910.27 Fall Prevention Protection

PRECAST MANHOLES

02631-1

1.05 SUBMITTALS:

- A. Six (6) sets of manufacturer literature of the materials of this section shall be submitted to the Engineer for review.
- B. Tests reports as required shall be submitted to the Engineer.

PART 2 - PRODUCTS

2.01 PRECAST CONCRETE SECTIONS:

- A. All precast concrete sections shall conform to ASTM C478 with the following exceptions and additional requirements:

- 1. The wall thickness of precast sections shall be as designated on the drawings, meeting the following minimum requirements:

<u>Section Diameter (Inches)</u>	<u>Minimum Wall Thickness (Inches)</u>
48	5
60	6
72	7
84	8

- 2. Type II cement shall be used except as otherwise approved.
 - 3. Sections shall be steam cured and shall not be shipped until at least five days after having been cast.
 - 4. Minimum compressive strength of concrete shall be 4000 psi at 28 days.
 - 5. No more than two lift holes may be cast or drilled in each section.
 - 6. The date of manufacture and the name or trademark of the manufacturer shall be clearly marked on the inside of each precast section.
 - 7. Acceptance of the sections will be on the basis of material tests and inspection of the completed product.
 - 8. Circumferential steel reinforcement in walls and bases shall be a minimum of 0.12 sq. in./lin. ft. for 4-foot diameter sections and 0.15 sq. in./lin. ft. for 5- and 6-foot diameter sections. Reinforcing shall extend into tongue and groove.
- B. Conical reducing sections shall have a wall thickness not less than 5-inches at the bottom and wall thickness of 8-inches at the top. Conical sections shall taper from a minimum of 48-inches diameter to 24 or 30-inches diameter at the top, as shown on the drawings.
 - C. Except where insufficient depth of cover dictates the use of a shorter base, bases shall be a minimum of 4 feet in height.
 - D. Slab top sections and flat riser sections (Grade Rings) shall conform to the contract drawings, with particular attention focused upon the reinforcing steel and be designed to meet or exceed an H-20 Loading requirement.

- E. The tops of the bases shall be suitably shaped by means of accurate ring forms to receive the riser sections.
- F. Precast sections shall be manufactured to contain wall openings of the minimum size to receive the ends of the pipes, such openings being accurately set to conform with line and grade of the sewer or drain. Subsequent cutting or tampering in the field, for the purpose of creating new openings or altering existing openings, will not be permitted except as directed by the Engineer.
- G. The exterior surfaces of all precast manhole bases, walls, and cones shall be given a minimum of one shop coat of bituminous dampproofing.
- H. The Engineer reserves the right to reject any unsatisfactory precast section and the rejected unit shall be tagged and removed from the job site immediately.
- I. The Engineer may also require the testing of concrete sections as outlined under Physical Requirements in ASTM C478 with the Contractor bearing all testing costs.

2.02 BRICK MATERIALS:

- A. Brick shall be sound, hard, and uniformly burned brick, regular and uniform in shape and size, of compact texture, and satisfactory to the Engineer. Bricks shall comply with ASTM C32, for Grade SS, hard brick, except that the mean of five tests for absorption shall not exceed 8 percent by weight.
- B. Rejected brick shall be immediately removed from the work and brick satisfactory to the Engineer substituted.
- C. Mortar shall be composed of portland cement, hydrated lime, and sand in which the volume of sand shall not exceed three times the sum of the volumes of cement and lime. The proportions of cement and lime shall be as directed and may vary from 1:1/4 for dense hard-burned brick to 1:3/4 for softer brick. In general, mortar for Grade SS Brick shall be mixed in the volume proportions of 1:1/2:4-1/2; portland cement to hydrated lime to sand.
- D. Cement shall be Type II portland cement as specified for concrete masonry.
- E. Hydrated lime shall be Type S conforming to ASTM C207.
- F. The sand shall comply with ASTM C144 specifications for "Fine Aggregate," except that all of the sand shall pass a No. 8 sieve.

2.03 FRAMES, GRATES, COVERS AND STEPS:

- A. Castings shall be of good quality, strong, tough, even-grained cast iron, smooth, free from scale, lumps, blisters, sandholes, and defects of every nature which would render them unfit for the service for which they are intended. Contact surfaces of covers and frame seats shall be machined to prevent rocking of covers.
- B. All castings shall be thoroughly cleaned and may be subject to a careful hammer inspection at the Engineer's discretion.
- C. Castings shall be ASTM A48 Class 30B or better.
- D. Manhole frames and covers shall have a clear opening of 24-inch with a 7 to 9 inch depth and 26-inch diameter cover. The surface shall have a diamond pattern with the cast words "WATER," "DRAIN" or "SEWER," whichever is appropriate.

- E. Manhole steps shall conform to ASTM C478 requirements and shall be fabricated of either extruded aluminum or steel reinforced plastic. Steps shall be uniformly spaced at a maximum of 12-inches unless otherwise shown on the drawings.

2.04 SEWER MANHOLE ACCESSORIES:

- A. Gasket materials shall be top grade (100% solids, vulcanized) butyl rubber and shall meet or exceed AASHTO M-198.
- B. Couplings at the manhole-pipe interface shall be made with a rubber seal system (with or without stainless steel straps) meeting the requirements of ASTM C923 and recommended for this type of connection.
- C. Stubs installed as specified and indicated on the drawings shall be short pieces of the same class pipe as that entering the manhole and shall have either stoppers or end caps as shown on the drawings. Stoppers or end caps shall be especially designed for that application.

PART 3 - EXECUTION

3.01 INSTALLATION:

A. PRECAST SECTIONS:

- 1. Precast bases shall be supported on a compacted level foundation of crushed stone, as specified in Section 02221 EARTHWORK, at least 6-inches thick, but shall vary to the depth necessary to reach sound undisturbed earth.
- 2. Precast reinforced concrete sections shall be set vertical and with sections in true alignment.
- 3. Butyl rubber joint sealant shall be installed between each concrete section.
- 4. All holes in sections used for handling the sections shall be thoroughly plugged with mortar. Mortar shall be one part cement to 1-1/2 parts sand, mixed slightly damp to the touch (just short of "balling"), hammered into the holes until it is dense and an excess of paste appears on the surface, and then finished smooth and flush with the adjoining surfaces.

B. BRICK WORK:

- 1. Bricks shall be moistened by suitable means, as directed, until they are neither so dry as to absorb water from the mortar nor so wet as to be slippery when laid.
- 2. Each brick shall be laid as a header in a full bed and joint of mortar without requiring subsequent grouting, flushing or filling, and shall be thoroughly bonded as directed.
- 3. The brick inverts shall conform accurately to the size of the adjoining pipes. Side inverts shall be curved and main inverts (where direction changes) shall be laid out in smooth curves of the longest possible radius which is tangent to the centerlines of adjoining pipe.

C. CASTINGS:

1. Cast iron frames, grates and covers shall be as specified. The frames and covers shall be set by the Contractor to conform accurately to the grade of the finished pavement, existing ground surface, or as indicated on the drawings. Frames shall be adjusted to meet the street surface.
2. Cast iron manhole frames and covers not located in paved areas shall be set 6-inches above finished grade, at a height as directed by the Engineer, or as indicated on the drawings. The top of the cone shall be built up with a minimum of 1 course and a maximum of 5 courses of brick and mortar used as headers for adjustment to final grade.
3. Frames shall be set concentric with the top of the concrete section and in a full bed of mortar so that the space between the top of the concrete section or brick headers and the bottom flange of the frame shall be completely filled and made watertight. A thick ring of mortar extending to the outer edge of the concrete shall be placed all around the bottom flange. The mortar shall be smoothly finished to be flush with the top of the flange and have a slight slope to shed water away from the frame.
4. Covers and/or grates shall be left in place in the frames, for safety reasons, except while work is being performed.

D. ACCESSORIES:

1. Accessories shall be installed in accordance with manufacturer's instructions.
2. Stubs shall be set accurately to the dimensions indicated on the drawings. Stubs shall be sealed with suitable watertight plugs.

3.02 LEAKAGE TESTS:

A. Leakage tests shall be made by the Contractor and observed by the Engineer on each manhole. The test shall be by vacuum or by water exfiltration as described below:

B. VACUUM TEST:

1. The vacuum test shall be conducted in accordance with ASTM C1244. Test results will be judged by the length of time it takes for the applied vacuum to drop from 10 inches of mercury to 9 inches. If the time is less than that listed in Table 1 of ASTM C1244, the manhole will have failed the test. Test times from Table 1 are excerpted below.

TABLE 1

Minimum Test Times for Various Manhole Diameters

Depth (Feet)	Diameter (Inches)		
	48	60	72
	<u>Times (Seconds)</u>		
0-12	30	39	49
12-16	40	52	67
16-20	50	65	81
20-24	59	78	97
26-30	74	98	121

2. If the manhole fails the initial test, the Contractor shall locate the leaks and make proper repairs. Leaks may be filled with a wet slurry of accepted quick setting material. If the manhole should again fail the vacuum test, additional repairs shall be made, and the manhole water tested as specified below.

C. WATER EXFILTRATION TEST:

1. After the manhole has been assembled in place, all lifting holes shall be filled and pointed with an approved non-shrinking mortar. All pipes and other openings into the manhole shall be suitably plugged and the plugs braced to prevent blow out. The test shall be made prior to placing the shelf and invert. If the groundwater table has been allowed to rise above the bottom of the manhole, it shall be lowered for the duration of the test.
2. The manhole shall be filled with water to the top of the cone section. If the excavation has not been backfilled and observation indicates no visible leakage, that is, no water visibly moving down the surface of the manhole, the manhole may be considered to be satisfactorily water-tight. If the test, as described above, is unsatisfactory as determined by the Engineer or if the manhole excavation has been backfilled, the test shall be continued. A period of time may be permitted if the Contractor so wishes, to allow for absorption by the manhole. At the end of this period, the manhole shall be refilled to the top of the cone, if necessary, and a measuring time of at least 8 hours begun. At the end of the test period, the manhole shall be refilled to the top of the cone, measuring the volume of water added. This amount shall be extrapolated to a 24-hour loss rate and the leakage determined on the basis of depth. The leakage for each manhole shall not exceed one gallon per vertical foot for a 24-hour period. If the manhole fails this requirement, but the leakage does not exceed 3 gallons per vertical foot per day, repairs by approved methods may be made as directed by the Engineer to bring the leakage within the allowable rate of one gallon per foot per day. Leakage due to a defective section or joint or exceeding the 3 gallon per vertical foot per day, shall be cause for rejection of the manhole. It shall be the Contractor's responsibility to uncover the rejected manhole as necessary and to disassemble, reconstruct or replace it as directed by the Engineer. The manhole shall then be retested and, if satisfactory, interior joints shall be filled and pointed.
3. No adjustment in the leakage allowance will be made for unknown causes such as leaking plugs, absorption, etc. It shall be assumed that all loss of water during the test is a result of leaks through joints or through the concrete. Furthermore, the Contractor shall take any steps necessary to assure the Engineer that the water table is below the bottom of the manhole throughout the test.
4. If the groundwater table is above the highest joint in the manhole, and there is no leakage into the manhole, as determined by the Engineer, such a test can serve to evaluate water-tightness of the manhole. However, if the Engineer is not satisfied with the results, the Contractor shall lower the water table and carry out the test as described hereinbefore.

3.03 CLEANING:

- A. All new manholes shall be thoroughly cleaned of all silt, debris and foreign matter of any kind, prior to final inspection.

END OF SECTION

SECTION 02800

LOAMING AND SEEDING

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This section covers all labor, materials, and equipment necessary to do all loaming, seeding and related work as indicated on the drawings and as herein specified. All existing lawn, cross country areas and grassed areas disturbed by the Contractor's operations shall be repaired and restored as herein specified.

1.02 QUALITY ASSURANCE:

- A. For a particular source of loam and/or compost, the Engineer may require the Contractor to send approximately 10 pounds of loam and/or compost to an approved testing laboratory and have the following tests conducted:
 - 1. Organic concentration
 - 2. pH
 - 3. Nitrogen concentration
 - 4. Phosphorous concentration
 - 5. Potash concentration
- B. These tests shall be at the Contractor's expense. Test results, with soil conditioning and fertilizing recommendations, shall be forwarded to the Engineer.

1.03 SUBMITTALS:

- A. Six sets of information detailing the seed mixes, fertilizers, mulch material, slope protection material (if required) and origin of loam shall be submitted to the Engineer for review.
- B. Three sets of test results shall be submitted to the Engineer for review.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. LOAM:
 - 1. Loam shall be a natural, fertile, friable soil, typical of productive soils in the vicinity, obtained from naturally well-drained areas, neither excessively acid nor alkaline, and containing no substances harmful to grass growth. Loam shall not be delivered to the site in frozen or muddy condition and shall be reasonably free of stumps, roots, heavy or stiff clay, stones larger than 1 inch in diameter, lumps, coarse sand, noxious weeds and seed stock, sticks, brush or other litter.
 - 2. The loam shall contain not less than 4 percent nor more than 20 percent organic matter as determined by the loss of weight by ignition of oven-dried samples. Test samples shall be oven-dried to a constant weight at a temperature of 230 degrees F.
 - 3. Loam shall be blended 75% loam, 25% organic weed free vegetative source

compost.

B. LIME:

1. Lime shall be standard commercial ground limestone containing at least 50 percent total oxides (calcium oxide and magnesium oxide), and 50 percent of the material must pass through a No. 100 mesh sieve with 98 percent passing a No. 2 mesh sieve.

C. FERTILIZER:

1. Fertilizer shall be commercial fertilizer, 10-10-10 fertilizer mixture containing at least 40 percent of organic nitrogen. It shall be delivered to the site in the original sealed containers, each showing the manufacturer's guaranteed analysis. Fertilizer shall be stored so that when used it will be dry and free flowing. No fertilizer shall be used which has not been marketed in accordance with State and Federal Laws, relating to fertilizers.

D. MULCH:

1. Materials to be used in mulching shall conform to the following requirements:
2. Straw Mulch - Straw Mulch shall consist of stalks or stems of grain after threshing.
3. Compost – Compost shall be primarily from a vegetative source weed and weed free.
4. Wood Fibre Mulch - Wood Fibre Mulch shall consist of wood fibre produced from clean, whole uncooked wood, formed into resilient bundles having a high degree of internal friction and shall be dry when delivered to the project.

E. SEED:

1. Seed shall be of an approved mixture, the previous year's crop, clean, high in germinating value, a perennial variety, and low in weed seed. Seed shall be obtained from a reliable seed company and shall be accompanied by certificates relative to mixture purity and germinating value.
2. Grass seed for lawn areas shall conform to the following requirements:

	Proportion by Weight	Germination Minimum	Priority Minimum
Chewing's Fescue	30%	70%	97%
Kentucky 31 Fescue	30%	90%	98%
Kentucky Blue Grass	20%	80%	85%
Domestic Rye Grass	20%	90%	98%

3. Grass seed for cross-country areas, slopes and other areas not normally mowed shall conform to the following requirements:

	Proportion by Weight	Germination Minimum	Priority Minimum
Creeping Red Fescue	50%	85%	95%
Kentucky 31	30%	85%	95%
Domestic Rye	10%	90%	98%
Red Top	5%	85%	92%
Ladino Clover	5%	85%	96%

F. TEMPORARY COVER CROP:

1. Temporary cover crop shall conform to the following requirements:

	Percent by Weight	Germination Minimum
Winter Rye	80% Min.	85%
Red Fescue (Creeping)	4% Min.	80%
Perennial Rye Grass	3% Min.	90%
Red Clover	3% Min.	90%
Other Crop Grass	0.5% Max.	
Noxious Weed Seed	0.5% Max.	
Inert Matter	1% Max.	

G. SLOPE EROSION PROTECTION:

1. Erosion control blanket shall be 100% degradable plastic or jute mesh with 100% degradable straw or straw/coconut fill. Fill shall be held together by degradable fastening. Weight shall be 0.50 lb/sq. yd. Erosion control blankets shall be applied parallel to direction of water flow. The erosion control blankets shall be by North American Green, Evansville, IN or approved equal. For slopes 2:1 or greater, Model SC150 shall be used. For slopes less than 2:1, Model S150 shall be used.
2. Six inch wire staples shall be placed according to manufacturers recommendations to anchor the mesh material. Staples shall be designed to decompose.

PART 3 - EXECUTION

3.01 SURFACE PREPARATION:

- A. After approval of rough grading, loam/compost blend shall be placed on areas affected by the Contractor's operations. Loam/compost blend shall be at least 6 inches compacted thickness.
- B. Lime shall be applied to bring the pH to 6.5 or, without a soil test, at the rate of 2-3 tons of lime per acre.
- C. Loam shall be worked a minimum of 3 inches deep, thoroughly incorporating the lime into the soil. The surface shall then be raked until the surface is finely pulverized and smooth and compacted with rollers, weighing not over 100 pounds per linear foot of tread, to an even surface conforming to the prescribed lines and grades. Minimum depth shall be 6-inches after completion.

3.02 SEEDING:

- A. Seeding shall be done when weather conditions are approved as suitable, in the periods between April 1 and May 30 or August 15 and October 1, unless otherwise approved.
- B. If there is a delay in seeding, during which weeds grow or soil is washed out, the Contractor shall remove the weeds or replace the soil before sowing the seed, without additional compensation. Immediately before seeding is begun, the soil shall be lightly raked.
- C. Seed shall be sown at a rate of 5 lb per 1,000 sq. ft. on a calm day by machine. Seed rate may be adjusted with the approval of the Engineer.
- D. One half the seed shall be sown in one direction and the other half at right angles. Seed shall be raked lightly into the soil to a depth of 1/4 inch and rolled with a roller weighing not more than 100 pounds per linear foot of tread.
- E. The surface shall be kept moist by a fine spray until the grass shows uniform germination over the entire area. Wherever poor germination occurs in areas larger than 3 sq. ft., the Contractor shall reseed, roll, and water as necessary to obtain proper germination.
- F. The Contractor shall water, weed, cut and otherwise maintain and protect seeded areas as necessary to produce a dense, healthy growth of perennial lawn grass.
- G. If there is insufficient time in the planting season to complete the fertilizing and seeding, permanent seeding may be left until the following planting season, at the option of the Contractor or on order of the Engineer. In that event, a temporary cover crop shall be sown or the site otherwise stabilized with erosion control blankets. This cover crop shall be cut and watered as necessary until the beginning of the following planting season, at which time it shall be plowed or harrowed into the soil before annual plants reach maturity, the area shall be limed and the permanent seed crop shall be sown as specified.

3.03 PLACING MULCH:

- A. Straw Mulch shall be loosely spread to a uniform depth over all areas to be seeded, at the rate of 4-1/2 tons per acre, or as otherwise directed.
- B. Straw Mulch may be applied by mechanical apparatus, if in the judgment of the Engineer the apparatus spreads the mulch uniformly and forms a suitable mat to control slope erosion. The apparatus shall be capable of spreading at least 80 percent of the hay or straw in lengths of 6-inches or more, otherwise it shall be spread by hand without additional compensation.
- C. Compost mulch may be applied by mechanical apparatus, if in the judgment of the Engineer the apparatus spreads the mulch uniformly and forms a suitable mat to control slope erosion. Application rate will vary by compost source, and should be calculated to ensure a uniform thickness of approximately 1 inch.
- D. Wood Fibre Mulch shall be uniformly spread over certain selected seeded areas at the minimum rate of 1,400 pounds per acre unless otherwise directed. It shall be placed by spraying from an approved spraying machine having pressure sufficient to cover the entire area in one operation.

3.04 SEEDING AND MULCHING BY SPRAY MACHINE:

- A. The application of lime, seed and mulch may be accomplished in one operation by the use of an approved spraying machine. The materials shall be mixed with water in the machine and kept in an agitated state in order that the materials may be uniformly suspended in the water. The spraying equipment shall be so designed that when the solution is sprayed over an area, the resulting deposits of lime, seed and mulch shall be equal to the specified quantities.
- B. A certified statement shall be furnished, prior to start of work, to the Engineer by the Contractor as to the number of pounds of limestone, seed and mulch per 100 gallons of water.
- C. This statement should also specify the number of square yards of seeding that can be covered with the solution specified above. If the results of the spray operation are unsatisfactory, the Contractor will be required to abandon this method and to apply the lime, seed and mulch by other methods.

3.05 INSPECTION AND ACCEPTANCE:

- A. At the beginning of the planting season following that in which the permanent grass crop is sown, the seeded areas will be inspected. Any section not showing dense, vigorous growth at that time shall be promptly reseeded by the Contractor at his own expense. The seeded areas shall be watered, weeded, cut and otherwise maintained by the Contractor until the end of that planting season, when they will be accepted if the sections show dense, vigorous growth.

END OF SECTION

SECTION 02830

CHAIN LINK FENCE AND ACCESSORIES

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This section of the specification covers the furnishing and installing of new sections of chain link fence and accessories complete, along with installing relocated sections of existing chain link fence as specified herein and as shown on the drawings.

1.02 RELATED WORK:

- A. Section 02221, EARTHWORK
- B. Section 03300, CAST-IN-PLACE CONCRETE

1.03 SYSTEM DESCRIPTION:

- A. New fence sections at the East Natick II Pump Station site shall be 5-feet high to match existing fence and shall be as shown on the drawings. The fence shall have a top rail and bottom tension wire.
- B. All fence materials unless specifically stated otherwise, shall be bonded polyvinyl chloride (PVC) coated.
- C. Fence materials and installation shall meet or exceed the standards of the Chain Link Fence Manufacturer's Institute, New York, N.Y. except as otherwise specified in these specifications, and fence materials shall also meet or exceed F.S. RR-F-191H/GEN.

1.04 REFERENCES:

- A. The following standards form a part of this specification as referenced.

American Society for Testing and Materials (ASTM)

ASTM A53	Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
ASTM A121	Zinc-Coated (Galvanized) Steel Barbed Wire
ASTM A123	Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A153	Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM F668	Specification for Poly (Vinyl Chloride) (PVC) - Coated Steel Chain-Link Fence Fabric.

Federal Specifications (FS)

FS RR-F-191H/GEN	Fencing Wire and Post, Metal (and Gates, Chain-Link Fabric, and Accessories)
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1.05 SUBMITTALS:

- A. Six sets of shop drawings of the fence materials and the proposed color shall be submitted to the Engineer for review as specified in Section 01300. Shop drawings shall show dimensions, joints and other details of the fence and appurtenances to be furnished.

1.06 WARRANTY:

- A. Prior to installation, the fence contractor shall provide the fence manufacturer's notarized certification that all vinyl coated components are fully warranted by the manufacturer for 15 years against rust and corrosion.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Concrete:

- 1. Concrete for footings shall be of 3000 psi design strength as specified under Section 03300, CAST-IN-PLACE CONCRETE..

B. Fence:

1. General:

- a. All components of the fence system shall be coated with a black, thermally fused and bonded, polyvinyl chloride (PVC) resin.

2. Posts, Top Rails, Compression Braces and Gate Frames:

- a. Posts, top rails, compression braces and gate frames shall be fabricated from hot-dip galvanized, Schedule 40, steel pipe conforming to ASTM A 120. The zinc coating shall not be less than 1.8 ounces per square foot of pipe surface. Pipe shall be galvanized both inside and outside. The PVC coating shall be a specially compounded, virgin polyvinyl chloride resin thermally fused and bonded to the galvanized steel over a chemical primer. The final thickness of the PVC coating shall be 14 mils.
- b. Posts, rails and braces shall conform to the following minimum requirements.

Application	O.D., Inches (inches)	Weight #/LF (SCH 40)	Weight #/LF (ASTM1043)
Top & Bottom Rails	1-5/8	2.27	1.82
Line Posts	2-1/2	3.65	3.12
Corner & Terminal Posts	3	5.79	4.64
Gate Posts	6	18.99	N/A
Post Braces	1-5/8	2.27	1.82

3. Fence Fabric:
 - a. PVC coated fence fabric shall conform to ASTM F-668, Type 2B, and shall be 60 inches wide. Fabric wires shall be individually galvanized and PVC coated prior to weaving. Fence fabric core wires shall be nine (9) gauge. The hot dip galvanized wires shall have a zinc coating of not less than 0.3 ounces per square foot of wire surface area, in accordance with ASTM specification A 641. The PVC coating shall be thermally fused and bonded to the galvanized wire over a chemical primer. The final thickness of the PVC coating shall be 12 mils. The finished fence fabric shall have a two (2) inch mesh.
4. Tension Wire and Tension Rods:
 - a. Tension wires shall be comprised of a six (6) gauge core wire, hot dip galvanized with a minimum zinc coating of 0.4 ounces per square foot of wire surface, in accordance with ASTM specification A 641, and coated with 12 mils of PVC thermally fused and bonded to the galvanized wire over a chemical primer.
 - b. Tension rods shall be used for cross bracing on each gate frame and bracing on corner and end sections of the fence as shown on the drawings and specified. Tension rods shall be 3/8 inch diameter hot dip galvanized steel rod threaded on at least one end. Each brace shall consist of two (2) rods connected with a turnbuckle to allow adjustment. Ends of each brace shall be connected to the fence framework with clamps or by other means. Galvanizing and PVC coating for tension rods shall be as specified for posts, top rails, compression braces and gate frames in 2.02 B.
5. Compression braces shall be installed on all end, corner, gate and pull posts midway between the top rail and ground surface, and shall extend to the first or second line post as specified in 3.01 A. Braces shall be attached in accordance with the manufacturer's instructions and shall be braced or tensioned with tension rods.
6. The fabric bands shall not be less than 1/8" x 3/4" in section and tension bars shall not be less than 1/4" x 3/4" in section.
7. All posts shall have tops designed to fit securely over the posts, to exclude water, and on line posts to bear the top pipe rail.
8. Post tops and other fittings and hardware shall be of either steel, malleable iron, or wrought iron, and shall be galvanized in accordance with ASTM A153 prior to application of the PVC coating. Fittings and hardware shall be designed to fasten to posts and concrete.
9. Grout for posts set in solid rock shall consist of one part Portland cement and three parts clean, sharp, well graded sand with just enough water for proper workability. The grout shall be thoroughly worked into the hole so as to leave no voids, and shall be crowned to shed water from the post.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. The posts shall be set plumb and true to the line and grade of the proposed fence in concrete bases as shown on the Drawings. Line posts shall be spaced at a maximum of 10 feet, center to center. All posts in the ground shall be set in 3000 psi concrete footings. The concrete footing shall be 12 inches in diameter and poured to the depths indicated on the drawings. Each post shall be embedded in the footing as shown on the drawings. The top exposed surface of the footing shall be one inch above finished grade and be sloped to shed water. The footing shall extend a minimum of 6 inches below the bottom of the embedded post.
- B. If solid rock is encountered without an overburden of soil, poles shall be set into the rock a minimum depth of 24-inches for all posts as shown on the drawings, and grouted into solid rock with the post hole diameter a minimum of one inch larger than that of the post.
- C. Where solid rock is covered by an overburden of soil or loose rock, the posts shall be set into the rock as specified above. The total pole setting depth shall not exceed the depths required for setting in earth
- D. "Pull posts", defined as line posts braced to adjacent line posts, shall be spaced at intervals not exceeding 500 feet. End and gate posts shall be braced to the adjacent line post. Corner and pull posts shall be braced to the two adjacent line posts. Changes in line of 30 degrees or more shall be considered as corners.
- E. Top rails shall pass through the tops of the line posts, forming a continuous rail. Lengths of top rail shall be joined by sleeve type couplings. Top rails shall be securely fastened to terminal posts.
- F. Chain link fabric shall be placed on the outside face of the fence. The fabric shall be placed approximately 2 inches above the ground and on a straight grade between posts. The fabric shall be stretched taut and securely fastened to the posts. Stretching by motor vehicle shall not be permitted. Fastening to end and corner posts shall be with tension bars and tension bands spaced at 15 inch intervals. Rolls of wire fabric shall be joined by weaving a single strand into the ends of the rolls to form a continuous mesh. Chain link fabric shall be fastened to the bars (top, bottom and sides) of the gate frame by tension bars and tension bands.
- G. Materials with damaged coating will be rejected and removed from the site. The Contractor shall take care not to damage coating during installation. Following erection, any cuts or marred spots in the vinyl coating shall be touched up with a liquid vinyl patch supplied by the manufacturer for the purpose.

END OF SECTION

SECTION 03100
CONCRETE FORMWORK

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This section of the specifications covers the furnishing and installation of forms for cast-in-place concrete.

1.02 RELATED WORK:

- A. Section 03200, CONCRETE REINFORCEMENT
- B. Section 03300, CAST-IN-PLACE CONCRETE

1.03 REFERENCES:

- A. The following standards form a part of this specification:
 - AMERICAN CONCRETE INSTITUTE (ACI)
 - ACI 347 Recommended Practices for Concrete Formwork
 - U.S. ARMY CORPS OF ENGINEERS (CE)
 - CE 03300 Cast-in-Place Concrete

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Forms for exterior and interior surfaces which will be exposed to view after the work is completed, whether such surfaces are painted or unpainted, shall be new plywood stock, steel, tempered masonite, or other materials which will provide smooth concrete surfaces without subsequent surface plastering. Plastic or plastic-faced forms shall not be used, except with the prior approval of the Engineer.
- B. Form ties shall be cone type or equal, with waterstop, which leaves no metal closer than 2-inches to finished face of concrete.
- C. Form release agent shall be a non-staining, non-yellowing, non-toxic liquid free from kerosene and resins of the type recommended by the manufacturer of the forming system being used such as EZ strip by L&M Construction Chemicals, Omaha, NB and "Magic Kote" by Symons Corp., Des Plaines, IL or approved equal.
- D. Where steel adjacent to vertical faces of forms cannot be otherwise secured, mortar doughnuts shall be used to prevent steel from lying too close to the finish vertical faces of the concrete.

PART 3 - EXECUTION

3.01 PREPARATION:

- A. Surfaces of forms to be in contact with concrete shall be greased with nonstaining form release compound. Wetting will not be accepted as a substitute. Approval of the Engineer shall be obtained before use of coated materials or liners in lieu of form release compound, except as modified herein.

3.02 CONSTRUCTION:

- A. For concrete surfaces which will be visible after completion of the structure, painted or unpainted, the type and the precise location of form ties, nails joints between form members, and any other features which will leave a visible trace in the finished concrete, will be subject to the approval of the Engineer.
- B. Formwork shall be so constructed, braced, or tied that the formed surfaces of the concrete will be perfectly true, smooth, and to the dimensions shown on the drawings. All forms used for circular sections shall be true arcs as indicated on the drawings. Short chords will not be acceptable. Form line shall present an uninterrupted surface conforming to radii indicated on the drawings.
- C. Forms shall be sufficiently tight to prevent leakage of mortar, and when necessary shall have temporary openings as required for thorough cleaning, and as required for introduction of concrete to avoid excessive free fall. Panels damaged in stripping or otherwise shall not be reused.
- D. Unless otherwise noted on the design drawings, exposed edges shall have a 3/4-inch chamfer. Chamfer shall not be used where masonry or other material will subsequently be installed flush with one of the adjacent surfaces of the concrete. Where a wash or slope is indicated on the drawings no additional chamfer is required.
- E. The Contractor shall be responsible for safe practices in removing forms and shoring and for placing adequate reshores. Care shall be exercised in the removal of forms to prevent damage to the concrete surfaces.

END OF SECTION

SECTION 03200
CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This section of the specification covers the furnishing and installation of reinforcement for cast-in-place concrete.

1.02 RELATED WORK:

- A. Section 03100, CONCRETE FORMWORK
- B. Section 03300, CAST-IN-PLACE CONCRETE

1.03 SUBMITTALS:

- A. The Contractor shall furnish the Engineer with complete checked, reinforcing steel shop drawings and bar lists. Shop drawing shall include grade of steel used as well as splice lengths.
- B. Mill test reports shall accompany drawings. Fabrication shall not commence until the drawings and mill test reports have been released by the Engineer.
- C. When fiber reinforcement is used, contractor shall submit manufacturer's data confirming that material meets the specification.

1.04 REFERENCES:

- A. The following standards form a part of these specifications:
 - American Concrete Institute (ACI)
 - ACI SP-66 ACI Detailing Manual (1980)
 - ACI 318 Building Code Requirements for Concrete
 - ACI 350 Environmental Engineering Concrete Structures
 - American Society for Testing and Materials (ASTM)
 - ASTM A185 Standard Specification for Welded Steel Wire Fabric for Concrete Reinforcement
 - ASTM A497 Specification for Welded Deformed Steel Wire Fabric for Concrete Reinforcement
 - ASTM A615 Deformed Billet-Steel Bars for Concrete Reinforcement
 - American Welding Society (AWS)
 - AWS 12.1 Recommended Practices for Welding Reinforcing Steel, Metal Inserts and Connections in Reinforced Concrete Construction

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Steel reinforcing bars shall conform to ASTM A615, Grade 60.
- B. Welded steel wire fabric shall conform to ASTM A185 or ASTM A497. Gauge and spacing of wires shall be as indicated on the drawings.
- C. Reinforcing steel shall be detailed in accordance with ACI SP-66 modified as applicable to conform to ACI 350.
- D. Reinforcement shall be accurately formed to the dimensions indicated on the drawings. Bars shall be shipped to the site with bars of the same size and shape, fastened in bundles with securely wired-on metal identification tags listing both size and mark. Any bar showing cracks after bending shall be discarded.
- E. Steel failing to meet the requirements of this specification or the drawings will be rejected and shall be removed from the site immediately.

PART 3 - EXECUTION

3.01 STEEL INSTALLATION:

- A. Before being placed in position, reinforcement shall be thoroughly cleaned of loose mill and rust scale, dirt, and other coatings (including ice), that reduce or destroy bond. When there is a delay in depositing concrete after reinforcement is in place, bars shall be reinspected and cleaned as necessary.
- B. After forms have been oiled, but before concrete is placed, all steel shall be securely wired in the exact position called for, and shall be maintained in that position until all concrete is placed and compacted. Chair bars and supports shall be provided in a number and arrangement satisfactory to the Engineer.
- C. Concrete blocks having a minimum bearing area of 2-inches by 2-inches and equal in quality to that specified for the slab, shall be used for supporting reinforcing bars for slabs on grade. Wood blocks, stones, brick chips, etc., shall not be used to support reinforcement.
- D. Metal supports shall be of types which will not penetrate the surface of formwork or slab and which will not show through or stain surfaces which are to be exposed to view, painted or unpainted.
- E. Welding of reinforcing bars will be permitted only where permission of the Engineer has been obtained in advance. Such welding shall be performed only under conditions established by the Engineer, and in accordance with AWS 12.1.
- F. Reinforcement which is to be exposed for a considerable length of time after having been placed shall be painted with a heavy coat of cement grout, if required by the Engineer.

END OF SECTION

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. Furnish and install all concrete and related items as indicated on the Drawings and as specified herein. Work includes but not limited to the following:
 - 1. Cast-in-place concrete for new equipment pads and aprons.
 - 2. Cast-in-place concrete required for thrust blocks.
 - 3. Cast-in-place concrete for new structures and walls.
 - 4. Cast-in-place concrete for patching existing structures and walls.
 - 5. Cast-in-place concrete for footings.

1.02 RELATED WORK

- A. Section 02221, EARTHWORK
- B. Section 03100, CONCRETE FORMWORK
- C. Section 03200, CONCRETE REINFORCEMENT
- D. Section 07601, BITUMINOUS DAMPPROOFING
- E. Section 07901, JOINT SEALANTS
- F. Items furnished under other sections and installed under this section include, but are not limited to:
 - 1. Items embedded into concrete, including anchors, sleeves, floor drains, castings, frames for hatches, angles, nosings, and other miscellaneous metals.

1.03 REFERENCES:

- A. The following standards form a part of these specifications:

American Concrete Institute (ACI)

- | | | |
|-----|-----|--|
| ACI | 301 | Structural Concrete for Buildings |
| ACI | 302 | Recommended Practice for Concrete Floor and Slab Construction |
| 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 |

CAST-IN-PLACE CONCRETE

ACI	318	Building Code Requirements for Reinforced Concrete
ACI	347	Recommended Practice for Concrete Formwork
ACI	350	Concrete Sanitary Engineering Structures
American Society for Testing and Materials (ASTM)		
ASTM	C33	Concrete Aggregates
ASTM	C39	Compressive Strength of Cylindrical Concrete Specimens
ASTM	C42	Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
ASTM	C87	Effect of Organic Impurities in Fine Aggregate on Strength of Mortar
ASTM	C94	Ready-Mixed Concrete
ASTM	C143	Standard Method for Slumps of Portland Cement Concrete
ASTM	C150	Portland Cement
ASTM	C171	Sheet Materials for Curing Concrete
ASTM	C231	Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM	C260	Air-Entraining Admixtures for Concrete
ASTM	C309	Liquid Membrane-Forming Compounds for Curing Concrete
ASTM	C494	Chemical Admixtures for Concrete
ASTM	D1751	Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
ASTM	D1752	Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction

1.04 QUALITY ASSURANCE:

- A. Concrete Testing Service: The Contractor shall employ a certified independent testing laboratory to perform material evaluation tests and to provide copies of material tests and mix designs. Retesting shall be performed at no additional cost to the Owner if materials do not meet Contract Documents.
- B. Workmanship: The Contractor shall correct concrete Work which does not conform to the Contract Documents, including strength, tolerances and finishes at no additional cost to the Owner.

1.05 SUBMITTALS:

- A. Six sets of shop drawings of the materials specified herein shall be submitted to the Engineer for review in accordance with Section 01300.

- B. Six copies of the statement of materials constituting the design of mixes which satisfy the specified strength for each size aggregate as required by ASTM C94 shall be submitted to the Engineer within one week following award of the contract.
- C. Provide one copy of the "Certificate of Delivery" for each load of concrete as it arrives on the site, under the provisions of ASTM C94.

1.06 PROJECT CONDITIONS:

- A. Weather: Protect concrete from damage and reduced strength during mixing, placing and curing.
- B. Cold Weather:
 - 1. Cold weather is defined as a period when, for more than 3 consecutive days, the following conditions exist:
 - a) The average daily air temperature is less than 40 F.
 - b) The air temperature is not greater than 50 F for more than one-half of any 24-hr period.
 - 2. The average daily air temperature is the average of the highest and the lowest temperatures occurring during the period from midnight to midnight.
- C. Hot Weather: Hot weather conditions are defined as any combination of the following conditions: high ambient temperature, high concrete temperature, low relative humidity, wind velocity and solar radiation.

PART 2 - PRODUCTS

2.01 CONCRETE:

- A. Concrete conforming to the requirements listed below shall be used where indicated on the drawings. Unless otherwise indicated, concrete used for footings, foundation walls, floor slabs, containment walls, etc. shall be the 4,000 psi mix. Concrete used as fill under foundations, and elsewhere approved by the Engineer, shall be the 3,000 psi mix.

TABLE

Minimum Compressive Strength at 28 days (psi)	Maximum Water/Cement Ratio (Gallons per bag of cement)*	Cement Factor: 94 lb bags per cubic yard minimum**
3000	0.56 (6.9)	5.5
4000	0.48 (5.6)	6.5
5000	0.40 (4.7)	7.4

*Based on air-entrained concrete. If non-air-entrained concrete is called for, the listed maximum water/cement ratios may be increased slightly, as approved by the Engineer. The water is the total water in the mix, including free water on the aggregate.

**These are minimum amounts; increase as necessary to meet mix requirements.

- B. Concrete shall conform to ASTM C94. One copy of the Certificate of Delivery required by ASTM C94 shall be delivered to the Engineer immediately upon arrival of each load of concrete at the site. The Contractor shall be responsible for the design of the concrete mixtures.
- C. Standard compression tests of all proposed mixes shall be made by the testing laboratory or other satisfactory evidence shall be presented that the design mixes will attain the minimum strengths listed on the design drawings or called for herein, within the limitations of the ACI Code. No concrete shall be delivered to the job site until the Engineer has approved the design mixes.
- D. All concrete (unless otherwise directed) shall contain an air-entraining agent. Air entrained concrete shall have an air content by volume of 3 to 6 percent for 1-1/2-inch aggregate and 4 to 8 percent for 3/4-inch aggregate. The air content shall be the responsibility of the testing laboratory and in accordance with ASTM C231.
- E. All concrete shall contain a water reducing agent to minimize cement and water content of the mix, at the specified slump, in accordance with ASTM C494.
- F. Slump for all concrete shall be from 3-inch to 4-inch. Any concrete having a slump greater than 4 inches shall be promptly removed from the site.
- G. No calcium chloride or admixtures containing calcium chloride shall be added to the concrete. No admixture other than those specified shall be used in concrete without the specific written permission of the Engineer in each case.
- H. No additional water, except for the amount indicated by the design mix shall be added to the concrete without the prior permission of the Engineer.

2.02 CEMENT:

- A. The cement shall be an approved brand of American manufactured Portland Cement, Type IIA conforming to ASTM C150. The brand name and type of cement proposed for use shall be submitted to the Engineer for approval immediately following award of contract. Only one color of cement, all of the same manufacture, shall be used for the work.
- B. When the use of high-early-strength Portland cement (Type IIIA) is permitted by the Engineer the same strength requirements shall apply, but the indicated strengths shall be attained in 7 days instead of 28 days.

2.03 ADMIXTURES:

- A. Air entraining agent shall be in accordance with ASTM C260 and shall be Darex AEA, as manufactured by W.R. Grace & Company; Placewel (air entraining Type), as manufactured by Johns Manville; Sika AER as manufactured by Sika Chemical Company; or an approved equal product.
- B. Water reducing agent shall be WRDA, as manufactured by WR Grace & Company; Placewel (non-air entraining Type), as manufactured by Johns Manville; Sika Plastiment as manufactured by Sika Chemical Company; or an approved equal product.
- C. Water reducing agent-retarder shall be "Daratard", as manufactured by WR Grace & Company; Sika Plastiment as manufactured by Sika Chemical Company; or an approved equal product.

- D. Superplasticizer agent shall be in accordance with ASTM C484, Type F or Type G and contain no more than 0.1% chloride ions. The admixture shall be Sikament as manufactured by Sika Chemical Corp; Super P as manufactured by Anti-Hydro; DARACEM-100 as manufactured by W.R. Grace & Co.; or an approved equal product.

2.04 AGGREGATES:

- A. Except as otherwise noted, aggregate shall conform to the requirements of ASTM C33.
- B. Fine aggregate shall consist of washed inert natural sand conforming to the requirements of ASTM C33.
- C. Coarse aggregate shall consist of well-graded crushed stone or washed gravel conforming to the requirements of ASTM C33.
- D. The following designated sizes of aggregate shall be the maximum employed in concrete.
 - 2-inch for mass concrete
 - 1-inch for reinforced sections 18-inch and over in thickness
 - 3/4-inch for reinforced and unreinforced sections less than 18-inch thickness.

2.05 WATER:

- A. Water for concrete shall be potable, free from injurious amounts of oil, acid, alkali, organic matter and other deleterious substances.

2.06 GROUT:

- A. Grout shall be mixed in the proportions of one part Portland Cement to 2 parts sand, by volume. Only sufficient water shall be used to enable grout to barely hold its shape when squeezed into a ball in the hand. Aggregate for grout shall conform to the requirements of the reference specification for concrete. Prior approval of the Engineer shall be obtained for the use of proprietary grouts, and the instructions of the Engineer shall be followed in their use.

2.07 CURING MATERIALS:

- A. Curing compound shall be a curing/hardener compound such as Acurion by AntiHydro, Sikaguard Cure/Hard by Sika, Super Diamond Clear by Euclid or approved equal.
- B. Curing paper shall be a fiber-reinforced laminated Kraft bituminous product conforming to the requirements of ASTM C171.

2.08 JOINT FILLER:

- A. Preformed joint filler strip shall conform to ASTM D1751 or D1752, having a thickness as indicated on the drawings.
- B. Fillers shall be provided in pieces of the full thickness required. Use of multiple layers of thin pieces to make-up the full thickness will not be permitted.

2.09 JOINT SEALANT:

- A. Joint sealant for construction and control joints shall be a two-part polysulfide base sealant conforming to Thiokol's Building Trade Performance Specification, Class A (self-leveling), Type II (hardness: 35-45 Shore A).

PART 3 - EXECUTION

3.01 GENERAL:

- A. Under no circumstances shall concrete which has set or partially set before placing be used; and no retempering of concrete or grout will be permitted.

3.02 PREPARATION:

- A. Before placing concrete, forms and the space to be occupied by the concrete shall be thoroughly cleaned, and reinforcing steel and embedded metal shall be free from dirt, oil, mill scale, loose rust, paint or other material which would tend to reduce the bond.
- B. Unless otherwise indicated, a moisture barrier shall be used under all slabs placed on the ground. The moisture barrier shall be fungi-resistant and shall have a vapor permeance rating not exceeding 0.5 perm. The moisture barrier shall be asphalt-saturated waterproof reinforced Kraft paper, clear polyethylene sheeting 0.006-inch thick, polyethylene coated asphalt-saturated reinforced Kraft paper, two layers of 30-pound asphalt-saturated felt solidly mopped with hot bitumen, or other similar material meeting the requirements for fungi-resistance and vapor permeance. Sheets shall be lapped 6-inches at joints and sealed with 2-inch wide tape.
- C. When no moisture barrier is used, the earth, concrete, masonry, or other water-permeable material against which concrete is to be placed shall be thoroughly saturated with water immediately before concrete is placed. No concrete shall be placed until the consolidation of the ground and the arrangement and details of forms and reinforcing have been inspected and approved by the Engineer.
- D. When joining fresh concrete to concrete which has attained full set, the latter shall be cleaned by chipping and washing off all dirt and scum and laitance. It then shall be moistened prior to placing new concrete.
- E. Concrete surfaces which act as a seat for structural members (other than those resting on grout) shall be troweled to an extremely flat and level surface. If necessary, such surfaces shall be ground off to achieve the required flatness and level.
- F. Fill concrete on top of concrete shall be placed in the locations indicated on the drawings or designated by the Engineer. Before fill concrete is placed, the following procedures shall be used to prepare surfaces; all dirt, scum and laitance shall be removed by chipping and washing. The clean, roughened base surface shall be saturated with water, but shall have no free water on the surface. A coat of 1:2 cement-sand grout, approximately 1/8-inch thick, shall be well scrubbed into the thoroughly dampened concrete base. The concrete fill shall be placed immediately, before grout has dried or set. Fill concrete shall be brought to the lines and grades shown on the drawings or approved by the Engineer.
- G. Concrete for thrust and anchor blocks shall be placed against undisturbed earth and wooden side forms shall be used to provide satisfactory lines and dimensions. Felt roofing paper shall be placed to protect joints. No concrete shall be placed so as to cover joints, bolts or nuts, or to interfere with the removal of the joints. Minimum bearing areas and dimensions shall be as shown on the drawings.

3.03 MIXING:

- A. Concrete shall be ready-mixed, or transit-mixed, as produced by equipment acceptable to the Engineer. No hand-mixing will be permitted. Adding water in controlled amounts during the

mixing cycle shall be done only with the express approval of, and under the direction of, the Engineer.

- B. Ready-mix or transit-mixed concrete shall be transported to the site in watertight agitator or mixer trucks loaded not in excess of rated capacities for the respective conditions as stated on the nameplate. Discharge at the site shall be within 1-1/2 hours after cement was first introduced into the mix. Central mixed concrete shall be plant-mixed a minimum of 1-1/2 minutes per batch and then shall be truck-mixed or agitated a minimum of 8 minutes. Agitation shall begin immediately after the pre-mixed concrete is placed in the truck and shall continue without interruption until discharge. Transit-mixed concrete shall be mixed at mixing speed for at least 10 minutes immediately after charging the truck, followed by agitation without interruption until discharged.
- C. All central plant and rolling stock equipment and methods shall conform to the latest Truck Mixer and Agitator Standards of the Truck Mixer Manufacturers' Bureau of the National Ready-Mixed Concrete Association, as well as ACI 304 and ASTM C94.
- D. Attention is called to the importance of dispatching trucks from the batching plant so that they shall arrive at the site of the work just before the concrete is required, thus avoiding excessive mixing of concrete while waiting or delays in placing successive layers of concrete in the forms.

3.04 INSTALLATION/APPLICATION/ERECTION:

A. PLACING:

- 1. No concrete shall be placed by pumping methods without the prior written approval of the Engineer. Should the Contractor be allowed to place concrete by pumping methods, procedures, mix design of concrete, and all other precautions shall be in accordance with ACI 304.2R and as approved by the Engineer.
- 2. Concrete shall be placed in alternate areas, as defined by the construction and control joints indicated on the design drawings. A minimum of 3 days shall elapse between placement of adjacent sections.
- 3. Segregation of the concrete shall be prevented during handling; should any segregation occur, the concrete should be remixed before it is placed. Concrete shall be placed in the forms in horizontal layers not over 1 to 2 feet thick. Concrete shall not be allowed to drop freely more than 4 feet. If the free drop to the point of placement must exceed 4 feet, the Contractor shall obtain the approval of the Engineer for the proposed method of depositing the concrete. The concrete shall not be required to flow over distances greater than 3 feet in any direction in the forms or on the ground, unless otherwise permitted by the Engineer.
- 4. Unless otherwise noted, the work begun on any day shall be completed in daylight of the same day.
- 5. "Cold Joints" are to be avoided, but if they occur, they are to be treated as bonded construction joints.
- 6. Chutes for conveying concrete shall be of U-shaped design and sized to insure a continuous flow of concrete. Flat (coal) chutes shall not be employed. Chutes shall be metal or metal-lined, and each section shall have approximately the same slope. The slope shall not be less than 25 nor more than 45 degrees and shall be such as to prevent segregation of the ingredients. The discharge end of the chute shall be

provided with a baffle plate or spout to prevent segregation. If the discharge end of the chute is more than 5 feet above the surface of the concrete in the forms, a spout shall be used and the lower end maintained as near the surface of deposit as practicable. When the operation is intermittent, the chute shall discharge into a hopper. Chutes shall be thoroughly cleaned before and after each run, and the debris and any water shall be discharged outside the forms. Concrete shall not be allowed to flow horizontally more than 5 feet.

7. Concrete during and immediately after depositing shall be thoroughly compacted by means of suitable tools. Internal type mechanical vibrators shall be employed to produce the required quality of finish. Vibration shall be done by experienced operators under close supervision and shall be carried on long enough to produce homogeneity and optimum consolidation without permitting segregation of the solid constituents or "pumping" or migration of air. All vibrators shall be supplemented by proper wooden spade puddling adjacent to forms to remove included bubbles and honeycomb. This is essential for the top lifts of walls. All vibrators shall travel at least 10,000 rpm and be of adequate capacity. At least one vibrator shall be used for every 10 cu. yds. of concrete per hour. In addition, one spare vibrator in operating condition shall be on the site.
8. Concrete slabs on the ground shall be well-tamped into place and foundation material shall be wet, tamped, and rolled until thoroughly compacted prior to placing concrete.
9. Concrete shall be deposited continuously in layers of such thickness that no concrete will be deposited on concrete which has hardened sufficiently to cause the formation of seams and planes of weakness within the section. If a section cannot be placed continuously, construction joints may be located at points as provided for in the drawings or approved by the Engineer.
10. Chutes, hoppers, spouts, adjacent work, etc., shall be thoroughly cleaned before and after each run, and the water and debris shall not be discharged inside the form.

B. CONCRETE PLACING DURING COLD WEATHER:

1. Concrete shall not be placed on frozen ground, and no frozen material or material containing ice shall be used. Materials for concrete shall be heated when concrete is mixed, placed, or cured when the mean daily temperature is below 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. No accelerant shall be used to prevent freezing.
2. The temperature of concrete surfaces shall not be permitted to drop below 50° F. for at least 7 days after placement of the concrete.
3. All details of Contractor's handling and protecting of concrete during freezing weather shall be subject to the approval and direction of the Engineer. All procedures shall be in accordance with provisions of ACI 306.

C. CONCRETE PLACING DURING HOT WEATHER:

1. Concrete just placed shall be protected from the direct rays of the sun and the forms and reinforcement just prior to placing shall be sprinkled with cold water. The Contractor shall make every effort to minimize delays which will result in excessive mixing of the concrete after arrival on the job.

2. During periods of excessively hot weather (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. Temperature records shall be maintained throughout the period of hot weather giving air temperature, general weather conditions (calm, windy, clear, cloudy, etc.) and relative humidity. The record shall include checks on temperature of concrete as delivered, and after placing in forms. Data should be correlated with the progress of the work so that conditions surrounding the construction of any part of the structure can be ascertained.

D. PIPES AND EMBEDDED METALS:

1. Special care shall be taken to bring the concrete into perfect contact with pipes and iron work embedded in the walls and floors, particularly underneath and around all pipes where a head of water exists, making watertight joints in all cases.
2. In general, such embedded items are not shown on the structural design drawings. Design drawings of the other trades shall be consulted for their location and details.
3. Anchor bolt location, size and details shall be verified with the equipment manufacturer's certified drawings before installation.
4. Anchor bolts, reglets, sleeves, edge angles and similar embedded items will be provided, delivered to the site, under other sections of the specification, for installation under this section.
5. Where edge angles, etc., have nuts welded on to receive machine screws, the threads of the nuts shall be protected from concrete, and the concrete shall be excluded from the space to be occupied by the screw, by use of wood plugs or other effective means.
6. Inserts required for hanging mechanical and electrical items will be provided and installed in the forms under the mechanical and electrical section of the specification.
7. Should the Contractor be allowed to leave openings in the concrete for pipes or ironwork, to await the arrival of which would delay the prosecution of the work, they shall be subject to the approval of the Engineer, and the construction joints shall be provided. In filling any such openings with concrete, a mixture of 1: 1-1/2: 3 shall be used and a perfect watertight bond shall be secured between the old and new concrete.
8. In bolting miscellaneous items to concrete, after the latter has set, expansion bolts of an approved pattern and type shall be used. The Contractor shall submit to the Engineer, for approval, the types of expansion bolts. Expansion bolts shall not be used until they are approved.

E. CURING:

1. Concrete curing shall be performed as specified in ACI 30I and as stated herein. All curing procedures shall have prior approval of the Engineer.

2. Concrete floors which are to receive paint, concrete fill, mortar setting beds, grout fill, or any other subsequent finish shall be cured by one of the following procedures immediately after completion of placement and finishing:
 - a. Ponding or continuous sprinkling.
 - b. Application of absorptive mats or fabric kept continuously wet.
 - c. Application of sand kept continuously wet.
 - d. Application of waterproof sheet materials conforming to ASTM C171.
 - e. Application of curing compounds conforming to ASTM C309; only if it can be demonstrated to the Engineer's satisfaction that the compound is applicable and will not prevent bonding of the subsequent finish to be received. Compound shall be placed at a rate of 200 square feet per gallon, in two applications perpendicular to each other.
3. Curing procedure shall be continued for at least 7 days.
 - a. Moisture loss from surface placed against metal or wood forms shall be minimized by keeping forms wet until removal.
 - b. Curing shall be continued for at least 7 days. When forms are removed during the curing period, surfaces shall be cured by spraying or by the use of a curing compound as previously specified.
 - c. Surfaces shall be protected from traffic or damage until surfaces have hardened sufficiently. If necessary, 1/2-inch thick plywood sheets shall be used to protect the exposed surface.

F. BRACING AND SUPPORTS:

1. All concrete members shall be adequately and safely supported and braced until the permanent supports and braces are installed.
2. Backfilling against exterior walls shall not be done until supporting slabs are in place and have attained 70 percent of design strength, otherwise walls shall be braced against earth lateral pressure, using a system approved by the Engineer.
3. Backfilling against retaining walls shall not commence until the wall concrete has reached its 28 day strength.

G. REMOVING FORMS AND SUPPORTS:

1. Removal of forms shall take place in accordance with ACI 347, Section 3.6. Except as otherwise specifically authorized by the Engineer, forms shall not be removed until the concrete has aged for the following number of day-degrees or attained 50 percent strength. (Day- degrees equals the total of number of days times the average daily air temperature at the surface of concrete. For example, 5 days at a daily average temperature of 60 deg. F. equals 300 day-degrees.)

<u>Location</u>	<u>Day-Degrees</u>
Beams and Slabs	500
Walls and Vertical Surfaces	200

2. Shores under beams and slabs shall not be removed until the concrete has attained at least 70 percent of the specified cylinder strength and also sufficient strength to support safely its own weight and the construction loads upon it.

H. PATCHING:

1. Defective concrete and honeycombed areas as determined by the Engineer shall be chipped down reasonably square and at least one-inch deep to sound concrete by means of hand chisels or pneumatic chipping hammers. Irregular voids or surface stones need not be removed if they are sound, free of laitance, and firmly imbedded in the parent concrete, subject to Engineer's final inspection. If honeycomb exists around reinforcement, chip to provide a clear space at least 1-inch wide all around the steel. For areas less than 1-1/2 inches deep, the patch may be made following the procedure for filling form tie holes, described in the subsection below, using adequately dry (non-trowelable) mixtures to avoid sagging. Thicker repairs will require build-up in 1-inch layers on successive days. Unless otherwise indicated, thicker repairs shall be made with Vertipatch mortar mixture blended with Acryl-Set, both by Master Builders, Inc., Cleveland, Ohio, or approved equal.
2. For concrete areas exposed to serious abrasion and/or impact forces, the Engineer may order the use of grout with a non-shrink metallic aggregate (Embeco by Master Builders, Inc.; Ironite by Fox Industries, Madison, IL; or approved equal) as an additive in the proportions listed below:

<u>Material</u>	<u>Small Patches</u>		<u>Large Formed Patches</u>	
	<u>Volumes</u>	<u>Weights</u>	<u>Volumes</u>	<u>Weights</u>
Cement	1.0	1.0	1.0	1.0
Metal Aggregate	0.15	0.25	0.2	0.33
Sand	1.5	1.5	1.0	1.0
Pea Gravel	--	--	1.5	1.5

I. FINISHING OF FORMED SURFACES:

1. All concrete which is to be left exposed to view shall be scraped to remove imperfections left by voids in the forms.
2. In addition to scraping, exterior exposed concrete shall be covered with a cement-base plaster mix. The mix shall consist of Thoroseal Plastic Mix and Acryl 60, as manufactured by Standard Drywall Products, Miami, FL, or approved equal. It shall be mixed and applied in accordance with the manufacturer's recommendations.
3. In addition to scraping, interior concrete surfaces which will be exposed to view and concrete surfaces which are to be prepared and painted as specified in Section 09900 shall receive a smooth rubbed finish, in accordance with ACI 301.
4. To permit satisfactory finishing, forms shall be removed from the vertical faces of the concrete as early as is possible without damaging the surface. Immediately after stripping forms, any fins or projections left by the forms shall be chipped off, and the surfaces rubbed smooth.
5. Form tie holes and other voids and faults shall be patched. Voids, etc., shall be cleaned out, roughened, thoroughly wetted, coated with neat cement paste, and filled with mortar of cement and sand in the same proportions, materials, and color as used

in the concrete. The surface of the patch shall be flush with the surrounding surface after finishing operations are complete. Surface shall be kept continuously damp until patches are firm enough to be rubbed without damage.

6. Rubbing shall be performed while the surface is wet using a carborundum or cement sand brick, to achieve a smooth uniform, even textured finish. Patched and chipped areas shall be blended to match as closely as possible the appearance of the rest of the surface. No cement wash or plastering will be permitted, and no mortar shall be used except as required above.
7. Where finishing is performed before the end of the curing period, concrete shall under no circumstances be permitted to dry out, and shall be kept continuously moist from time of placing until end of curing period, or until curing membrane is applied.

J. CONCRETE FLOOR FINISHING REQUIREMENTS:

1. Unless designated otherwise, concrete floors shall have a troweled finish as specified in Section II.7 of ACI 30I. Troweled finishes shall conform to the requirements of "Class A Tolerances," Section II.9 as specified in ACI 30I.

K. FLOOR FINISH:

1. Concrete floor slabs shall receive a combination curing and hardening compound.
2. Curing compound shall be "Chem Hard" manufactured by L&M Construction Chemicals, "AEUCOSIL" manufactured by Euclid Chemical Co., or "Cure-Hard" manufactured by W.R. Meadows, Inc., or approved equal.

3.05 QUALITY CONTROL TESTING DURING CONSTRUCTION:

- A. The Contractor shall employ a certified testing laboratory to perform tests and to submit test reports.
- B. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
 1. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency has changed.
 2. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231 pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.
 3. Concrete Temperature: Test hourly when air temperature is 40°F and below, and when 80°F and above; and each time a set of compression test specimens are required.
 4. Compressive Strength Tests: ASTM C 39; one set for each day's pour exceeding 5 cu. yds. plus additional sets for each 50 cu. yds. over and above the first 25 cu. yds. of each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing.
 5. When frequency of testing will provide less than 5 strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches or from each batch if fewer than 5 are used.

6. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
 7. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength, and no individual strength test result falls below specified compressive strength by more than 500 psi.
- C. Test results shall be reported in writing within 24 hours after tests have been completed. Reports of compressive strength tests shall contain the Project identification name and number, date of concrete placement, name and location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7-day tests and 28-day tests.
- D. Additional Tests: The Contractor's independent testing laboratory shall make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by and at no additional cost to the Owner. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42.
- E. FAILURE TO MEET REQUIREMENTS:
1. The Engineer shall have the right to reject concrete represented by low strength tests or to agree to further testing of the concrete. Rejected concrete shall be promptly removed and replaced with concrete conforming to the specification. The decision of the Engineer as to whether substandard concrete is to be accepted or rejected or additional tests shall be conducted shall be final. All direct and indirect costs associated with further curing and testing of the concrete shall be at the Contractor's expense.
 2. If the Engineer agrees to consider further curing and/or testing of the concrete before making a final decision, the Contractor shall submit a detailed plan to the Engineer, including proposed criteria for acceptance of the concrete. The plan may include additional curing of the concrete, drilling and testing of cores, load testing of the structure, or a combination.
 3. If additional curing is permitted before further inspection and testing, the Contractor shall provide any necessary materials and labor to further cure the suspect concrete.
 4. If drilling and testing of cores is permitted, the Contractor shall be responsible for obtaining the cores, including provision of ladders, scaffolding, and such incidental equipment as may be required. If additional curing is permitted, cores shall be drilled after the curing period, and shall be in accordance with ASTM Methods C39 and C42. The Contractor shall repair all core holes to the satisfaction of the Engineer. The burden of proof, including, but not limited to the work of cutting and testing the cores, inspection, evaluation, engineering, and repair of the holes, or removal and replacement of the concrete in question, and all associated costs therefore, shall be at the expense of the Contractor.
 5. If load testing of the concrete is permitted, and if not otherwise indicated, slabs or beams under load test shall be loaded with their own weights plus a superimposed load of 2 times the design live load. The load shall be applied uniformly over the portion being tested in the approved manner and left in position for 24 hours. The structure shall be considered satisfactory if deflection "D" in feet, at end of 24-hour period, does not exceed value:

D equals $0.001 (L \times L)/t$

in which "L" is span in feet, "t" is depth of slab, or beam in inches. If deflection exceeds "D" in the above formula, the concrete shall be considered faulty unless within 24 hours after removal of the load, the slab, or beam under test recovers at least 75 percent of the observed deflection.

6. If the suspect concrete still fails to meet specification requirements, the Engineer shall have the right to reject the concrete, have it removed and replaced, in accordance with the second paragraph of Item 4 herein, or to require mechanical strengthening of the concrete to satisfy project requirements. The Contractor must submit a removal and replacement plan for review by the Engineer.

END OF SECTION

SECTION 04200

UNIT MASONRY

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This Section includes furnishing labor, materials, and equipment for patching and toothing-in new face brick to match the existing exterior brick veneer at the East Natick I Pump Station as shown on the Drawings.
- B. Anchor bolts, loose lintels, metal frames, mechanical and electrical sleeves, access doors, louvers and similar items will be furnished under other sections for installation in the masonry work under this section of the specification.

1.02 RELATED WORK:

- A. Section 03300, CAST-IN-PLACE CONCRETE
- B. Section 07920, JOINT SEALANTS
- C. Section 09900, PAINTING
- D. Section 10200, LOUVERS AND VENTS
- E. Section 15800, HEATING AND VENTILATION
- F. Division 16, ELECTRICAL

1.03 REFERENCES:

- A. The following standards form a part of these specifications, as referenced:

American Society for Testing and Materials (ASTM)

- 1. ASTM C67 Sampling and Testing Brick
- 2. ASTM C144 Aggregate for Masonry Mortar
- 3. ASTM C150 Portland Cement
- 4. ASTM C207 Hydrated Lime for Masonry Purposes
- 5. ASTM C216 Facing Brick
- 6. ASTM D226 Asphalt Saturated Roofing Felt for Use in Constructing Built-up Roofs

1.04 SUBMITTALS:

- A. Submit the following in accordance with Section 01300:
 - 1. One full size sample of the brick and of each anchoring, tying and reinforcing device samples showing the color range of brick and mortar shall be submitted to the

Engineer before the material is delivered to the job. Brick and mortar color shall match existing brick and mortar as close as possible.

2. Material Certificates: For each type and size of the following:
 - a. Masonry units.
 - i. Include data on material properties.
 - ii. For exposed brick, include test report for efflorescence according to ASTM C 67.
 - b. Joint reinforcement.
 - c. Anchors, ties, and metal accessories.
3. Mix Designs: For each type of mortar include description of type and proportions of ingredients.
 - a. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.
4. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.
5. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.05 DELIVERY AND STORAGE OF MATERIALS:

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver preblended, dry mortar mix in moisture-resistant containers designed for use with dispensing silos. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in covered weatherproof dispensing silos.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

PART 2 - PRODUCTS:

2.01 MATERIALS:

- A. Wall anchors, ties, joint reinforcing and other bonding devices shall be hot-dip galvanized.
- B. Bond ties shall be long enough to extend to within one-inch of concrete masonry unit faces.

- C. Horizontal masonry joint reinforcing for walls and partitions shall be "Dur-O-Wall," "Bet-R-Wall," "Trus-Mesh," or approved equal, galvanized ladder-type reinforcing. Longitudinal wires shall be a minimum of number 9 gage.
- D. Cavity wall ties shall be rectangular-shaped, not less than 4-inches wide by 8-inches long, made of 3/16-inch diameter galvanized metal. Ties shall be adjustable with plastic moisture drip in the approximate center of the airspace remaining after insulation is in place.
- E. Metal lath (to support concrete fill or mortar in cells of masonry units) shall be galvanized small diamond mesh lath weighing 3.4 pounds per square yard.
- F. Weep and vent hole shall be formed using permanent 3/8-inch wide by 2-1/2-inches high, cell vent weep hole ventilators, rigid, located 24-inches on center. Weep hole vents shall be of polypropylene co-polymer (PPCP).
- G. Mortar for brick shall consist of 1 part portland cement, 1/2 part hydrated lime, and 4 parts sand and a waterproofing admixture, or a premixed blend meeting ASTM C270 Type "S" and approved by the Engineer. Color to match existing as approved by the Owner.
- H. Grout shall consist of 1 part portland cement and 3 parts maximum of sand, conforming to ASTM C476, with a slump of 7-inches.
- I. Portland cement shall be any American Brand conforming to ASTM C150, Type II.
- J. Sand shall conform to ASTM C144. Sand shall be natural sand, washed and cleaned, free from organic or other deleterious matter. When dry, 100 percent shall pass a No. 8 sieve, not more than 34 percent shall pass a No. 50 sieve, and not more than 10 percent shall pass a No. 100 sieve.
- K. Water shall be potable.
- L. Lime shall be an approved brand of Type A mason's hydrated lime conforming to the requirements of ASTM C207.
- M. Waterproofing admixture for mortar shall be equal to one of the following: Hydratite Plus, W.R. Grace Company; Medusa Waterproofing, Medusa Portland Cement Company; or Omicron Mortarproofing, Master Builders Company.
- N. Tar paper for bond breaker at construction joints and similar locations shall be 15 pound impregnated felt conforming to ASTM D226.
- O. Reinforcing steel bars shall conform to ASTM A615, Grade 60.

2.02 MASONRY WALL INSULATION:

- A. All exterior masonry walls shall be insulated with expanded polystyrene inserts or with granular vermiculite masonry insulation.
- B. Inserts shall conform to Federal Specification HH-524B and shall have a maximum water vapor transmission rate of 1.4 perm-inch. Inserts shall be installed according to the manufacturer's instructions at the Block Producer's Plant so that only block with inserts already installed are delivered to the job site. Block containing damaged or mutilated inserts shall not be accepted.
- C. The vermiculite insulation shall be treated for water repellancy and shall conform to ASTM C516. Loose fill insulation shall be placed in cells of masonry units at the completion of every

third course. Vermiculite insulation shall be equal to Zonolite Masonry Insulation by W.R. Grace & Co., or approved equal.

- D. Compressible insulation between masonry walls and roof deck as shown shall be a closed cellular polyvinyl chloride strip gasket 4-inches wide by a sufficient depth to completely seal the joint. It shall be vinyl Type "V" 1000 series by Williams Products, Inc., Troy, MI, or approved equal.
- E. Cavity wall insulation shall be 3-inch thick, vapor-proof cellular polystyrene equal to Styrofoam SM by Dow Chemical Company unless otherwise shown on the drawings. It shall be adhered to the air/vapor barrier membrane with a mastic in accordance with the manufacturers' instruction.

2.03 FACING BRICK:

- A. Facing brick shall conform to Grade SW, Type FBX brick, as specified by ASTM C216. Brick shall be sized to match existing.
- B. Color and texture shall match existing and shall be selected by the Owner from samples submitted by the Contractor prior to start of work. All brick shall be whole and capable of passing standard absorption, efflorescence and compression tests in accordance with ASTM C67.

2.04 MEMBRANE WALL FLASHING:

- A. Membrane wall flashing shall be composed of two layers of asphalt saturated woven cotton fabric which is placed electro sheet copper, bonded to fabric with asphalt mastic, or an approved equal. Fabric shall be coarsely woven cotton and shall weigh not less than 4 oz per sq yd before saturation and 11 oz after saturation. Electro sheet copper shall consist of a full sheet of copper weighing 3 oz per sq ft. When completely assembled the flashing shall be grooved by a series of parallel depressions.
- B. Mastic shall be heavy-bodied, reinforced, self-priming trowel coat dampproofing, as manufactured by the Minwax Company, Inc., the Flintkote Company, the A.C. Horn Division of the Dewey & Almy Company, or an approved equal.

2.05 AIR AND VAPOR BARRIER MEMBRANE:

- A. Provide and install on the exterior of the interior wall wyth, per manufacturers' instructions, a self adhering composite membrane which forms a complete air and vapor barrier, with complete accessories.
- B. Membrane material shall be Perm-A-Barrier, as manufactured by WR Grace Chemical Company, or approved equal.

2.06 HORIZONTAL JOINT REINFORCEMENT:

- A. Horizontal joint reinforcement shall be placed in joints of alternate courses in both solid and back-up walls and partitions 6-inches and more in thickness, and in every course of those less than 6-inches thick.
- B. The first 2 courses over door openings and similar openings shall have reinforcement extending beyond jambs a minimum of 24-inches. Splices shall overlap at least 6-inches.

2.07 FLASHING REQUIREMENTS:

- A. Any membrane required or as indicated on the Drawings shall be provided and installed under this section of the specification. The Drawings and other relevant sections of the specification shall be consulted to ascertain the location and extent of flashing required.
- B. Surface to receive fabric flashing shall be smooth, hard and free of loose materials.
- C. On all horizontal masonry surfaces to be flashed, the flashing shall be laid in a fresh bed of mortar or trowel coat of asphalt mastic, while other surfaces receiving the flashing shall be thoroughly dry, free from loose materials, reasonably smooth and sufficiently spotted with asphalt mastic to hold it in place until the masonry is set. Splices shall be accomplished in accordance with the manufacturer's instructions.
- D. Membrane flashing shall start 1/2-inch from the outside face of wall, go through the brick or brick and concrete block and turn up not less than 2-inches, into the block or into the reglet cast in the concrete as indicated on the Drawings.
- E. Where flashing is indicated on the Drawings, it shall be continuous.
- F. Weep holes shall be placed in vertical mortar joints of exterior wythe of walls immediately above all horizontal through flashing. Weep holes shall be at 24-inches o.c., maximum, except as otherwise indicated on the Drawings. Provide one shovel of pea stone at each weep hole.
- G. Weep holes shall not be permitted to become plugged with mortar.
- H. Flashing shall be compatible with air/vapor barrier membrane.

2.08 MASONRY CLEANERS:

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.
 - 1. Manufacturers:
 - a. Diedrich Technologies, Inc.
 - b. EaCo Chem, Inc.
 - c. ProSoCo, Inc.
 - d. Or equal.

PART 3 - EXECUTION

3.01 EXAMINATION:

- A. Examine conditions for compliance with requirements for installation tolerances and other conditions affecting performance of unit masonry. Do not proceed with installation until unsatisfactory conditions have been corrected.
 - 1. For the record, prepare written report listing conditions detrimental to performance of unit masonry.

- B. Examine rough-in and built-in construction to verify actual locations of piping connections prior to installation.

3.02 INSTALLATION:

- A. Thickness: Build cavity and composite walls and other masonry construction to the full thickness shown. Build single-wythe walls to the actual thickness of the masonry units, using units of thickness indicated.
- B. Cut masonry units with motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide continuous pattern and to fit adjoining construction. Use full-size units without cutting, where possible. Allow units cut with water-cooled saws to dry before placing, unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- C. Mix units for exposed unit masonry from several pallets or cubes as they are placed to produce uniform blend of colors and textures.
- D. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.
- E. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.

3.03 MORTAR MIXING REQUIREMENTS:

- A. Mortar color for exposed masonry work shall match existing mortar.
- B. For all exterior masonry, mortar waterproofing shall be added to the mortar in accordance with the manufacturer's directions.
- C. Plasticity of mortar shall be maintained by retempering as required up to 2-1/2 hours after original mixing of mortar. Mortar requiring retempering to maintain proper workability after this period shall be discarded.
- D. Mixers, mortar boxes, and all tools used with mortar shall be clean, and free from rust and any foreign material, particularly salt. No salt shall be permitted on the work.
- E. Except as otherwise approved for small batches, all mortar shall be mixed in a mechanically operated batch mixer of the drum type in which the water can be accurately and uniformly controlled. The mortar shall be thoroughly mixed for at least five minutes after all materials are in the mixer.
- F. For exposed concrete masonry the cement used in the mortar shall show no signs of efflorescence when tested in accordance with provisions of ASTM C67.

3.04 MASONRY CONSTRUCTION:

- A. Vertical joints in each course shall break halfway over the units of the course below. All joints shall be 3/8-inch. Load-bearing, fire-rated, and solid block and brick shall be laid with all contact surfaces fully embedded in mortar.
- B. Other block may be laid with face shell mortar bedding. All vertical edges shall be fully butted and all joints filled. Each course shall be bonded at corners and intersections.
- C. Masonry shall be laid to lines, with walls and partitions built plumb, true, and square. Joints shall be of uniform thickness. Units shall be laid with common running bond, except where

otherwise noted with vertical joints accurately centered relative to units above and below. Walls of one unit thickness shall be laid to obtain the smoothest surface that the variation in thickness or the units will permit; discrepancies shall be absorbed equally in both faces of wall where appearances of both sides of wall are of importance.

- D. Masonry shall be protected from entrance of water and from other damage during construction. Any masonry built of cracked, pitted, chipped, stained, or otherwise injured or defaced units shall be taken down as far as the Engineer directs and be rebuilt. Poorly tooled joints, and joints not uniform in color and texture, will be adequate grounds for rejection of the work. All masonry shall be covered at night and during bad weather with non-staining waterproof coverings.
- E. Temporary bracing and shoring shall be introduced wherever necessary to support loads to which the masonry may be subjected. The supports shall be left in place as long as required for safety.
- F. As work progresses, and before staging is raised or removed, all exposed masonry shall be pointed up, all holes and joints filled, loose mortar removed, and defective joints cut out and repointed if necessary. Completed joints shall be neat, true, uniform, and free of voids, mortar crumbs, and other defects. Only first class jointing will be acceptable on joints which will be exposed to view, in the completed work.
- G. All masonry walls shall start on concrete floors or walls and shall terminate against beam soffits or structural ceilings, except where otherwise noted on the drawings or specified herein. No partitions shall terminate at the underside of dropped ceilings or acoustical tile construction, except where noted on the Drawings.
- H. Masonry shall be laid in courses as indicated on the drawings with joints of uniform thickness. All joints, both horizontal and vertical, shall be in proper alignment. When mortar becomes "thumb-print" hard, exterior and interior joints shall be thoroughly tooled so as to be slightly concave, and to have a glassy-hard, polished surface, free from drying cracks.
- I. Masonry over lintels, metal frames, and other supporting members on which the masonry will produce a perceptible deflection shall be erected in a triangular pattern, starting at midspan and working simultaneously in each direction toward the jambs or other rigid supporting member.
- J. Masonry units shall be dry when laid. Masonry saws shall be used for cutting and fitting masonry units, to produce straight, true edges and joints of the same width as the remainder of the work. Power masonry saws shall be used to facilitate close tolerance work.
- K. All anchors, ties, frames, steel sections, and other material required to be embedded in masonry shall be accurately placed, plumbed, and braced as required. Masonry to which door bucks or frames are to be anchored shall not be permitted to distort their alignment.
- L. The completed masonry walls, etc., shall present a flush, uniform, and finished appearance, with no awkward gaps, openings, or recesses at locations where structural or mechanical items penetrate, intersect, or rest on masonry, except where such gaps, openings, or recesses are indicated on the Drawings.
- M. Wherever possible, all miscellaneous metal items shall be erected, plumbed, braced and built into the masonry; where this is not possible, suitable metal anchors shall be built into the masonry for attaching the miscellaneous metal item. Steel door and other frames shall be filled with mortar or grout.

- N. All reinforced hollow vertical cells shall be filled with grout (not mortar). The grout shall be rodded and vibrated until well consolidated and all voids are filled.
- O. At wall and wall intersections, and similar locations, hollow blocks having flush, flat face visible on the face of the wall or partition and in reveal shall be used. No cells shall be left visible in face of wall or partition, at reveals of openings, etc. Mortar or mortar and masonry fill shall be used between concrete masonry units and adjacent roof deck members, except where the Drawings indicate otherwise.
- P. Install vapor barrier membrane against the exterior surface of the CMU, taking particular care to seal all penetrations with a manufacturer approved sealant system. Lap and seal membrane around windows, doors, openings, etc., and the roof construction.
- Q. Masonry shall not be laid overhand. Where necessary to avoid laying masonry overhand, staging shall be constructed on both sides of the wall.
- R. Masonry at intersections of walls or partitions shall be bonded with masonry or approved metal ties. Ties shall be spaced at not more than 16-inches o.c. unless otherwise noted on the Drawings.
- S. No masonry work shall be done when the mean daily temperature is below 40 degrees F., or is expected to fall below 40 degrees within 72 hours, except with the permission of, and in accordance with the requirements of subsection entitled Masonry Work at Temperatures Below 40 degrees F. No salt or other anti-freeze or accelerator ingredients shall be used in the mortar.
- T. All necessary channels, chases, holes, and openings shall be made, and all sleeves that may be required for piping or wiring installation shall be set. Pipes, conduits, and outlet boxes shall be built-in as required, and all cutting and patching of the work of this section shall be done as required to accommodate the work of other trades. Drawings covering the work of other trades shall be consulted as necessary to determine the extent of such work required.

3.05 MASONRY WORK AT TEMPERATURES BELOW 40 DEGREES F.:

- A. All materials shall be covered to prevent wetting, and shall be stored off the ground. At temperatures below 20 degrees F, all materials shall be stored in covered enclosures and kept at a temperature above 32 degrees F. Mortar shall be between 70 degrees F. and 120 degrees F. when used.
- B. When temperature in the air is between 30 and 40 degrees F., either the water or the sand shall be heated to between 70 degrees F. and 160 degrees F. (Heating the sand is preferable, as it makes the mortar more workable and maintains workability longer than heating the water). When temperature of the air is between 10 degrees F. and 30 degrees F., both the sand and the water shall be heated to between 70 degrees F. and 160 degrees F. When the temperature of the air is or is expected to fall below 10 degrees F. within 24 hours, no masonry shall be erected.
- C. Masonry work under construction shall be protected with canvas or other windbreak material. All such material shall be flame-proofed. Canvas shall completely enclose that portion of work requiring protection, but shall be held off to allow air circulation between canvas and masonry. Canvas shall be securely held, and lapped at edges to prevent heat loss.
- D. Temperatures shall be recorded frequently, at least every hour, and artificial heat supplied as required to maintain 40 degrees F. under the canvas. Points at which temperature is measured shall be those designated by the Engineer. Care shall be taken that one side of masonry is not heated more rapidly than the other side; air circulation shall be provided as required to maintain even temperatures.

- E. Covering shall be used on both completed and unfinished work. The warmed enclosure shall be kept on masonry for 72 hours after laying. Following the 72 hour period, the masonry shall be brought gradually to ambient temperature but shall not be allowed to drop faster than one degree F. per hour. The Contractor shall furnish and install maximum/minimum thermometers in an enclosure which contains a hasp and staple.
- F. The Engineer shall designate the number and location of the thermometers.

3.06 LINTELS:

- A. Install steel lintels where indicated.
- B. Provide masonry lintels where shown and where openings of more than 12 inches (305 mm) for brick size units and 24 inches (610 mm) for block size units are shown without structural steel or other supporting lintels.
 - 1. Provide prefabricated or built-in-place masonry lintels. Use specially formed bond beam units with reinforcement bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.
- C. Provide minimum bearing of 8 inches (200 mm) at each jamb, unless otherwise indicated.

3.07 FLASHING, WEEP HOLES, AND VENTS:

- A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to the downward flow of water in the wall, and where indicated.
- B. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Place through-wall flashing on sloping bed of mortar and cover with mortar. Seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer before covering with mortar.
- C. Install flashing as follows:
 - 1. Extend sheet-metal flashing 1/2 inch (13 mm) beyond face of masonry at exterior and turn down to form a drip.
- D. Install weep holes in the head joints in exterior wythes of the first course of masonry immediately above embedded flashing and as follows:
 - 1. Form weep holes with product specified in Part 2 of this Section.
 - 2. Space weep holes 32 inches (600 mm) o.c.
 - 3. Place cavity drainage material immediately above flashing in cavities, as detailed on Architectural Drawings.
- E. Install vents in vertical head joints at the top of each continuous cavity. Space vents and close off cavities vertically and horizontally with blocking in manner indicated.
 - 1. Install through-wall flashing and weep holes above horizontal blocking.
- F. Install reglets and nailers for flashing and other related construction where shown to be built into masonry.

3.08 REPAIRING, POINTING, AND CLEANING:

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or if units do not match adjoining units. Install new units to match adjoining units; install in fresh mortar or grout, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point-up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for application of sealants.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears prior to tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
 - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 - 2. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
 - 3. Wet wall surfaces with water prior to application of cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
 - 4. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2 applicable to type of stain present on exposed surfaces.
- E. Protection: Provide final protection and maintain conditions that ensure unit masonry is without damage and deterioration at time of Substantial Completion.

3.09 MASONRY WASTE DISPOSAL:

- A. Recycling: Undamaged, excess masonry materials are Contractor's property and shall be removed from the Project site for his use.
- B. Excess Masonry Waste: Remove excess, clean masonry waste and legally dispose of off Owner's property.

3.10 CLEAN-UP:

- A. Mortar droppings on face of wall shall be allowed to set up and shall then be promptly removed with a trowel and by rubbing with a piece of block. Droppings shall not be allowed to remain on the wall until completion of the masonry. Walls shall be cleaned by brushing with a stiff brush. No acid cleaners shall be used.
- B. Masonry surfaces to be left exposed, either painted or unpainted, shall be thoroughly cleaned. Spattering and staining of floors, finished surfaces, pipe, equipment, etc., shall be avoided, and all finished surfaces shall be left in clean and perfect condition. Suitable drop cloths or other adequate means of protection shall be provided as necessary.

END OF SECTION

SECTION 05120

STRUCTURAL STEEL FRAMING

PART 1 – GENERAL

1.01 SUMMARY:

- A. Work Included: Provide labor, materials and equipment necessary to complete all steel structural work as specified herein and as shown on the drawings.

1.02 RELATED SECTIONS:

- A. Section 01300 – Submittals
- B. Section 05500 – Miscellaneous and Ornamental Iron

1.03 DEFINITIONS:

- A. Structural Steel: Elements of structural-steel frame, as classified by AISC's "Code of Standard Practice for Steel Buildings and Bridges," that support design loads.

1.04 PERFORMANCE REQUIREMENTS:

- A. Connections: Provide details of connections required by the Contract Documents to be selected or completed by structural-steel fabricator to withstand loads indicated and comply with other information and restrictions indicated.
 - 1. Select and complete connections using AISC's "Manual of Steel Construction, Load and Resistance Factor Design," Volume 2, Part 9.
 - 2. Engineering Responsibility: Fabricator's responsibilities include using a Licensed Professional Engineer registered in the State of Rhode Island to prepare structural analysis data for structural-steel connections.

1.05 SUBMITTALS:

- A. Submit the following in accordance with Section 01300:
 - 1. Product data for materials and equipment for each type of product indicated.
 - 2. Shop Drawings: Show fabrication of structural-steel components.
 - a. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
 - b. Include embedment drawings.
 - c. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.
 - d. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.

- e. For structural-steel connections indicated to comply with design loads, include structural analysis data signed and stamped by the Licensed Professional Engineer registered in the Commonwealth of Massachusetts.
- 3. Welding certificates.
- 4. Qualification Data: For Installer, fabricator, Licensed Professional Engineer registered in the Commonwealth of Massachusetts, testing agency.
- 5. Mill Test Reports: Signed by manufacturers certifying that the following products comply with requirements:
 - a. Structural steel including chemical and physical properties.
 - b. Bolts, nuts, and washers including mechanical properties and chemical analysis.
 - c. Direct-tension indicators.
 - d. Tension-control, high-strength bolt-nut-washer assemblies.
 - e. Shear stud connectors.
 - f. Shop primers.
 - g. Nonshrink grout.
- 6. Source quality-control test reports.

1.06 REFERENCE STANDARDS

- A. Work under this Section shall comply with the following standards in effect at bid:
 - 1. American Institute of Steel Construction (AISC):
 - a. "Code of Standard Practice for Steel Buildings and Bridges."
 - b. "Seismic Provisions for Structural Steel Buildings" and "Supplement No. 2."
 - c. "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design" and "Load and Resistance Factor Design Specification for Structural Steel Buildings."
 - d. "Specification for the Design of Steel Hollow Structural Sections."
 - e. "Specification for Allowable Stress Design of Single-Angle Members" and "Specification for Load and Resistance Factor Design of Single-Angle Members."
 - 2. American Society for Testing and Materials (ASTM)
 - 3. Research Council on Structural Connections (RCSC): "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

4. American Welding Society (AWS) D1.1, "Structural Welding Code--Steel."

1.07 QUALITY ASSURANCE:

- A. Installer Qualifications: A qualified installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category CSE.
- B. Fabricator Qualifications: A qualified fabricator who participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category Cbd.
- C. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel."
- D. Preinstallation Conference: Conduct conference at Project site.

1.08 DELIVERY, STORAGE, AND HANDLING:

- A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from erosion and deterioration.
 1. Store fasteners in a protected place. Clean and relubricate bolts and nuts that become dry or rusty before use.
 2. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

1.09 COORDINATION:

- A. Furnish anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

PART 2 - PRODUCTS

2.01 STRUCTURAL-STEEL MATERIALS:

- A. W-Shapes: ASTM A 992/A 992M, ASTM A 572/A 572M, Grade 50.
- B. Channels, Angles, M and S-Shapes: ASTM A 36/A 36M, ASTM A 572/A 572M, Grade 50.
- C. Plate and Bar: ASTM A 36/A 36M, ASTM A 572/A 572M, Grade 50.
- D. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.
- E. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.
- F. Medium-Strength Steel Castings: ASTM A 27/A 27M, Grade 65-35 carbon steel.
- G. High-Strength Steel Castings: ASTM A 148/A 148M, Grade 80-50, carbon or alloy steel.
- H. Welding Electrodes: Comply with AWS requirements.

2.02 BOLTS, CONNECTORS, AND ANCHORS:

- A. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy hex steel structural bolts; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.
 - 1. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C.
- B. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1, steel structural bolts with splined ends; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.
 - 1. Finish: Mechanically deposited zinc coating, ASTM B 695, Class 50.
- C. Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1, Type B.
- D. Anchor Rods: ASTM F 1554, grade as applicable, hot-dip zinc coating, ASTM A 153/A 153M, Class C.
- E. Threaded Rods: ASTM A 193/A 193M, grade as applicable, hot-dip zinc coating, ASTM A 153/A 153M, Class C.
- F. Eye Bolts and Nuts: ASTM A 108, Grade 1030, cold-finished carbon steel.
- G. Sleeve Nuts: ASTM A 108, Grade 1018, cold-finished carbon steel.
- H. Adhesive Anchors:
 - 1. Adhesive anchor rod system shall be Hilti HY150, W.R. Meadows Rezi-weld LV, Five Star Rapid Setting Anchor Gel, or equal utilizing ASTM F 593 AISI 304 threaded stainless steel rods with manufacturer recommended nuts, bolts, and washers. Preparation, drilling and installation shall be as recommended by manufacturer. Anchorage embedment shall withstand the ultimate tensile loading of the anchor bolt. Provide adhesive anchor rod system for fastening support steel to concrete walls and floor.
- I. Expansion Anchors
 - 1. Galvanized Steel, 1/2 inch minimum diameter.
 - 2. Fed Spec FF-S-325; wedge type, Group II, Type 4, Class 1 or 2; self-drilling type, Group III, Type 1; or nondrilling type, Group VIII, Type 1 or 2; Hilti, Phillips, Rawlplug, USM, or equal.
 - a. Bolts and nuts
 - i. Galvanized steel.
 - ii. Carbon steel bolts and nuts; hot-dip galvanized ASTM A153 and A385.
 - b. Flat washers
 - i. ANSI B18.22.1; of the same materials as bolts and nuts.

2.03 PRIMER:

- A. Primer: SSPC-Paint 25, Type II, iron oxide, zinc oxide, raw linseed oil, and alkyd.
- B. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer.
- C. Galvanizing Repair Paint: ASTM A 780.

2.04 GROUT:

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.05 FABRICATION:

- A. Structural Steel: Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."
 - 1. Camber structural-steel members.
 - 2. Identify high-strength structural steel according to ASTM A 6/ A 6M and maintain markings until structural steel has been erected.
 - 3. Mark and match-mark materials for field assembly.
 - 4. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- B. Architecturally Exposed Structural Steel: Comply with fabrication requirements, including tolerance limits, of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for structural steel identified as architecturally exposed structural steel.
 - 1. Fabricate with exposed surfaces smooth, square, and free of surface blemishes including pitting, rust, scale, seam marks, roller marks, rolled trade names, and roughness.
 - 2. Remove blemishes by filling or grinding or by welding and grinding, before cleaning, treating, and shop priming.
- C. Thermal Cutting:
 - 1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1.
- D. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.
- E. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- F. Holes: Provide holes required for securing other work to structural steel and for passage of other work through steel framing members.

1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
2. Base-Plate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.06 SHOP CONNECTIONS:

- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 1. Joint Type: Snug tightened.
- B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.
 1. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
 2. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.
 3. Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances. Prevent weld show-through on exposed steel surfaces.
 - a. Grind butt welds flush.
 - b. Grind or fill exposed fillet welds to smooth profile. Dress exposed welds.

2.07 STEEL PRIMERS AND FINISHES:

- A. Shop prime steel surfaces except the following:
 1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
 2. Surfaces to be field welded.
 3. Surfaces to be high-strength bolted with slip-critical connections.
 4. Surfaces to receive sprayed fire-resistive materials.
- B. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for The Society for Protective Coatings (SSPC) surface preparation specifications and environmental exposure conditions of installed metal fabrications:
 1. Exteriors (SSPC Zone 1B) to Receive Zinc-Rich Primer: SSPC-SP 10/NACE No. 2, "Near White Metal Blast Cleaning."

2. Interiors (SSPC Zone 1A): SSPC-SP 6, "Commercial Blast Cleaning."
3. Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be field welded, embedded in concrete or masonry. Extend priming of partially embedded members to a depth of 2 inches.
4. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
5. Comply with SSPC-PA 2, "Measurement of Dry Coating Thickness with magnetic Gages."

2.08 SOURCE QUALITY CONTROL:

- A. Engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports.
 1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
- B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.
- C. Bolted Connections: Shop-bolted connections will be inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- D. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1 and other inspection procedures, at testing agency's option.
- E. In addition to visual inspection, shop-welded shear connectors will be tested and inspected according to requirements in AWS D1.1 for stud welding and as follows:
 1. Bend tests will be performed if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
 2. Tests will be conducted on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1.

PART 3 – EXECUTION

3.01 EXAMINATION:

- A. Verify elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments, with steel erector present, for compliance with requirements.
 1. Elevations shall be verified by a surveyor licensed in the Commonwealth of Massachusetts.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION:

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and

loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place, unless otherwise indicated.

3.03 ERECTION:

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC's "Code of Standard Practice for Steel Buildings and Bridges."
- B. Base and Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting base and bearing plates. Clean bottom surface of base and bearing plates.
 - 1. Set base and bearing plates for structural members on wedges, shims, or setting nuts as required.
 - 2. Weld plate washers to top of base plate.
 - 3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of base or bearing plate before packing with grout.
 - 4. Promptly pack grout solidly between bearing surfaces and base or bearing plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- C. Maintain erection tolerances of structural steel and architecturally exposed structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."
- D. Align and adjust various members forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 - 1. Level and plumb individual members of structure.
 - 2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.
- E. Splice members only where indicated.
- F. Remove erection bolts on welded, architecturally exposed structural steel; fill holes with plug welds; and grind smooth at exposed surfaces.
- G. Do not use thermal cutting during erection unless approved by the Authority. Finish thermally cut sections within smoothness limits in AWS D1.1.
- H. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.
- I. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1 and manufacturer's written instructions.

3.04 FIELD CONNECTIONS:

- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Snug tightened.
- B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.
 - 1. Comply with AISC's "Code of Standard Practice for Steel Buildings and Bridges" for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
 - 2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
 - 3. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.
 - 4. Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances. Prevent weld show-through on exposed steel surfaces.
 - a. Grind butt welds flush.
 - b. Grind or fill exposed fillet welds to smooth profile. Dress exposed welds.

3.05 EXPANSION ANCHORS AND EPOXY ANCHORS:

- A. Install in conformity with manufacturer's recommendations for maximum holding power.
- B. Depth of hole not less than four bolt hole diameters.
- C. Minimum distance between center of any expansion anchor and edge or exterior corner of concrete to be at least 4-1/2 times diameter of hole in which anchor is installed.
- D. Minimum distance between centers of expansion anchors to be at least eight times diameter of hole in which anchors are installed.

3.06 FIELD QUALITY CONTROL:

- A. Testing Agency: Engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections.
- B. Bolted Connections: Shop-bolted connections will be inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- C. Welded Connections: Field welds will be visually inspected according to AWS D1.1.
 - 1. In addition to visual inspection, field welds will be tested according to AWS D1.1 and other inspection procedures at testing agency's option:
- D. In addition to visual inspection, test and inspect field-welded shear connectors according to requirements in AWS D1.1 for stud welding and as follows:

1. Perform bend tests if visual inspections reveal either a less-than- continuous 360-degree flash or welding repairs to any shear connector.
 2. Conduct tests on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1.
- E. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

3.07 REPAIRS AND PROTECTION:

- A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Touchup Painting: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists and accessories, bearing plates, and abutting structural steel.
1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
 2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.

END OF SECTION

SECTION 05500
MISCELLANEOUS AND ORNAMENTAL IRON

PART 1 – GENERAL

1.01 SUMMARY:

- A. This section of the specification covers all miscellaneous metal items required for the work, except as specified elsewhere.
- B. All miscellaneous metalwork shall be fabricated as detailed or approved and shall be installed complete with all necessary anchors, anchor bolts, eye bolts, guides, bolts and other accessories.
- C. In general, site and shop fabricated items are included under this section, and factory fabricated items excluded. This section includes but is not limited to:
 - 1. Furnishing and installing steel shapes.
 - 2. Furnishing and installing expansion anchors and adhesive anchors in brick and concrete.
 - 3. Furnishing and installing loose steel lintels, shelf and relieving angles.
 - 4. Furnishing and installing stairs, railings and posts
 - 5. Furnishing and installing grating
 - 6. Furnishing and installing access hatches and frames
 - 7. Furnishing and installing other site or shop fabricated metal items not provided under Section 05120, STRUCTURAL STEEL FRAMING, or otherwise excluded.

1.02 RELATED SECTIONS:

- A. Section 01300 - Submittals
- B. Section 03300 - Cast in Place Concrete
- C. Section 04200 - Unit Masonry
- D. Section 05120 - Structural Steel Framing
- E. Section 09900 - Painting and Coating

1.03 QUALITY ASSURANCE:

- A. The drawings show the character and extent of the work required, but do not attempt to show all methods, materials, and details of construction, fastening, etc. Supplementary parts customarily necessary to complete an item, though such parts are not definitely shown or specified, shall be included as part of the item.
- B. The size and spacing of screws, connectors, anchors, and similar items, and the size and dimensions of metal items stated herein shall apply in general; specific sizes and spacing of fasteners and dimensions of metal items listed on the drawings shall take precedence.
- C. Items supplied hereunder which are required to be built into the concrete, masonry, etc., shall be delivered to the site at locations as directed, and as required by the overall construction schedule.

- D. Manufacturers of other products comparable in quality and type to those specified will be acceptable if satisfactory data on past performance and other required information is furnished by the Contractor, and if approved by the Engineer.
- E. Contractor shall submit an affidavit to Engineer that materials used are protected from or will not be subject to galvanic action.

1.04 REFERENCE STANDARDS:

- A. Work under this Section shall comply with the following standards in effect at bid:
 - 1. American Society for Testing and Materials (ASTM):
 - a. A36 Specification for Structural Steel.
 - b. A53 Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - c. A120 Specification for Pipe, Steel, Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless, for Ordinary Uses.
 - d. A153 Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - e. A385 Practice for Providing High-Quality Zinc Coatings (Hot-Dip).
 - 2. American National Standards Institute (ANSI)
 - a. A14.3 Safety Code for Fixed Ladders
 - b. B.18.22.1 Plain Washers.
 - 3. Federal Specifications FF-S-325 Shield, Expansion; Nail, Expansion; and Nail, Drive Screw (Devices, Anchoring, Masonry).
 - 4. American Welding Society (AWS):
 - a. A2.0 Standard Welding Symbols
 - b. B3.0 Qualification Procedure
 - c. D1.1 Structural Welding Code
 - 5. Steel Structures Painting Council (SSPC)

1.05 SUBMITTALS:

- A. Submit the following in accordance with Section 01300:
 - 1. Shop drawings for all metalwork included in this section shall be submitted to the Engineer for review.
 - a. Identify all welds on detailed Shop Drawings.

2. Before fabricating or assembling any aluminum or stainless steel items, samples indicating full range of finish, color, and texture to be supplied shall be submitted to the Engineer for review.
3. The shop drawings shall be complete and checked, showing sizes, layout, method of assembly, fastenings, anchorage or connection with other work, finish, and coatings, etc. Shop drawings for aluminum work shall indicate alloys, temper and finish to be used.

1.06 DELIVERY, STORAGE, AND HANDLING:

A. Acceptance at Site:

1. All items, as delivered and erected, shall be free of winds, warps, local deformations, and unspecified bends.

B. Storage and Protection:

1. Store miscellaneous metal work on blocking so no metal touches the ground and water cannot collect.
2. Protect material from bending under its own weight or superimposed loads.

1.07 PROJECT CONDITIONS:

- A. Field Measurements: Check locations of walls and other construction in which metal fabrications must fit by accurate field measurements before fabrication. Show recorded measurements on final shop drawings.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Steel shapes, plates, and bars: ASTM A36.
- B. Sheet steel shall be cold-rolled or hot-rolled carbon sheet steel conforming to ASTM A366 or ASTM A569 as appropriate.
- C. Steel pipe shall conform to ASTM A53.
- D. Expansion Anchors
 1. Galvanized Steel, 1/2 inch minimum diameter.
 2. Fed Spec FF-S-325; wedge type, Group II, Type 4, Class 1 or 2; self-drilling type, Group III, Type 1; or nondrilling type, Group VIII, Type 1 or 2; Hilti, Phillips, Rawlplug, USM, or equal.
 - a. Bolts and nuts
 - i. Galvanized steel.
 - ii. Carbon steel bolts and nuts; hot-dip galvanized ASTM A153 and A385.

- b. Flat washers
 - i. ANSI B18.22.1; of the same materials as bolts and nuts.
- E. Stainless Steel: Comply with the following standards for the forms and types of stainless steel for the required items of work:
 - 1. Type: AISI Type 302/304
 - 2. Bar Stock: ASTM A276
 - 3. Plate: ASTM A167
 - 4. Tubing: ASTM A269
- F. Adhesive Anchors
 - 1. Adhesive anchor rod system shall be Hilti HY200, W.R. Meadows Rezi-weld LV, Five Star Rapid Setting Anchor Gel, or equal utilizing ASTM F 593 AISI 304 threaded stainless steel rods with manufacturer recommended nuts, bolts, and washers. Preparation, drilling and installation shall be as recommended by manufacturer. Anchorage embedment shall withstand the ultimate tensile loading of the anchor bolt. Provide adhesive anchor rod system for fastening support steel to concrete walls and floor.

2.02 FERROUS METALS:

- A. Metal Surfaces: For metal fabrications exposed to view in the completed Work, provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- B. Cast-in-Place Anchors in Concrete: Anchors of type indicated below, fabricated from corrosion-resistant materials capable of sustaining, without failure, the load imposed within a safety factor of 4, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.
 - 1. Threaded or wedge type; galvanized ferrous castings, either ASTM A 47 malleable iron or ASTM A 27 cast steel. Provide bolts, washers, and shims as required, hot-dip galvanized per ASTM A 153.

2.03 PAINT:

- A. Shop Primer for Ferrous Metal: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with performance requirements of FS TT-P-664, selected for resistance to normal atmospheric corrosion, compatibility with finish paint systems indicated, and capability to provide a sound foundation for field-applied topcoats despite prolonged exposure.
- B. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-21035 or SSPC-Paint 20.
- C. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12, except containing no asbestos fibers.

2.04 FASTENERS:

- A. General: Provide plated fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating, for exterior use or where built into exterior walls. Select fasteners for the type, grade, and class required.
- B. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A with hex nuts, ASTM A 563, and, where indicated, flat washers.
- C. Machine Screws: ANSI B18.6.3.
- D. Lag Bolts: ANSI B18.2.1.
- E. Wood Screws: Flat head, carbon steel, ANSI B18.6.1.
- F. Plain Washers: Round, carbon steel, ANSI B18.22.1.
- G. Lock Washers: Helical, spring type, carbon steel, ANSI B18.21.1.
- H. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.
 - 1. Material: Group 1 alloy 304 or 316 stainless-steel bolts and nuts complying with ASTM F 593 and ASTM F 594.
- I. Toggle Bolts: FS FF-B-588, tumble-wing type, class and style as required.

2.05 GROUT:

- A. Nonshrink, Metallic Grout: Factory-packaged, ferrous-aggregate grout complying with ASTM C 1107.
- B. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout recommended by manufacturer for interior and exterior applications.

2.06 FABRICATION:

- A. Form metal fabrications from materials of size, thickness, and shapes indicated but not less than that needed to comply with performance requirements. Work to dimensions indicated, using proven details of fabrication and support. Use type of materials specified for components of each metal fabrication.

2.07 ROUGH HARDWARE:

- A. Furnish bent, or otherwise custom-fabricated, bolts, plates, anchors, hangers, dowels, and other miscellaneous steel and iron shapes for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures.

- B. Fabricate items to sizes, shapes, and dimensions as specified. Furnish malleable-iron washers for heads and nuts that bear on wood structural connections, and furnish steel washers elsewhere.

2.08 LOOSE STEEL LINTELS:

- A. Loose lintels shall have a minimum bearing of 8 inches at each end, unless otherwise shown. All lintels in exterior walls shall be galvanized. Openings and recesses in masonry walls and partitions for ducts, grilles, louvers, cabinets, panels, pressed metal frames etc., with a clear masonry opening, shall have steel angle lintels conforming to the following schedule of sizes unless otherwise indicated on the design drawings:

Wall Thickness (in.)	Opening Size	No. of Angles	Angle Size
4	to 3'-0"	1	3-1/2 x 3-1/2 x 5/16
4	3'-1" to 6'-0"	1	4 x 3-1/2 x 5/16
6	to 3'-0"	2	2-1/2 x 2-1/2 x 5/16
6	3'-1" to 6'-0"	2	3-1/2 x 2-1/2 x 5/16
8	to 3'-0"	2	3-1/2 x 2-1/2 x 5/16
8	3'-1" to 7'-6"	2	4 x 3-1/2 x 5/16
10	to 3'-0"	3	3 x 3 x 5/16
10	3'-1" to 7'-6"	3	4 x 3 x 5/16
12	to 3'-0"	3	3-1/2 x 3-1/2 x 5/16
12	3'-1" to 7'-6"	3	4 x 3-1/2 x 5/16
14	to 3'-0"	3	4 x 3-1/2 x 5/16
14	3'-1" to 7'-6"	3	4 x 3-1/2 x 5/16

- B. Fabricate loose structural steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated.
- C. Weld adjoining members together to form a single unit where indicated.

2.09 STEEL GRATING:

- A. Steel grating shall be rectangular pattern grating made in accordance with industry standards. The grating shall be made from structural carbon steel conforming to ASTM A36 and shall be galvanized. The bars shall be welded together prior to galvanizing and the completed grating shall be free from imperfections or irregularities which would cause warping or camber when the grating is in use.
- B. Loading and structural requirements shall be checked by the grating manufacturer to determine its stability. Unless otherwise indicated, the grating shall be designed for a live load of 250 pounds per square foot.
- C. The steel grating shall have positive anchorage when in place, such as bolting, or clipping.

2.10 STEEL RAILINGS:

- A. Steel railings shall be in accordance with OSHA and the Commonwealth of Massachusetts standards and be capable of withstanding a load of 200 pounds applied at any point, in any direction on the top rail. Unless otherwise indicated on the drawings, pipe rail posts shall be 1-1/2-inch ID Schedule 80 black welded steel pipe conforming to ASTM A53, color galvanized with an epoxy primer and finish coat. Interior reinforcement shall be provided in posts and/or rails as required to resist the 200 pound load.
- B. Bends in pipe shall be made with manufactured elbows. Rail ends which are not continuous with posts or bolted to the wall shall have self-return to solid walls, or shall have rounded end caps where there is no adjacent wall. Posts shall be approximately 5 feet on centers, or as noted on the drawings.
- C. Connections shall be welded, with welds ground smooth. Railings shall be fabricated in panels which are as long as can be conveniently handled, to eliminate as much field welding as possible.
- D. Exterior removable railing shall be set in 2" I.D. galvanized pipe sleeves set per J.5 above and fastened at ends as shown on the drawings.
- E. Submit certification by a professional engineer licensed in the state where the project is located, stating load capacity.

2.11 STEEL STAIRS:

- A. Stairs shall be designed by the fabricator for a minimum live load of 150 pounds per square foot. Treads and risers shall be rigidly attached to the stringers to serve as lateral bracing; where necessary to achieve satisfactory rigidity, separate lateral bracing shall be added. All steel stair components shall be color galvanized with an epoxy primer and finish coat.
- B. Stringers of steel stairs shall be steel channels with angle brackets. Stringer channels shall be bolted or welded to adjacent construction at both ends. All exposed ends of channel stringers shall have steel closure plates welded on. Closure plates shall in all cases be at least as thick as the stringer web. Corners and arises shall be ground to eliminate burrs and sharp projections.
- C. Treads, risers and platforms shall be cast iron, and platforms shall be reinforced as required. Platforms shall have nosings to match the nosings on treads.
- D. Submit certification by a professional engineer licensed in the state where the project is located, stating load capacity.

2.12 ALUMINUM HATCHES:

- A. Hatches shall have 1/4-inch thick, one-piece, mill finish, extruded aluminum frame, incorporating a continuous concrete anchor and bituminous coating applied to the exterior of the frame. Door panels shall be 1/4-inch aluminum diamond plate, and shall open to 90 Deg. Doors shall automatically lock with a stainless steel hold open arm with aluminum release handle. Doors shall incorporate enclosed stainless steel compression spring assists and shall close flush with the frame.
- B. Lifting handle, hinges and all fastening hardware shall be stainless steel. Unit shall lock with stainless steel slam locks with removable keys. Hatches shall include a special keyed cylinder lock with access through a weather-tight removable deckplate.

- C. A new hatch shall be installed in the existing wet well top slab at the East Natick II Pump Station site as shown on the Drawings and shall be equipped with a channel and drain type frame. Unit shall be furnished completely fabricated and shall be installed by the Contractor. Hatch shall be 2'-6" x 5'-0" Model JD-AL as manufactured by Bilco Co., New Haven, CT., or approved equal, and shall be designed for service loading as indicated on the Drawings.
- D. A new hatch shall be installed in the existing roof slab at the Knight Street Pump Station site as shown on the Drawings. Door leaf shall be 1/4-inch thick aluminum diamond plate reinforced for a 625 p.s.f. live load (capable of holding up to 10 ft. head of water). The frame shall be 3/8-inch thick aluminum angle with a horizontal leg to allow for bolting to the top slab. The hatch shall be fitted with 316 stainless steel pressure locks to hold the cover securely on a U-shaped neoprene gasket riveted to the frame to minimize water intrusion. The access door shall be equipped with a lifting handle, and a 316 stainless steel hold open arm with red vinyl grip that automatically keeps the cover in its upright, open position. Hinges shall be fabricated with aluminum lugs and 316 stainless steel pins. A staple for a padlock shall be supplied for security. Installation shall be in accordance with the manufacturer's attached instructions with others being responsible for providing an effective seal between the frame and the concrete. Unit shall be furnished completely fabricated and shall be installed by the Contractor. Hatch shall be 3'-0" x 3'-0" Model FPS as manufactured by U.S.F. Fabrication, Inc., Hialeah, FL, or approved equal.
- E. The manufacturers shall guarantee against defects in material or workmanship for a period of five (5) years from date of Owner's acceptance.
- F. The underside of the access hatch at the East Natick II Pump Station shall have warning sign which reads "Warning Hazardous Area, Enter Only with Proper Equipment".

2.13 MISCELLANEOUS FRAMING AND SUPPORTS:

- A. General: Provide steel framing and supports for applications indicated that are not a part of structural steel framework.
- B. Fabricate units to sizes, shapes, and profiles indicated to receive other adjacent construction retained by framing and supports. Fabricate from structural steel shapes, plates, and steel bars of welded construction using mitered joints for field connection. Cut, drill, and tap units to receive hardware, hangers, and similar items.
 - 1. Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units are installed after concrete is placed.
 - a. Except as otherwise indicated, space anchors 24 inches o.c. and provide minimum anchor units in the form of steel straps 1-1/4 inches wide by 1/4 inch thick by 8 inches long.
- C. Galvanize miscellaneous framing and supports in the following locations:
 - 1. Exterior locations.
 - 2. Interior locations where indicated.

2.14 MISCELLANEOUS STEEL TRIM:

- A. Unless otherwise indicated, fabricate units from structural steel shapes, plates, and bars of profiles shown with continuously welded joints, and smooth exposed edges. Miter corners and use concealed field splices wherever possible.
- B. Provide cutouts, fittings, and anchorages to coordinate assembly and installation with other work. Provide anchors, welded to trim, for embedding in concrete or masonry construction, spaced not more than 6 inches from each end, 6 inches from corners, and 24 inches o.c., unless otherwise indicated.
- C. Galvanize miscellaneous steel trim in the following locations:
 - 1. Exterior locations.
 - 2. Interior locations where indicated.

2.15 FINISHES:

- A. Comply with NAAMM "Metal Finishes Manual" for recommendations relative to applying and designing finishes.
- B. Finish metal fabrications after assembly.

PART 3 - EXECUTION

3.01 PREPARATION:

- A. Furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installing anchorages, including concrete inserts, sleeves, anchor bolts, and miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction.
- B. Center nosings on tread widths with noses flush with riser faces and tread surfaces.
- C. Set sleeves in concrete with tops flush with finish surface elevations. Protect sleeves from water and concrete entry.

3.02 GENERAL INSTALLATION:

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners for securing miscellaneous metal fabrications to in-place construction. Include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting for installing miscellaneous metal fabrications. Set metal fabrication in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

- C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete masonry or similar construction.
- D. Fit exposed connections together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop-welded because of shipping size limitations. Do not weld, cut, or abrade the surfaces of exterior units that have been hot-dip galvanized after fabrication and are intended for bolted or screwed field connections.
- E. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.
- F. Field Welding: Comply with the following requirements:
 - 1. Prevent distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

3.03 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS:

- A. General: Install framing and supports in accordance with manufacturers' written instructions and Drawings.
- B. Anchor supports for operable partitions and rigidly brace from building structure.
- C. Support steel girders on solid grouted masonry, concrete, or steel pipe columns. Secure girders with anchor bolts embedded in grouted masonry or concrete or with bolts through top plates of pipe columns.
 - 1. Where grout space under bearing plates is indicated for girders supported on concrete or masonry, install as specified in this Section.
- D. Install pipe columns on concrete footings with grouted baseplates. Position and grout column baseplates as specified in this Section.
 - 1. Grout baseplates of columns supporting steel girders after girders are installed and leveled.

3.04 EXPANSION ANCHORS AND EPOXY ANCHORS:

- A. Install in conformity with manufacturer's recommendations for maximum holding power.
- B. Depth of hole not less than four bolt hole diameters.
- C. Minimum distance between center of any expansion anchor and edge or exterior corner of concrete to be at least 4-1/2 times diameter of hole in which anchor is installed.
- D. Minimum distance between centers of expansion anchors to be at least eight times diameter of hole in which anchors are installed.

3.05 GALVANIZING:

A. HOT-DIP GALVANIZING:

1. Provide a coating for iron and steel fabrication applied by the hot-dip process. The galvanizing bath shall contain .05-.09% nickel. Immediately before galvanizing, the steel shall be immersed in a bath of zinc ammonium chloride. The use of the wet kettle process is prohibited. Comply with ASTM A-123 for fabricated products and ASTM A-153 for hardware. Provide thickness of galvanizing specified in referenced standards. Provide coating by Duncan galvanizing or approved equal.

3.06 PAINTING:

A. Ferrous metals of this section, except for galvanized or stainless steel shall be shop primed in accordance with the following:

1. Submerged service components shall be sandblasted clean in accordance with SSPC-SP-10, Near White, immediately prior to priming.
2. Non-submerged service components shall be sandblasted clean in accordance with SSPC-SP-6, Commercial Grade, immediately prior to priming.
3. Shop primer, except as otherwise noted, shall be one spray applied coat with dry film thickness of 3.5 to 4.5 mils of Tnemec 66 Boston Gray Primer by Tnemec Co.; or Aquapun by PPG, Inc; or approved equal.
4. Portions of ferrous metals to be embedded in concrete or masonry shall be given a heavy brush coat of alkali resistant bituminous paint.
5. Scratches or abrasions in the shop coat and areas at field welds, bolts, nuts and other unpainted areas shall be touched up after erection with the paint specified for the shop coat. Cold galvanized paint shall be used for touch up of galvanized surfaces. Paint shall be one of the following; Sealube Co., ZRC; Galvicon Corp., Galvicon; Stanley Chemical Div., Zinc Shield; Duncan Galvanizing Corp., ZIRP; or an approved equal.
6. Shop and field prime paint systems shall be compatible with finish coat.

3.07 ADJUSTING AND CLEANING:

- A. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of the shop paint on miscellaneous metal is specified in Section 09900 Paragraph 3.06.C
- B. For galvanized surfaces, clean welds, bolted connections, and abraded areas, and apply galvanizing repair paint to comply with ASTM A 780.

END OF SECTION

SECTION 07160

BITUMINOUS DAMPPROOFING

PART 1 – GENERAL

1.01 DESCRIPTION:

- A. This Section includes furnishing all labor, materials and equipment necessary to install emulsified-asphalt dampproofing to following surfaces:
 - 1. Exterior, below-grade surfaces of concrete and masonry foundation walls.
 - 2. Back side of concrete and masonry retaining walls, below grade.
 - 3. Exterior above-grade surfaces where indicated.

1.02 RELATED WORK

- A. Section 02631 – PRECAST MANHOLES
- B. Section 03300 – CAST-IN-PLACE CONCRETE

1.03 SUBMITTALS

- A. Six sets of shop drawings of the materials specified herein shall be submitted to the Engineer for review in accordance with Section 01300.
- B. Product data for each type of product specified, including data substantiating that materials comply with requirements for each dampproofing material specified. Include recommended method of application, recommended primer, number of coats, coverage or thickness, and recommended protection course.
 - 1. Certification by dampproofing manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who has completed bituminous dampproofing similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- B. Single-Source Responsibility: Obtain primary dampproofing materials and primers from one source and by a single manufacturer. Provide secondary materials only as recommended by manufacturer of primary materials.

1.05 PROJECT CONDITIONS

- A. Substrate: Proceed with dampproofing only after substrate construction and penetrating work have been completed.
- B. Weather Limitations: Proceed with dampproofing only when existing and forecasted weather conditions will permit work to be performed according to manufacturer's recommendations and warranty requirements.

- C. Ventilation: Provide adequate ventilation during application of dampproofing in enclosed spaces. Maintain ventilation until dampproofing has thoroughly cured.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Cold-Applied, Cut-Back Asphalt Dampproofing:
 - a. ChemRex, Inc.; Sonneborn Building Products Div.
 - b. Karnak Chemical Corporation.
 - c. Meadows: W.R. Meadows, Inc.

2.02 BITUMINOUS DAMPPROOFING

- A. General: Provide products recommended by manufacturer for designated application.
 - 1. Odor Elimination: For interior and concealed-in-wall uses, provide type of bituminous dampproofing material warranted by manufacturer to be substantially odor free after drying for 24 hours under normal conditions.
- B. Cold-Applied, Cut-Back Asphalt Dampproofing: Asphalt and solvent compound mixed to a smooth, uniform consistency to provide a firm, moisture-resistant, vapor-resistant, elastic coating recommended by the manufacturer for dampproofing use when applied according to the manufacturer's instructions.
 - 1. Cold-Applied, Emulsified-Asphalt Dampproofing, Brush and Spray Coats: ASTM D 1227, Type III, Class 1.

2.03 MISCELLANEOUS MATERIALS

- A. Emulsified-Asphalt Primer: ASTM D 1227, Type III, Class 1, except diluted with water as recommended by manufacturer.
- B. Asphalt-Coated Glass Fabric: ASTM D 1668, Type I.
- C. Patching Compound: Manufacturer's fibered mastic of type recommended by dampproofing manufacturer.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, with Applicator present, for compliance with requirements for surface smoothness and other conditions affecting performance of work.
 - 1. Proceed with dampproofing application only after substrate construction and penetrating work have been completed and unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Protection of Other Work: Mask or otherwise protect adjoining exposed surfaces from being stained, spotted, or coated with dampproofing. Prevent dampproofing materials from entering and clogging weep holes and drains.
- B. Clean substrates of projections and substances detrimental to work; fill voids, seal joints, and apply bond breakers if any, as recommended by prime material manufacturer with particular attention at construction joints.
- C. Apply patching compound for filling and patching tie holes, honeycombs, reveals, and other imperfections.
- D. Install cant strips and similar accessories as shown and as recommended by prime materials manufacturer even though not shown.
- E. Install separate flashings and corner protection stripping, as recommended by prime materials manufacturer, where indicated to precede application of dampproofing. Comply with details shown and with manufacturer's recommendations. Pay particular attention to requirements at building expansion joints, if any.
- F. Prime substrate as recommended by prime materials manufacturer.

3.03 APPLICATION

- A. Material shall not be applied in wet weather or to wet or damp surfaces. No work shall be performed when the temperature is below 40 degrees F. Surfaces shall not be coated until 30 days after completion of concrete, masonry work, or patching, whichever is later. At least 3 good drying days shall immediately precede application.
- B. Comply with manufacturer's written recommendations unless more stringent requirements are indicated or required by Project conditions to ensure satisfactory performance of dampproofing.
 - 1. Apply additional coats if recommended by manufacturer or required to achieve coverages indicated.
 - 2. Allow each coat of dampproofing to cure 24 hours before applying subsequent coats.
 - 3. Apply from finished-grade line to top of footing, extend over top of footing, and down a minimum of 6 inches over outside face of footing.
 - 4. Extend 12 inches onto intersecting walls and footings, but do not extend onto surfaces exposed to view when Project is completed.
 - 5. Install flashings and corner protection stripping at internal and external corners, changes in plane, construction joints, cracks, and where shown as "reinforced," by embedding an 8-inch- wide strip of asphalt-coated glass fabric in a heavy

coat of dampproofing. Dampproofing coat required for embedding fabric is in addition to other coats required.

- C. One coat of asphalt primer shall be applied to clean, dry surfaces of all below grade concrete and masonry surfaces. Application shall be at a rate not less than 1 gallon per 100 square feet.
- D. Dampproofing shall be trowelled on primed surfaces at the minimum rate of four (4) gallons per 100 sq. ft. Two coats shall be applied, with a 24 hour drying time between applications. The second coat shall be applied perpendicular to the first. Each coat shall be a minimum of 1/16-inch thick.

3.04 INSTALLATION OF PROTECTION COURSE

- A. Where indicated, install protection course over completed-and-cured dampproofing. Comply with dampproofing material manufacturer's written recommendations for attaching protection course. Support protection course with spot application of trowel-grade mastic where not otherwise indicated.

3.05 CLEANING

- A. Remove dampproofing materials from surfaces not intended to receive dampproofing.

END OF SECTION

SECTION 07560

FLUID APPLIED ROOFING MEMBRANE SYSTEM

PART 1 - GENERAL

1.01 SUMMARY:

A. This section includes furnishing all labor, materials and equipment necessary to install a fluid applied membrane waterproofing membrane system as shown on the drawings and described herein to the following surfaces:

1. Exterior concrete cupolas at the Knight Street Pump Station

B. Related Sections

1. Section 03300: Cast-In-Place Concrete

1.02 REFERENCES:

A. Factory Mutual (FM Global) - *Approval Guide*

B. American Society for Testing and Materials (ASTM) - *Annual Book of ASTM Standards*

C. National Roofing Contractors Association (NRCA)

D. American Society of Civil Engineers (ASCE)

1.03 DEFINITIONS:

A. Roofing Terminology: Refer to ASTM D1079 and the glossary of the National Roofing Contractors Association (NRCA) *Roofing and Waterproofing Manual* for definitions of roofing terms related to this section.

1.04 PERFORMANCE REQUIREMENTS:

A. Provide an installed roofing membrane that does not permit the passage of water, and will withstand the design pressures calculated in accordance with the most current revision of ASCE 7.

B. Manufacturer shall provide all primary waterproofing materials that are physically and chemically compatible when installed in accordance with manufacturers current application requirements.

C. Installer Qualifications: Engage an experienced Installer who has completed fluid applied waterproofing membrane systems similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

B. Single-Source Responsibility: Obtain primary waterproofing materials and primers from one source and by a single manufacturer. Provide secondary materials only as recommended by manufacturer of primary materials.

1.05 SUBMITTALS:

A. Six sets of shop drawings of the materials specified herein shall be submitted to the Engineer

for review in accordance with Section 01300.

- B. Product data for each type of product specified, including data substantiating that materials comply with requirements for each waterproofing material specified. Include recommended method of application, recommended primer, number of coats, coverage or thickness, and recommended protection course.
 - 1. Certification by waterproofing membrane system manufacturer that products supplied comply with state and local regulations controlling use of volatile organic compounds (VOCs).
- C. Installer shall provide written documentation from the manufacturer of their authorization to install the system.
- D. Certification that the waterproofing membrane meets FM Global Approval Standard 4470 for Class I roof covers, on non-combustible substrates, with a Class 1-990 wind uplift rating, a hail rating of SH and is ASTM E-108-00 Class A approved at a slope of 1 in 12.

1.06 REGULATORY REQUIREMENTS:

- A. All work shall be performed in a safe, professional manner, conforming to all federal, state and local codes.
- B. All waterproofing system components shall meet current VOC regulations as established by the State in which they are being installed; and stating total VOC content, in grams per liter, for all system components (i.e. primers, adhesives, coatings, etc.)

1.07 DELIVERY, STORAGE AND HANDLING:

- A. Deliver all waterproofing materials to the site in original containers, with factory seals intact.
- B. Store all pail goods in their original undamaged containers in a clean, dry location within their specified temperature range.
- C. Do not expose materials to moisture in any form before, during, or after delivery to the site. Reject delivery of materials that show evidence of contact with moisture.
- D. Remove manufacturer supplied plastic covers from materials provided with such. Use “breathable” type covers such as canvas tarpaulins to allow venting and protection from weather and moisture. Cover and protect materials at the end of each work day. Do not remove any protective tarpaulins until immediately before the material will be installed.
- E. Materials shall be stored above 55°F (12.6°C) a minimum of 24 hours prior to application.

1.08 PROJECT CONDITIONS:

- A. Weather:
 - 1. Proceed with waterproofing only when existing and forecasted weather conditions permit.
 - 2. Membrane installation can proceed when ambient temperatures are above 40°F (4.4°C), provided the substrate temperature is a minimum of 5°F above the dew point.
 - 3. It is recommended that overnight temperatures be above 40°F (4.4°C) when applying the membrane system. Consult with the manufacturer for cold weather installation

procedures when ambient temperatures are expected to fall below the minimums established herein.

- B. All surfaces to receive the membrane shall be free from visible water, dew, frost, snow and ice.
- C. Application of membrane should be conducted in well ventilated areas.
- D. Over its service life, do not expose membrane to a constant temperature below -58°F (-50°C) or in excess of 176°F (80°C) (i.e., hot pipes and vents or direct steam venting, etc.).

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS:

- A. For specification purposes and for establishing a quality of materials to be used, the fluid applied roofing membrane system to be provided under this section shall be equivalent to the Sikalastic RoofPro (Decothane) system as manufactured by the Sika Corporation, Inc. Alternative materials and suppliers will be considered if the minimum quality standards provided are met.

- 1. Sika Corporation, Inc.
201 Polito Avenue
Lyndhurst, NJ 07071
Phone: 800-933-7452
Fax: 201-922-6225
www.sikaconstruction.com

2.02 SEALANTS AND PRIMERS:

- A. Sikalastic DTE Primer - A two-component, solvent free, epoxy primer and damp proof membrane, which is designed to be applied to damp or new concrete with high moisture drive prior to the application of Decothane systems.
- B. Sika Concrete Primer (Quick Cure Primer) - A two-component, rapid curing, high solids, solvent based, dampproof primer designed for sealing cementitious substrates.
- C. Sikalastic EP Primer/Sealer (Epoxy Primer) - A two-component, cyclo-aliphatic, amine cured material with a high level of corrosion resistance for metal, modified bitumen surfaces, and chemically treated wood.

2.03 FLUID APPLIED MEMBRANE MATERIALS:

- A. Sika Reemat - A conformable, random woven fiberglass mat for total reinforcement of the roofing/waterproofing membrane system, which provides greater impact resistance and greater resistance to excessive thermal and structural movement while maintaining elasticity and membrane film integrity.
- B. Sika Flexitape Heavy - A nylon mesh for local reinforcement of the roofing/waterproofing membrane at structural cracks, expansion joints, and transitions between dissimilar materials.
- C. Sikalastic 621 TC (Decothane SP) - A single component, cold, fluid applied, moisture triggered, aliphatic, polyurethane meeting the following physical properties and ASTM D7311-07: *Standard Specification for Liquid Applied, Single Component, Moisture-Triggered, Aliphatic Polyurethanes used in Roofing.*

LIQUID PROPERTY REQUIREMENTS

PHYSICAL PROPERTIES	ASTM	REQUIREMENTS
VISCOSITY	D2196	5 to 20 Pa.s (pascal.seconds)
VOLUME SOLIDS	D2697	76% minimum
WEIGHT SOLIDS	D1644	83% minimum
SAG RESISTANCE	D4400	No sag at 700 micrometers (0.028 in. / 28 mil)

FILM PHYSICAL PROPERTY REQUIREMENTS

PHYSICAL PROPERTIES	ASTM	REQUIREMENTS
TENSILE STRENGTH (TENSION)	D412	MIN 1.86 MPa (270lb/in ²)
ELONGATION	D412	MIN 200%
ACCELERATED WEATHERING FL/UV – 5000 HOURS	G154	NO CRACKING OR CHECKING
WATER VAPOR TRANSMISSION PERMEABILITY / PERMEANCE	E96	MAXIMUM 8.5 gms/m ² / day (0.033 perm-inches)
FLEXIBILITY – MANDREL BEND	D522	PASS NO CRACKING OR FLAKING
TEAR RESISTANCE	D624	MINIMUM 5.8 kN/m (33 lbf/in)
INDENTATION HARDNESS	D2240	82 Durometer Units (+/- 5 units)
DYNAMIC PUNCTURE RESISTANCE	D5635	MINIMUM 15 joules (357 ft.poundals)
STATIC PUNCTURE RESISTANCE	D5602	MINIMUM 20.7 kg. (45.5 lbs.)

2.04 FLASHING MATERIALS:

- A. The fluid-applied membrane system is seamless and self-flashing. No special flashings are required for system installation.

PART 3 - EXECUTION

3.01 INSPECTION:

- A. Verify that the surfaces and site conditions are ready to receive work.
- B. Verify that the surfaces are clean and smooth, free of depressions, waves, or projections, and properly sloped to drains, valleys, eaves, scuppers or gutters.
- C. Verify that the surfaces are dry and free of ice or snow.

3.02 SUBSTRATE PREPARATION:

- A. Concrete
 - 1. New concrete shall have been cured for 28 days minimum before application of materials. Inspect all surfaces to receive fluid applied roofing membrane system. Report to the Engineer all surfaces not acceptable to receive the roofing membrane system. It shall be the responsibility of the Contractor to provide substrates acceptable for proper application of the roofing membrane system.

2. Prepare substrates in accordance with manufacturer's directions and as approved. Use particular care to remove laitance in the preparation of surfaces.
 3. Light broom finish equivalent.
 4. Curing agents must be checked for compatibility with waterproofing materials.
 5. In all retrofit roof applications, it is required that the concrete be inspected for defects.
 6. Using most effective means, prepare concrete surfaces to minimum CSP 3-5 standards, as required by manufacturer based upon actual field conditions, as outlined in International Concrete Repair Institute (ICRI) Guideline No. 03732: Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays.
 7. Patch all unsound or defective concrete with repair mortar acceptable to membrane manufacturer.
- B. Test substrates for moisture content and adhesion capabilities. Report to the Engineer if surfaces are not acceptable for materials application.
- C. Failure to give notice to the Engineer of unsuitable substrate shall be construed as acceptance of the substrate as being satisfactory for the proper application of the flooring.

3.03 INSTALLATION – GENERAL:

- A. Install Sikalastic RoofPro (Decothane) roofing/waterproofing system according to all current application requirements in addition to those listed in this section.

3.04 FLUID APPLIED MEMBRANE APPLICATION:

A. Surface Preparation:

1. Concrete and Masonry

- a) All previously prepared concrete and masonry surfaces to receive the fluid applied membrane should be low-pressure (5,000 psi or less) power-washed, in accordance with ICRI Guideline No. 03732: Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays to remove all dirt, debris, or surface contamination that would compromise bonding of the roofing/waterproofing membrane system. Remove oil or grease with solvent or detergent and water. Rinse surface clean of all cleaning agent remains.
- b) All surfaces should be blown clean using an air compressor to remove any remaining loose debris, and to facilitate the drying process.
- c) All cracks and voids >0.040" should be routed and caulked with a single component polyurethane sealant. Allow to cure per manufacturer's instructions prior to overcoating with the waterproofing system.
- d) At all inside corners and any gaps or voids, apply a minimum ½" bead of a single component polyurethane sealant, and allow to cure per manufacturer's instructions prior to overcoating with the waterproofing system.

- e) Membrane terminations should be finalized prior to project start-up and documented in shop drawings, but in general, terminations should occur in raked out mortar joints, saw cut terminations, and where feasible, under installed counter-flashing materials.
- f) Tape lines should always be used to achieve a straight and professional looking edge detail.

B. Membrane Application

1. The following Sikalastic RoofPro (Decothane) system components are specified for this project.
 - a) Primer Coat - Sikalastic EP Primer at 6-8 mils.
 - b) Detail Coat - Sika Reemat Heavy Duty 6" Flexitape for Cracks, joints, dissimilar materials, and vert to-horiz transitions.
Sikalastic 621 - embedment urethane at 30 mils.
 - c) Base Coat - Sikalastic 621 - base reinforcement coat at 45 mils.
Sika Reemat Premium - Non- Woven fiberglass.
 - d) Top Coat - Sikalastic 621 at 30 mils
2. The base embedment coat shall be applied to all horizontal and vertical surfaces by ½" – ¾" nap roller, brush or airless spray to achieve minimum wet film thicknesses as specified above.
3. While the base embedment coat is still wet, immediately lay precut lengths of conformable reinforcing scrim (Sika Reemat) into the wet base embedment coat, and using a short nap roller with the appropriate roller frame and handle, roll the scrim to force the wet coating up through the scrim to achieve full saturation and embedment. Add additional material, if necessary, to ensure that the mesh is fully saturated and fully conformed to the substrate without any visible pinholes.
4. Minimum overlap of the reinforcement mesh shall be 2" in all directions. Reinforcement shall turn up all adjacent wall surfaces, etc. until the termination point is accomplished according to the project details and specifications. Membrane terminations should be finalized prior to project start-up and documented in shop drawings, but in general, terminations should occur in raked out mortar joints, saw cut terminations, and where feasible, under installed counter-flashing materials. Tape lines should always be used to achieve a straight and professional looking edge detail.
5. Allow the base embedment coat to cure and dry prior to the next application procedure.
6. Apply top coat by ½" – ¾" nap roller, brush or airless spray to achieve minimum wet film thicknesses, as specified in the table above.
7. Allow top coat to dry overnight prior to exposing to foot traffic.

3.05 ROOF/WATERPROOFING PROTECTION:

- A. Protect all partially and fully completed waterproofing work from other trades until completion.
- B. Whenever possible, stage materials in such a manner that foot traffic is minimized over completed areas.
- C. When it is not possible to stage materials away from locations where partial or complete installation has taken place, temporary walkways and platforms shall be installed in order to protect all completed areas from traffic and point loading during the application process.

- D. Temporary tie-ins shall be installed at the end of each workday and removed prior to commencement of work the following day.

3.06 CLEAN-UP:

- A. All work areas are to be kept clean, clear and free of debris at all times.
- B. Do not allow trash, waste, or debris to collect on the roof. These items shall be removed from the roof on a daily basis.
- C. All tools and unused materials must be collected at the end of each workday and stored properly off of the finished roof surface and protected from exposure to the elements.
- D. Dispose of or recycle all trash and excess material in a manner conforming to current EPA regulations and local laws.
- E. Properly clean the finished roof surface after completion, and make sure the drains and gutters are not clogged.
- F. Clean and restore all damaged surfaces to their original condition.

END OF SECTION

SECTION 07900

JOINT SEALERS

PART 1 - GENERAL

1.01 SUMMARY:

- A. This Section includes joint sealants for the following locations:
1. Exterior joints in vertical surfaces and nontraffic horizontal surfaces as indicated below:
 - a. Control and expansion joints in cast-in-place concrete.
 - b. Joints between cast-in-place concrete and unit masonry.
 - c. Perimeter joints between cast-in-place concrete, unit masonry and frames of doors and windows.
 - d. Other joints as indicated.
 2. Exterior joints in horizontal traffic surfaces as indicated below:
 - a. Control, expansion, and isolation joints in cast-in-place concrete slabs.
 - b. Joints between different materials listed above.
 - c. Other joints as indicated.
 3. Interior joints in vertical surfaces and horizontal nontraffic surfaces as indicated below:
 - a. Control and expansion joints on exposed interior surfaces of exterior walls.
 - b. Perimeter joints of exterior openings where indicated.
 - c. Vertical control joints on exposed surfaces of interior unit masonry and concrete walls and partitions.
 - d. Perimeter joints between interior wall surfaces and frames of interior doors, windows, and elevator entrances.
 - e. Other joints as indicated.
 4. Interior joints in horizontal traffic surfaces as indicated below:
 - a. Control and expansion joints in cast-in-place concrete slabs.
 - b. Other joints as indicated.

1.02 RELATED SECTIONS:

- A. Section 03300 – Cast-in-Place Concrete
B. Section 04200 - Unit Masonry

1.03 SYSTEM PERFORMANCE REQUIREMENTS:

- A. Provide elastomeric joint sealants to establish and maintain watertight and airtight continuous seals without causing staining or deterioration of joint substrates.

- B. Provide joint sealants for interior applications to establish and maintain airtight continuous seals that are water resistant and cause no staining or deterioration of joint substrates.

1.04 SUBMITTALS:

- A. Submit the following in accordance with Section 01300:
 - 1. Product data from manufacturers for each joint sealant product required.
 - a. Certification by joint sealant manufacturer that sealants plus the primers and cleaners for sealant installation comply with local regulations controlling use of volatile organic compounds.
 - 2. Certificates from manufacturers of joint sealants attesting that their products comply with Contract Documents requirements and are suitable for the use indicated.
 - 3. Qualification data complying with requirements specified in Paragraph 1.04. Include list of completed projects with project names addresses, names of Architects and Owners, plus other information specified.
 - 4. Product test reports for each type of joint sealants indicated, evidencing compliance with requirements specified.

1.05 QUALITY ASSURANCE:

- A. Obtain joint sealant materials from a single manufacturer.
- B. Product Testing: Provide comprehensive test data for each type of joint sealant based on tests conducted by a qualified independent testing laboratory on current product formulations within a 24-month period preceding date of Contractor's submittal of test results to the Authority .
 - 1. Test elastomeric sealants for compliance with requirements specified by reference to ASTM C 920. Include test results for hardness, stain resistance, adhesion and cohesion under cyclic movement (per ASTM C 719), low-temperature flexibility, modulus of elasticity at 100 percent strain, effects of heat aging, and effects of accelerated weathering.

1.06 DELIVERY, STORAGE, AND HANDLING:

- A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle materials in compliance with manufacturer's recommendations.

1.07 PROJECT CONDITIONS:

- A. Environmental Conditions: Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealant manufacturer or below 40 deg F.
 - 2. When joint substrates are wet.
- B. Joint Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than allowed by joint sealant manufacturer for application indicated.

- C. Joint Substrate Conditions: Do not proceed with installation of joint sealants until contaminants are removed from joint substrates.

1.08 SEQUENCING AND SCHEDULING:

- A. Sequence installation of joint sealants to occur not less than 21 nor more than 30 days after completion of waterproofing.

PART 2 - PRODUCTS

2.01 MATERIALS, GENERAL:

- A. Compatibility: Provide joint sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
- B. VOC Content of Interior Sealants: Provide interior sealants and sealant primers that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - 1. Sealants: 250 g/L.
 - 2. Sealant Primers for Nonporous Substrates: 250 g/L.
 - 3. Sealant Primers for Porous Substrates: 775 g/L.
- C. Colors: Provide color of exposed joint sealants as selected from manufacturer's full range of standard colors for products of type indicated.

2.02 JOINT SEALANTS:

- A. Elastomeric Sealants: Comply with ASTM C 920 for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- B. Stain-Test-Response Characteristics: Elastomeric sealants shall be nonstaining to porous substrates. Provide products that have undergone testing according to ASTM C 1248.
- C. Single-Component Neutral-Curing Silicone Sealant:
 - 1. Manufacturers:
 - a. Dow Corning Corporation; 790.
 - b. GE Silicones; SilPruf LM SCS2700.
 - c. Tremco; Spectrem 1.
 - d. Or equal.
 - 2. Extent of Use: Joints in exterior vertical and soffit surfaces.
- D. Multicomponent Pourable Urethane Sealant:
 - 1. Manufacturers:
 - a. Bostik Findley; Chem-Calk 550.

- b. Meadows, W. R., Inc.; POURTHANE.
 - c. Pecora Corporation; Urexpan NR-200.
 - d. Or equal.
 - 2. Extent of Use: Joints in exterior horizontal surfaces.
- E. Single-Component Mildew-Resistant Acid-Curing Silicone Sealant:
 - 1. Manufacturers:
 - a. Dow Corning Corporation; 786 Mildew Resistant.
 - b. GE Silicones; Sanitary SCS1700.
 - c. Tremco; Tremsil 200.
 - d. Or equal.
 - 2. Extent of Use: Sanitary joints at toilet rooms.
- F. Latex Sealant: Comply with ASTM C 834, Type P, Grade NF.
 - 1. Manufacturers:
 - a. Bostik Findley; Chem-Calk 600.
 - b. Pecora Corporation; AC-20+.
 - c. Tremco; Tremflex 834.
 - d. Or equal.

2.03 JOINT SEALANT BACKING:

- A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Plastic Foam Joint Fillers: Preformed, compressible, resilient, nonstaining, nonwaxing, nonextruding strips of flexible plastic foam of material specified below to control sealant depth:
 - 1. Closed-cell polyethylene foam, nonabsorbent to liquid water and gas, nonoutgassing in unruptured state.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.04 MISCELLANEOUS MATERIALS:

- A. Primer: Material recommended by joint sealant manufacturer for adhesion of sealant to joint substrates indicated.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues and adjacent nonporous surfaces, and formulated to promote adhesion of sealants with joint substrates.

- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.01 PREPARATION:

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with recommendations of joint sealant manufacturer and the following requirements:
 - 1. Remove all foreign material from joint substrates including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - 2. Clean concrete, masonry, unglazed surfaces of ceramic tile, and similar porous joint substrate surfaces to produce a clean, sound substrate capable of developing bond with joint sealants. Remove loose particles remaining from cleaning operations.
 - 3. Remove laitance and form release agents from concrete.
 - 4. Clean metal, glass, porcelain enamel, glazed surfaces of ceramic tile, and other nonporous surfaces.
- B. Joint Priming: Prime joint substrates where indicated or where recommended by joint sealant manufacturer. Apply primer to comply with joint sealant manufacturer's recommendations. Confine primers to areas of joint sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Prevent contact of sealant with adjoining surfaces. Remove tape after tooling without disturbing joint seal.

3.02 INSTALLATION OF JOINT SEALANTS:

- A. General: Comply with joint sealant manufacturer's printed installation instructions applicable to products and applications indicated.
- B. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Acoustical Sealant Application Standard: Comply with recommendations of ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.
- D. Installation of Sealant Backings: Install sealant backings to comply with the following requirements:
 - 1. Install joint fillers of type indicated to provide support of sealants during application and at position to produce the cross-sectional shapes and depths of installed sealants relative to joint widths that allow sealant movement capability.
 - a. Do not leave gaps between ends of joint fillers.
 - b. Do not stretch, twist, puncture, or tear joint fillers.
 - c. Remove absorbent joint fillers that have become wet prior to sealant application and replace with dry material.

2. Install bond breaker tape between sealants where backer rods are not used between sealants and joint fillers or back of joints.
- E. Installation of Sealants: Install sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint widths that allow sealant movement capability. Install sealants at the same time sealant backings are installed.
 - F. Tooling of Nonsag Sealants: After sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads, to eliminate air pockets, and to form adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.
 1. Provide concave joint configuration per Figure 5A in ASTM C 1193.
 2. Provide flush joint configuration, per Figure 5B in ASTM C 1193.
 - a. Use masking tape to protect adjacent surfaces of recessed tooled joints.
 3. Provide recessed joint configuration, per Figure 5C in ASTM C 1193, of recess depth and at locations indicated.
 - G. Installation of Preformed Foam Sealants: Install each length of sealant immediately after removing protective wrapping. Do not pull or stretch material, and comply with sealant manufacturer's directions for installation methods, materials, and tools that produce seal continuity at ends, turns, and intersections of joints.
- 3.03 CLEANING:
- A. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.
- 3.04 PROTECTION:
- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage so that they are without deterioration or damage at time of Substantial Completion. Cut out and remove damaged or deteriorated joint sealants immediately and repair at no additional cost to the Authority.

END OF SECTION

SECTION 08390
DOOR FLOOD BARRIERS

PART 1 - GENERAL

1.01 SUMMARY

- A. This section includes furnishing all labor, materials and equipment necessary to install door flood barriers as shown on the drawings and described herein at the East Natick II Pump Station.

1.02 RELATED SECTIONS

- A. Section 01300 - Submittals
- B. Section 03300 - Cast-In-Place Concrete
- C. Section 04200 - Unit Masonry

1.03 REFERENCE STANDARDS

- A. Work under this Section shall comply with the following standards in effect at bid:
 - 1. American Society for Testing and Materials (ASTM)
 - a. ASTM A 36 - Standard Specification for Carbon Structural Steel.
 - b. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - c. ASTM B 211 - Standard Specification for Aluminum and Aluminum-Alloy Bar, Rod, and Wire.
 - 2. Aluminum Association - Specification for Aluminum Structures, 7th Edition.
 - 3. American Society of Mechanical Engineers (ASME)
 - a. ASME Structural Welding Code Section IX.
 - 4. Federal Emergency Management Plan (FEMA)
 - a. FEMA Technical Bulletin 3-93 - Non-Residential Flood Proofing.
 - b. FEMA 550-2006 - Section 3.4 (Wave Loads).
 - 5. Structural Engineering Institute/American Society of Civil Engineers (SEI/ASCE)
 - a. SEI/ASCE 7-02 - Minimum Design Loads for Buildings and Other Structures.
 - b. SEI/ASCE 24-05 - Flood Resistant Design and Construction.
 - 6. American Welding Society (AWS)
 - a. AWS D1.2 - Structural Welding Code - Aluminum.

b. AWS-1-GMAW-S, WPS No. B2.004.90.

7. Aluminum Structures - A Guide to Their Specifications and Design.
8. U.S. Army Corps of Engineers, EP 1165-2-314 - Flood Proofing Regulations, 15 December 1995.

1.04 DESIGN / PERFORMANCE REQUIREMENTS

- A. Design watertight planks to perform under hydrostatic loads equal to the height of the door to control short-term load pressures. All water pressure loads and operating loads shall be transferred to the building structure.
- B. Standard loading: designed for hydrostatic loading equal to the height of the door, and have no additional allowances included for hydrodynamic loads, wave loads, or debris impact loads.

1.05 SUBMITTALS

- A. Submit the following in accordance with Section 01300.
 1. Manufacturer's data sheets on each product to be used, including:
 - a. Preparation instructions and recommendations.
 - b. Storage and handling requirements and recommendations.
 - c. Installation instructions.
 2. Shop Drawings: Showing layout, profiles, and product components, including anchorage, hardware, and finishes. Include dimensional plans, applicable material specifications, elevations and sections detailing mounting and connections, and load diagrams.
 3. Calculations: Submit calculations stamped by a licensed Professional Engineer registered in Rhode Island to verify the flood plank's ability to withstand the design loading.
 4. Operation and Maintenance manuals to include methods for maintaining installed products in accordance with Section 01730, precautions against cleaning materials and methods detrimental to finishes and performance.
 5. Evidence of qualifications as specified in Paragraph 1.06, A.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer shall have continuous successful experience in design and manufacture of similar flood related closures during the last 5 years. Provide supporting evidence including list of installations, descriptions, name and method of contact.
- B. Welders shall be certified in accordance with American Welding Society Procedures: AWS-1-GMAW-S, WPS No. B2.004.90 for applicable material used in production of specified product.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging container with identification labels intact until ready for installation.
- B. Protect materials from exposure to moisture.
- C. Store materials in a dry, warm, ventilated weather-tight location. If outdoor storage, block materials to store at an incline. Tarp materials in a tent-like arrangement, elevated above the product with open sides. Store all other hardware in a dry controlled environment.
- D. Do not damage materials during unloading and handling.
- E. When using forklifts, fully support product being moved at lift points designated by manufacturer.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers:
 - 1. PS DOORS, 1150 S. 48th Street, Grand Forks, ND 58201;
 - 2. Flood Panel Ltd, 550 Military Trail, Ste 22-220, Jupiter, Florida 33418
 - 3. Presray Corporation, 32 Nelson Hill Road, Wassaic, New York 12592
 - 4. Or equal
- B. Obtain all door flood barriers and assemblies from single manufacturer.

2.02 DESIGN

- A. Loads for the design of the door flood barriers shall be determined per Dry Flood proofing Limitations on ASCE 24-05, Section 6.2.1.
- B. This stop log system shall be designed for the loads and load combinations listed on ASCE 7-02, Section 2.0 (Combinations of Loads), including the following flood loads according with ASCE 7-02 Section 5.3.3 (Loads During Flooding):
 - 1. Hydrostatic Loads, caused by water which is either stagnant or moves at velocities less than 5 ft/sec, according with ASCE 24-05, Section 6.2.1 and ASCE 7-02, Sections 5.3.3.2 and C5.3.3.2.
 - 2. Wave Loads: design for non-breaking wave action, according with FEMA 550-2006, Section 3.4 (Wave Loads) and ASCE 7-02 Section 5.3.3.4 (Wave Loads)..
- C. System to withstand a minimum wind load pressure of 126 psf.
- D. Frame(s) and Intermediate post(s) shall have mounting holes for connecting anchors and bolts. Anchor type, size, and method dependent on load capabilities of structure.

- E. The individual door flood barrier sections shall be 3" deep by 12.25" tall with a top interlocking gasket slot system which includes gaskets and gasket channels between sections and full height in the jamb channels. Multiple logs shall be stacked to meet or exceed the required height as indicated on the drawings. Embed plates may be allowed at the sill and jambs based on the condition at the opening and the loads imposed on the system for doors greater than 50-inches. Jamb supports shall be continuous structural steel channels designed specifically for the stop log system, anchored and sealed to the condition with embeds or mechanical anchors.

2.03 EQUIPMENT

- A. Door Flood Barriers for each existing door:
 - 1. Water tight stop log type aluminum flood barriers.
- B. Products Details:
 - 1. Sealing Requirements: stop log and gasket design shall provide a drop tight plank against short-term high water situations, up to the top of the door flood barrier shown on the drawings.
 - 2. Latching shall be operable from one side only.
 - 3. Mounting/Load Transfer: Anchor to existing structure.
 - 4. Frames to be cast-in-place or anchored utilizing mechanical, chemical or other anchor types as indicated. Manufacturer to include all anchors, water-stop, and sealants.
 - 5. Loading Direction Selection:
 - a. Standard: Positive Pressure Loading: direction of loading against stop log so as to further compress gaskets against stop log frame -"seating".
 - 6. Provide rectangular door opening with square corners to facilitate easy passage.
 - 7. Provide compression gasket which requires no inflation.

2.04 MATERIALS

- A. Stop Log:
 - 1. Aluminum Alloy (6061)
- B. Gaskets to be factory mounted to flood plank assembly. Gaskets to be compressible EPDM rubber type, UV and weather resistant, and shall be field replaceable.
- C. Frame to include jamb and sill members for field locating and installation on structure. Jamb members to be designed and fabricated with appropriate material as required for the loading.
 - 1. Aluminum of appropriate size and strength with welded or mechanical fastened construction.
- D. Sill:

1. Stainless Steel (304)
 2. Mild Carbon Steel – powder coated
- E. Frame Mounting Hardware: Provide anchors, sealant, and water stop, as required and indicated on the drawings.
- F. Operating Hardware: Provide hardware sized for the size and weight of the flood plank and loads. Hardware to be factory located on jambs and plank panels, as practical. All loads are transferred to building structure. Latching hardware to be as indicated on Drawings. Flood plank panel to be factory prepared for applicable latching devices.
- G. Aluminum products to be mill finish, welds are ground smooth, not polished, and are factory acid washed, neutralized and rinsed.
- H. Labeling. Each watertight plank and frame will be individually identified for matched installation.
- I. Instruction Placard: Provide pictorial and written operation instruction placards on inside of flood plank.

2.05 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication.

PART 3 - EXECUTION

3.01 GENERAL

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Do not begin installation until substrates have been prepared by removing all loose material, making firm, and to correct elevations indicated and in accordance with Manufacturer's recommendations.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's installations instructions, approved shop drawings, shipping, handling, and storage instructions, and product carton instructions.
- B. Frames shall be installed level, square, plumb, and rigid.
- C. Sealants, water-stop, and grouting to be applied per product application directions and in accordance with manufacturer's instructions.

- D. Field Grouting to be completed by appropriate personnel, and in accordance with product application directions and manufacturer's instructions.
- E. Tolerances: All dimensional requirements must be in accordance with manufacturer's installation instructions and shop drawings.
- F. Field Testing:
 - 1. Perform visual dry test for gasket alignment, continuity contact and pre-compression.
 - 2. Construct temporary water barrier and test installed flood plank with water against the full height of the barrier.

3.04 FIELD QUALITY CONTROL

- A. Products to be operated and field verified including the sealing surfaces to ensure that they maintain contact at the correct sealing points.
- B. With Owner personnel present, verify that latching assemblies operate freely and correctly.
- C. With Owner personnel present, verify all anchorage is in accordance with manufacture's installation instructions and applicable data sheets.

3.05 CLEANING

- A. Repair or replace damaged installed products or components.
- B. Clean all sealing surfaces.
- C. Touch up damaged finish.

3.06 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion to the satisfaction of, and at no additional cost to, the Owner.

END OF SECTION

SECTION 09900

FIELD PAINTING AND COATING

PART 1 - GENERAL

1.01 SUMMARY:

- A. This Section includes furnishing and installing labor, materials and equipment necessary to complete the following:
1. Field painting and coating of new exposed piping (including color coding), hangers, and supports, new surfaces of mechanical and electrical equipment not factory finished. Paint color must match adjacent surface.
 2. Field painting and coating of patched areas within existing masonry walls, concrete walls and floors affected by the Work. Paint color must match adjacent surface.
 3. Field painting and coating of new surfaces of mechanical and electrical equipment not factory finished, new exposed junction boxes, new pull boxes, new conduit and new wireways installed on painted surfaces.
 4. Surface preparation for painting and priming including.
 - a. Sanding, and preparing for painting.
 - b. Filling and sanding surface imperfections and holes in existing work indicated to be painted.
 - c. Installing paint-grade caulks and sealants at joints between adjacent surfaces indicated to be painted.
 - d. Cleaning and preparing existing masonry surfaces indicated to be painted.
 - e. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.
 5. Provide, operate, and maintain all temporary hoisting equipment and provide, maintain, and remove all staging and scaffolding, and rigging required for all painting work required to be completed.
- B. A schedule listing the various types of surfaces to be painted and the types of paints to be applied is included herein.
- C. Unless otherwise indicated, the following items shall not be painted:
1. Labels on equipment, such as Underwriters' Laboratories and Factory Mutual, equipment identification, performance rating, and name or nomenclature plates.
 2. Moving parts of operating units, exposed bolt threads, mechanical and electrical parts, such as valve and damper operators, linkages, sensing devices, motor and fan shafts.
 3. Electrical conduit, junction boxes, pull boxes, conduit and wireways.

4. Copper and brass piping unless mounted on painted or finished surfaces.
5. Stainless steel.
6. Plumbing fixtures.
7. Fiberglass and polyethylene storage tanks.
8. Uninsulated PVC piping (to be banded only)
- *9. Factory pre-finished architectural components.
- *10. Electrical panels and cabinets factory finish painted.

*Except for touch-up painting when required

1.02 SYSTEM DESCRIPTION:

- A. The term "paint" as used herein includes emulsions, enamels, paints, stains, varnishes, sealers, and other coatings, organic or inorganic, whether used as prime, intermediate, or finish coats.
- B. The Contractor shall do a complete painting job throughout the work in accordance with generally approved modern practices for work of high quality. Unless otherwise specified, all materials and surfaces customarily painted shall be given not less than one shop coat and two field coats or one prime coat and two finish coats, regardless of whether or not the surface to be painted is specifically mentioned.
- C. Paints containing lead shall not be used.
- D. To ensure a satisfactory painting job it is essential that the paints applied in the shop and in the field be mutually compatible. The Contractor shall determine what shop paints have been used and shall verify that field applied paints are compatible therewith.
- E. The colors of finish coatings shall be selected by the Engineer from color chips submitted by the Contractor for review. The color selection shall be in the form of a schedule indicating the colors to be used on the various surfaces. The colors used in the final work shall be in accordance with the color schedule and shall match the selected color chips.
- F. All coating systems used for potable water applications shall be previously approved by the National Sanitation Foundation (N.S.F.) in accordance with Standard 61. Evidence of such approval shall be an approval letter from N.S.F. listing the submitted materials.
- G. Paints submitted shall meet all Federal and State E.P.A. regulations pertaining to volatile organic compounds (VOC) compliance.

1.03 SUBMITTALS:

- A. Six (6) sets of manufacturers' literature of proposed paints shall be submitted to the Engineer for review.
- B. Six (6) sets of the painting schedule shall be submitted to the Engineer for review.
- C. Three (3) sets of color chips shall be submitted to the Engineer for selection of colors.

1.04 DELIVERY AND STORAGE:

- A. Paint shall be delivered to the site in the manufacturer's sealed containers. Each container shall bear the manufacturer's label, listing the brand name, type and color of paint, and instructions for thinning. Thinning shall be done only in accordance with directions of the manufacturer. Job mixing or job tinting may be done when approved by the Engineer and for preparing sample colors.
- B. Painting materials shall be stored and mixed in a single location designated by the Engineer for this purpose. The Contractor shall not use any plumbing fixture or pipe for mixing or for disposal of any refuse. He shall carry all necessary water to his mixing room, and shall dispose of all waste outside of the building in a suitable receptacle. The Contractor will be held responsible for any damage done due to failure to observe these precautions.
- C. The paint storage area shall be kept clean at all times, and any damage thereto or to its surroundings shall be repaired. Any oily rags, waste, etc., shall be removed from the building every night, and every precaution shall be taken to avoid danger of fire.
- D. Heat must be provided in the storage area if paints are to be stored during winter months. The temperature shall be maintained above 40 degrees F. at all times.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. PAINT SCHEDULE:

- 1. Except as otherwise indicated, all paint used shall be of the type listed in the following schedule, by Tnemec Company, Inc., or other approved paint fully equal to paint manufactured by the above named company. No brand other than that named will be considered for approval unless the brand and type of paint proposed for each item in the following painting schedule are submitted in writing to the Engineer, along with sufficient data supported by certified tests.

PAINT SCHEDULE

<u>Key</u>	<u>Description</u>	<u>Tnemec</u>	<u>Minimum Dry Film Thickness/Coat (mils)</u>
APE	Acrylic Polyurethane Enamel	1095 Endura-Shield	3.0
ABF	Cementitious Block Filler	130 Envirofill	80-100 s.f./gal
CEE	Catalyzed Epoxy	66HS H.B. Epoxoline	4.0
CEM	Catalyzed Epoxy Mastic	135 Chembuild	(See Note 2)
CEP	Catalyzed Epoxy Primer	66HS-1211 H.B. Epoxoline Primer	3.0
EP	Epoxy-Polyamide	20HSPota-pox	3.0-5.0
HSE	High Solids Epoxy (Minimum 80%)	161HS Tneme-Fascure	6.0
MP	Modified Polyurethane	Series 262 Elasto-shield	100.0
PEF	Polyamine Epoxy Finish	280 Tnemec-Glaze	6.0
PEP	Polyamine Epoxy Primer	201 Exopoprime	6.0
PVA	PVA Sealer	151-1051 Elastogrip	1.5

PWC	Potable Water Coating	FC22 Epoxoline	25-30
WBE	Waterbased Acrylic Epoxy	113 H.B. Tnemec-Tufcoat	3.0
WP	Wood Primer	151-1051 ElastoGrip	1.0
WS	Wood Sealer	(See Note 1)	----
Z	Zinc-Rich Primer	94H20 HydroZinc	2.5

Notes:

- 1: Furnished by reputable manufacturer and acceptable to the Engineer.
- 2: Shall be used as a tie-coat between incompatible paints @ 4.0 mils.

B. PAINTING SCHEDULE:

1. Paint shall be applied in accordance with the paint key listed on the following schedule and defined in the preceding Paint Schedule:

<u>Item</u>	<u>Field Coats</u>		
	<u>1st</u>	<u>2nd</u>	<u>3rd</u>
<u>Walls:</u>			
Interior concrete and masonry walls	ABF	HSE	HSE
<u>Floors:</u>			
Interior concrete floors	PEP	PEF	PEF
<u>Ceilings:</u>			
(Not Applicable)			
<u>Metals:</u>			
Interior miscellaneous galvanized and non-ferrous metals and piping	CEE	CEE	-----
Exterior miscellaneous galvanized and non ferrous metals and piping	CEE	APE	-----
Miscellaneous interior ferrous piping, metalwork, ferrous parts or operating devices, valve handles, levers, pumps, and ferrous hangers and supports	CEP	CEE	
Miscellaneous exterior ferrous piping, metalwork, ferrous parts or operating devices, valve handles, levers, pumps, and ferrous hangers and supports	CEP	CEE	APE
Exposed electrical conduit, conduit fittings, outlet boxes	(Same as adjacent wall or ceiling)		

C. SPARE PAINT:

1. Furnish to the Owner one unopened gallon of each type and color of paint used on the work.
2. Furnish both components for each type and color of epoxy paints used on the work.

PART 3 - EXECUTION

3.01 SURFACE PREPARATION:

- A. Before any surface is painted, it shall be cleaned carefully of all dust, dirt, grease, loose rust, mill scale, old weathered paint, efflorescence, etc. All necessary special preparatory treatment shall then be applied. Where required, imperfections and holes in surfaces to be painted shall be filled in an approved manner.
- B. Cleaning and painting shall be so programmed that dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
- C. Surfaces which have been cleaned, pretreated, or otherwise prepared for painting, shall be painted with the first field coat as soon as practicable after such preparation has been completed, but in any event prior to any deterioration of the prepared surface.
- D. Wood shall be sanded to a smooth and even surface and then dusted off. Before priming wood which is to be painted, shellac shall be applied to all knots, pitch and sapwood. After priming or stain coat has been applied, nail holes and cracks shall be thoroughly filled with plastic wood or putty. For natural finish work, putty shall be colored to be imperceptible in the finished work.
- E. Exposed nails and other ferrous metal or surfaces to be painted with water-thinned paint shall be spot primed with aluminum.
- F. Cracks and holes in masonry and concrete surfaces to be painted shall be filled with Portland cement mortar. Surfaces shall be clean and dry before painting. All efflorescence, grease, oil, etc., shall be removed before painting, and all loose, crumbling material shall be removed by vigorous wire brushing over entire surface, followed by removal of all dust. All high areas on masonry and concrete surfaces such as mortar daubs, mortar ridges at joints, and ridges at form joints in concrete shall be removed.
- G. All holes in plaster shall be filled with plaster of paris and all cracks shall be cut out and filled. No sandpaper shall be used on plastered surfaces. Prior to painting, surfaces shall be tested with a moisture detecting device, such as Kaydel Plaster Tester, Type CP-48, as manufactured by Hard Moisture Gauges, Inc. No sealer or paint shall be applied when the moisture content of the plaster exceeds 8 percent, as determined by the test. Testing shall be done in the presence of the Engineer's representative, and in as many locations as directed. Plaster shall be thoroughly dry-brushed before painting or sealing.
- H. All nonferrous metal surfaces to be painted shall be cleaned of all dirt, grease, oil and other foreign substances per SSPC SP 7.
- I. All galvanized surfaces to be painted shall be brush blasted per SSPC SP7.
- J. Before application of the first full field coat, abraded areas of all non-galvanized ferrous metal items having shop coats shall be touched up with paint of the type indicated on the Painting Schedule.
- K. All items of equipment such as motors, pumps, instrumentation panels, electrical switchgear, and similar items, that have been given shop coats, paint filler, enamel or other treatment customary with the manufacturer, shall have, after installation, all scratches and blemishes touch up prior to application of the first field coat. Factory prefinished items not to be field painted shall be touched up with matching paint to repair any areas damaged during installation.

- L. Concrete floors that are to receive epoxy coating shall be brush blasted or shot blasted.
- M. Hardware accessories, machine surfaces, plates, lighting fixtures, and similar items in place prior to cleaning and painting, and not intended to be painted, shall be removed during painting operations and repositioned upon completion of each area or shall otherwise be protected.
- N. All PVC pipe to be painted shall be brush blasted per SSPC SP7 or shall be sanded to provide a uniform surface profile.

3.02 APPLICATION:

- A. Paint shall be used and applied as recommended by the manufacturer without being extended or modified, and with particular attention to the correct preparation and condition of surfaces to be painted.
- B. Paint shall be applied only within the temperature range recommended by the manufacturer. Painting of surfaces when they are exposed to the sun shall be avoided.
- C. Paint shall not be applied to wet or damp surfaces and shall not be applied in rain, snow, fog, or mist, or when the relative humidity exceeds 85 percent.
- D. No paint shall be applied when it is expected that the relative humidity will exceed 85 percent or that the air temperature will drop below 40 °F within 18 hours after the application of paint. Dew or moisture condensation should be anticipated and if such conditions are prevalent, painting shall be delayed until midmorning to be certain that the surfaces are dry. Further, the days painting should be completed well in advance of the probable time of day when condensation will occur, in order to permit the film an appreciable drying time prior to the formation of moisture.
- E. All paint shall be applied under favorable conditions by skilled painters and shall be brushed out carefully to a smooth, even coating without run or sags. Enamel shall be applied evenly and smoothly. Each coat of paint shall be allowed to dry thoroughly, not only on the surface but throughout the thickness of the paint film before the next coat is applied. Finish surfaces shall be uniform in finish and color, and free from flash spots and brush marks. In all cases, the paint film produced shall be satisfactory in all respects to the Engineer.
- F. Exposed nails and other ferrous metal or surfaces to be painted with water-thinned paints shall be spot primed with aluminum paints.
- G. In order to provide contrast between successive coats, each coat shall be of such tint as will distinguish it from preceding coats.
- H. The Contractor shall not only protect his work at all times, but shall also protect all adjacent work and materials by the use of sufficient drop cloths during the progress of his work. Upon completion of the work, he shall clean up all paint, spots, oil, and stains from floors, glass, hardware, and similar finished items.
- I. Paint shall be applied so as to obtain coverage per gallon and the dry film thickness recommended by the manufacturer. Dry film thickness readings shall be taken to insure that required thicknesses have been achieved. The Contractor shall record in a manner satisfactory to the Engineer, the quantities of paint used for successive coats on the various parts of the work.
- J. Spraying with adequate apparatus may be substituted for brush application of those paints and in those locations for which spraying is suitable.

- K. If paints are thinned for spraying, the film thickness after application shall be the same as though the unthinned paint were applied by brush. That is, the addition of a thinner shall not be used as a means of extending the coverage of the paint, but the area covered shall be no greater than the area which would have been covered with the same quantity of unthinned paint.
- L. Blast cleaned metal surfaces shall be coated immediately after cleaning, before any rusting or other deterioration or contamination of the surface occurs. Blast cleaned surfaces shall be coated not later than 8 hours after cleaning under ideal conditions or sooner if conditions are not ideal.

3.03 PIPING COLOR CODE:

- A. The following colors shall be utilized to facilitate identification of piping. Only insulation is to be painted on chemical feed lines.
 - 1. Waste Lines:

Sewer or Drain	Dark Gray
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 - 2. Other Lines:

	Light Gray
--	------------
- B. In situations where two colors do not have sufficient contrast to easily differentiate between them, a 6-inch band of contrasting color shall be painted on one of the pipes at approximately 30-inch intervals.
- C. Piping which is not painted shall be color coded with bands placed at each change in direction and no more than 5 feet apart on straight runs.

3.04 PIPING IDENTIFICATION:

- A. After painting, piping shall be identified by stenciling using the same specified paint as used on the pipes. Stenciling shall be of wording and color selected by the Engineer and sized as follows:

<u>Outside Diameter of Pipe or Covering</u>	<u>Size of Legend Letters</u>
3/4-inch to 1-1/4-inch	1/2-inch
1-1/2-inch to 2-inch	3/4-inch
2-1/2-inch to 6-inch	1-1/4-inch
8-inch to 10-inch	2-1/2-inch
Over 10-inch	3-1/2-inch

- B. Arrows shall indicate direction of flows. Where "a" is equal to 3/4 of outside diameter of pipe or covering, the arrow shaft shall be 2 "a" long by 3/8 "a" wide. The arrow head shall be an equilateral triangle with sides equal to "a." Maximum "a" dimension shall be 6-inches.
- C. Where pipe passes through a wall, use pipe markers and directional arrows on each side of the wall.
- D. Use pipe markers and directional arrows every 50 feet along continuous pipe lines.
- E. Use a pipe marker and directional arrow at each rise and "T" joint.
- F. When using directional arrows, point arrowhead away from pipe markers and in direction of

flow. If flow can be in both directions, use a double-headed directional arrow.

- G. The Engineer will assist in determining pipe content and direction of flows.

3.05 CLEANUP:

- A. The Contractor shall at all times keep the premises free from accumulation of waste material and rubbish caused by his employees or work. At the completion of the painting, he shall remove all of his tools, scaffolding, surplus materials, and all of his rubbish from and about the buildings and shall leave his work "broom clean" unless more exactly specified.
- B. The Contractor shall also upon completion remove all paint where it has been spilled, splashed, or splattered on all surfaces, including floors, fixtures, equipment, furniture, glass, hardware, etc., leaving the work ready for inspection.

END OF SECTION

SECTION 09905

SURFACE PREPARATION AND SHOP PRIME PAINTING

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This section covers the furnishing of all labor, materials, equipment and incidentals required for the surface preparation and application of shop primers on ferrous metals, excluding stainless steels, as specified herein.

1.02 RELATED WORK:

- A. Field painting is included in Section 09900.

1.03 SUBMITTALS:

- A. Submit to the Engineer for review, manufacturer's specifications and data on the proposed primers and detailed surface preparation, application procedures and dry mil thicknesses.
- B. Submit representative physical samples of the proposed primers, if required by the Engineer.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Submerged surfaces - Shop primer for ferrous metals which will be submerged or which are subject to splash action or which are specified to be considered a submerged surface shall be spray applied one coat of Tnemec 66 Boston Gray Primer, dry film thickness 4.0 to 6.0 mils by Tnemec Co., or approved equal.
- B. Non-galvanized Miscellaneous Metals - spray apply one coat 90-97 Tnemec-Zinc by Tnemec Co., or approved equal.
- C. Other Non-Galvanized and Non-Submerged Surfaces including process equipment - Spray apply one coat of Tnemec 66 by Tnemec Co.; or approved equal.
- D. Non-Primer Surfaces - Gears, bearings surfaces, and other similar surfaces obviously not to be painted shall be given a heavy shop coat of grease or other suitable rust-resistant coating. This coating shall be maintained as necessary to prevent corrosion during all periods of storage and erection and shall be satisfactory to the Engineer up to the time of the final acceptance test.
- E. Compatibility of Coating Systems - Shop priming shall be performed with materials specified above. However, shop painting shall be done with primers that are guaranteed by the manufacturer to be compatible with the corresponding finish coats specified in Section 09900.

PART 3 - EXECUTION

3.01 SURFACE PREPARATION:

- A. Non-submerged service components scheduled for priming, as defined above, shall be sand blasted clean in accordance with SSPC-SP-6, Commercial Grade, immediately prior to priming.
- B. Submerged service components scheduled for priming, as defined above, shall be sandblasted clean in accordance with SSPC-SP-10, near White, immediately prior to priming.
- C. Surface shall be dry and free of dust, oil, grease and other foreign material before priming.
- D. Shop prime in accordance with approved manufacturer's recommendations.

END OF SECTION

SECTION 10200
LOUVERS AND VENTS

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes furnishing all equipment, materials and labor to install the following:
 - 1. Fixed, extruded-aluminum louvers.

1.02 RELATED WORK

- A. Section 0330, CAST-IN-PLACE CONCRETE
- B. Section 07901, JOINT SEALANTS
- C. Section 09900, FIELD PAINTING AND COATING
- D. Section 15800, HEATING AND VENTILATION

1.03 DEFINITIONS

- A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section, unless otherwise defined in this Section or in referenced standards.
- B. Drainable-Blade Louver: Louver designed to collect and drain water to exterior at sill by means of gutters in front edges of blades and channels in jambs and mullions.

1.04 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide exterior metal louvers capable of withstanding the effects of loads and stresses from wind and normal thermal movement without evidencing permanent deformation of louver components including blades, frames, and supports; noise or metal fatigue caused by louver blade rattle or flutter; or permanent damage to fasteners and anchors.
 - 1. Wind Load: Uniform pressure (velocity pressure) of 30 lbf/sq. ft. (1440 Pa), acting inward or outward.
 - 2. Wind Load: Uniform pressures (velocity pressures) indicated on Drawings, acting inward or outward.
- B. Air-Performance, Water-Penetration, and Air-Leakage Ratings: Provide louvers complying with performance requirements indicated, as demonstrated by testing manufacturer's stock units 48 inches (1220 mm) wide by 48 inches (1220 mm) high. Test units according to AMCA 500.
 - 1. Perform testing on unpainted, cleaned, degreased units.
 - 2. Perform water-penetration testing on louvers without screens.

1.05 SUBMITTALS

- A. Product Data: For each type of product specified.
- B. Shop Drawings: For louver units and accessories. Include plans; elevations; sections; and details showing profiles, angles, and spacing of louver blades. Show unit dimensions related to wall openings and construction; free area for each size indicated; profiles of frames at jambs, heads, and sills; and anchorage details and locations.
 - 1. For installed louvers and vents indicated to comply with design loadings, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Product Certificates: Signed by manufacturers of louvers certifying that the products furnished comply with requirements and are licensed to bear the AMCA seal based on tests made according to AMCA 500 and complying with AMCA's Certified Ratings Program.
- D. Product Test Reports: Indicate compliance of products with requirements based on comprehensive testing of current products.
- E. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.06 QUALITY ASSURANCE

- A. Source Limitations: Obtain louvers and vents through one source from a single manufacturer where alike in one or more respects regarding type, design, or factory-applied color finish.
- B. Welding Standards: As follows:
 - 1. Comply with AWS D1.2, "Structural Welding Code--Aluminum."
 - 2. Comply with AWS D1.3, "Structural Welding Code--Sheet Steel."
- C. SMACNA Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" recommendations for fabrication, construction details, and installation procedures.
- D. Louvers shall bear AMCA Certified Ratings Seal. Ratings based on tests and procedures performed in accordance with AMCA 511 and comply with AMCA Certified Ratings Program. AMCA Certified Ratings Seal applies to air performance and water penetration ratings.

1.07 PROJECT CONDITIONS

- A. Field Measurements: Verify louver openings by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating louvers without field measurements. Coordinate construction to ensure that actual opening dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Aluminum Extrusions: ASTM B 221, alloy 6063-T5 or T-52.
- B. Fasteners: Of same basic metal and alloy as fastened metal or 300 series stainless steel, unless otherwise indicated. Do not use metals that are incompatible with joined materials.
 - 1. Use types and sizes to suit unit installation conditions.
 - 2. Use Phillips flat-head screws for exposed fasteners, unless otherwise indicated.
- C. Anchors and Inserts: Of type, size, and material required for loading and installation indicated. Use nonferrous metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as needed for corrosion resistance. Use toothed steel or expansion bolt devices for drilled-in-place anchors.
- D. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12 but containing no asbestos fibers, or cold-applied asphalt emulsion complying with ASTM D 1187.

2.02 FABRICATION

- A. Assemble louvers in factory to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
 - 1. Continuous Vertical Assemblies: Where height of louver units exceeds fabrication and handling limitations, fabricate units to permit field-bolted assembly with close-fitting joints in jambs and mullions, reinforced with splice plates and without interrupting blade-spacing pattern.
- B. Maintain equal louver blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.
- C. Maintain equal louver blade spacing to produce uniform appearance.
- D. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining materials' tolerances, and perimeter sealant joints.
 - 1. Frame Type: Channel type, unless otherwise indicated.
 - 2. Frame Type: Exterior flange, unless otherwise indicated.
 - 3. Frame Type: Interior flange, unless otherwise indicated.
- E. Include supports, anchorages, and accessories required for complete assembly.
- F. Provide vertical mullions of type and at spacings indicated, but not more than recommended by manufacturer, or 72 inches (1830 mm) o.c., whichever is less. At horizontal joints between louver units, provide horizontal mullions, unless continuous vertical assemblies are indicated.

- G. Provide sill extensions and loose sills made of same material as louvers where indicated or required for drainage to exterior and to prevent water penetrating to interior.
- H. Join frame members to one another and to fixed louver blades with fillet welds concealed from view, unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.03 LOUVERS

- A. All louvers shall be fixed, extruded aluminum, four inches deep with bird screens. Sizes shown on drawings are minimum louver opening sizes. Coordinate size and methods of securing louver with General Contractor for proper fit and neat appearance. Counterflash as required to assure an absolutely weathertight installation. Provide means of access to all screens. Screens shall be removable for cleaning and may be furnished in sections.
- B. Louvers located in masonry wall construction for air intake and discharge shall be furnished and installed by the Contractor and shall be constructed as follows:
 - 1. Frame:
 - Material: Extruded aluminum, Alloy 6063-T5.
 - Wall Thickness: 0.125 inch (3.2 mm), nominal.
 - Depth: 4 inches (152 mm).
 - Downspouts and caulking surfaces.
 - 2. Blades:
 - Style: Drainable.
 - Material: Extruded aluminum, Alloy 6063-T5.
 - Thickness: 0.125 inch (3.2 mm), nominal.
 - Angle: 37.5 degrees.
 - Centers: 5-29/32 inches (150 mm), nominal.
 - 3. Bird Screen:
 - Material: Aluminum, 1/2 inch mesh x 0.063 inch, inter-crimp.
 - Frame: Removable, rewire-able.
 - 4. Gutters: Drain gutter in head frame and each blade.
 - 5. Downspouts: Downspouts in jambs to drain water from louver for minimum water cascade from blade to blade.
 - 6. Vertical Supports: Hidden vertical supports to allow continuous line appearance up to 120 inches (3,048 mm).
 - 7. Sill: Steeply angled integral sill eliminating areas of standing or trapped moisture where mold or mildew may thrive and effect indoor air quality.
 - 8. Assembly: Factory assembled louver components. All welded construction.
- C. Performance Data:

1. Based on testing 48 inch x 48 inch (1,219 mm x 1,219 mm) size unit in accordance with AMCA 500.
 2. Minimum Free Area: 50 percent, nominal.
 3. Free Area Size: 9.08 square feet (0.84 m²).
 4. Maximum Recommended Air Flow Thru Free Area: 1,023 feet per minute (312 m/min).
 5. Air Flow: 9,289 cubic feet per minute (263 m³/min).
 6. Maximum Pressure Drop: 0.15 inches w.g. (3.8 mm w.g.).
 7. Water Penetration: Maximum of 0.01 ounces per square foot (3.1 g/m²) of free area at an air flow of 1,023 feet per minute (312 m/min) free area velocity when tested for 15 minutes.
- D. Finish:
1. Finish coating shall be Kynar 500 Fluoropolymer Coating. Color shall be as selected by Owner.
 2. Kynar 500 Fluoropolymer Coating:
 - Conform to AAMA 605.2
 - Apply coating following cleaning and pretreatment
 - Cleaning: AA-C12C42R1X.
 - Dry louvers before final finish application.
 - Total Dry Film Thickness: Approximately 1.2 mils (0.03 mm), when baked at 450 degrees F (232 degrees C) for 10 minutes.
- E. Louvers shall be stormtight and shall be Model ELF375DXH as manufactured by the Ruskin Manufacturing Co., or approved equal by Greenheck Fan Corporation or Airlite Co.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Coordinate Setting Drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.02 INSTALLATION

- A. Locate and place louver units level, plumb, and at indicated alignment with adjacent work.
- B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.
- C. Form closely fitted joints with exposed connections accurately located and secured.

- D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.
- E. Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.
- F. Protect galvanized and nonferrous-metal surfaces from corrosion or galvanic action by applying a heavy coating of bituminous paint on surfaces that will be in contact with concrete, masonry, or dissimilar metals.
- G. Install concealed gaskets, flashings, joint fillers, and insulation, as louver installation progresses, where weathertight louver joints are required. Comply with Division 7 Section "Joint Sealants" for sealants applied during louver installation.

3.03 ADJUSTING, CLEANING, AND PROTECTING

- A. Test operation of adjustable louvers and adjust as needed to produce fully functioning units that comply with requirements.
- B. Periodically clean exposed surfaces of louvers and vents that are not protected by temporary covering to remove fingerprints and soil during construction period. Do not let soil accumulate until final cleaning.
- C. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.
- D. Protect louvers and vents from damage during construction. Use temporary protective coverings where needed and approved by louver manufacturer. Remove protective covering at the time of Substantial Completion.
- E. Restore louvers and vents damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.
 - 1. Clean and touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION

SECTION 11303

SUBMERSIBLE WASTEWATER PUMPS AND APPURTENANCES

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This Section covers furnishing all equipment, materials, labor and supervision to complete the installation of the new submersible wastewater pumps and appurtenances at the existing East Natick II Pump Station site complete, as shown on the Drawings and as specified herein.

1.02 RELATED WORK:

- A. SECTION 02050 – DEMOLITION AND ALTERATIONS
- B. SECTION 02221 - EARTHWORK
- C. SECTION 03303 – CAST-IN-PLACE CONCRETE
- D. DIVISION 16, ELECTRICAL

1.03 SYSTEM DESCRIPTION:

- A. The wastewater pumping system shall consist of two (2) submersible pumps, stainless steel guide rail assembly, control panel, level controls, alarms, discharge piping, valves, miscellaneous electrical equipment, conduit and wiring, and other items, all as indicated on the Drawings, as specified herein and as required to provide a complete and satisfactory operation.
- B. The new submersible pumps including the stainless steel guide rail assembly, level control equipment, discharge piping and valves shall be installed within the existing 10' long x 6' wide x 14' deep wet well. The new pump control panel and electrical related items shall be installed within the new above-ground service enclosure being furnished and installed under Division 16.
- C. All equipment furnished under this Specification shall be suitable for installation as shown on the Contract Drawings. The Contractor shall be responsible for determining any restrictions that may prevent the use of any piece of equipment, as well as determining the necessary clearances required to move and install all equipment to its final location.
- D. Also, any wiring, signal cable and ancillary conduit not shown on the drawings that is required to properly connect the equipment and controls specified herein shall be furnished and installed by the Contractor.
- E. The submersible wastewater pumps shall be capable of proper and efficient operation under the conditions specified under Subsection 2.01, Paragraph A.
- F. All necessary mounting bolts, bolt sleeves, plates, nuts, inserts and washers shall be furnished and equipment aligned and grouted in place.

- G. Stainless steel nameplates giving the name of the manufacturer, the serial number of the item, the rated capacity, speed, or other pertinent data shall be properly and rigidly attached to each item of equipment.
- H. The sewage pumps, level controls, pump bases, discharge elbows, ball check valves, level switch junction box and hanger, pump control panel with programmable controller, pump power and sensor leads, guide rail supports and pump lifting chain shall be provided by the pump manufacturer. However, it is the responsibility of the Contractor that, in the event of dispute between him and the manufacturer, all work, materials and equipment be provided as specified.
- I. It is the intent of this Contract that the final installation shall be complete in all respects and the Contractor shall be responsible for minor details and any necessary special construction not specifically included in the Drawings or Specifications.

1.04 QUALITY ASSURANCE:

- A. It is the intent of this specification that all parts and components be constructed of the best materials suitable for the application. It is intended that all major components be manufactured by recognized leaders in the field and all major components shall be from the same manufacturer if possible.
- B. Except where specifically noted, equipment that is determined to be the equal of that specified shall be acceptable on the basis that any revisions in the design and construction of the structure, piping or appurtenant equipment required to accommodate such a substitution shall be made at no additional cost to the Owner and be as approved by the Engineer.
- C. All materials and methods of installation shall conform to federal, state and municipal codes and regulations having jurisdiction. Where Contract requirements are in excess of applicable standards, the Contract Provisions shall govern.

1.05 SUBMITTALS:

- A. In accordance with Section 01300, the Standard General Conditions and General Requirements, six (6) sets of shop drawings and descriptive literature shall be required for all structures, electrical equipment and materials, including the pumps, pipes, fittings, valves, paint and associated equipment describing the equipment and materials in sufficient detail to indicate full conformance with the detailed specifications for each type, class and size of each item to be furnished.
- B. All pipe delivered to the job site shall be accompanied by test reports and notarized affidavits certifying that the pipe and fittings conform to the requirements of the ASTM and AWWA Specifications referenced below and these specifications.
- C. The shop drawing submittal for the pumps and associated equipment (lifting chains, pump base and discharge elbow, ball check valves, guide rails, lifting crane, etc.) shall include a parts and materials list and, in the case of the pumps, the list shall be keyed to an exploded diagram showing all the parts in detail and their relative positions in the assembly. The control panel submittal shall include a schematic wiring diagram, panel layout diagram and a detailed submittal on each major component (switches, relays, lights, alarm, solid state components, programmable controller, VFDs, etc.).

- D. The data shown on the shop drawings shall be complete with respect to dimensions, design criteria, materials of construction, wiring diagrams and component parts to enable the Engineer to review the information. At the time of submission, the Contractor shall in writing, call the Engineer's attention to any deviations that the shop drawings may have from the requirements of these specifications
- E. The Contractor shall include with the shop drawings for approval, manufacturer's certified rating curves showing pump characteristics of head, brake horsepower, capacity, discharge, and efficiency for the pumps to be furnished. Catalog sheets showing a family of curves will not be acceptable. Rating curves may be from tests run on identical pumps at an earlier date.
- F. In addition to the above, submit the following shop drawing information to the Engineer for review:
 - 1. Certified dimensional drawings of each item of equipment and auxiliary apparatus to be furnished.
 - 2. Certified foundation and anchor bolt plans and details.
 - 3. Schematic electrical wiring diagrams and other data as required for completion of the installation.
 - 4. Basis of design and calculations of the design of all precast concrete units and members.
- G. Submit two (2) copies of As-Built Drawings upon completion and acceptance of the work. As-Built Drawings shall be complete and indicate the true measurements and locations, horizontal and vertical, of all new construction.

1.06 OPERATING INSTRUCTIONS:

- A. The services of a factory-trained, qualified, service representative of the pumping station manufacturer shall be provided at the station site at start-up to inspect the complete equipment installation to insure that it is installed in accordance with the manufacturer's recommendations, make all adjustments necessary to place the system in trouble free operation, to perform initial start-up of the pumps and related equipment, and instruct the operating personnel in the proper care and operation of the equipment furnished, all as further specified in Subsection 3.04.
- B. It shall be the Contractor's responsibility to obtain from the pump manufacturer, six (6) complete sets of operation and maintenance instructions covering all equipment supplied for the station.

1.07 REFERENCES:

- A. Comply with the provisions of the following except as otherwise indicated.
 - 1. Application sections of American Water Works Association (AWWA).
 - 2. Applicable specifications of the American Society for Testing Materials (ASTM).
 - 3. American Concrete Institute (ACI), Standard 350, "Concrete Sanitary Engineering Structures".

4. Applicable specifications of American Association of State Highway and Transportation Officials (AASHTO).
5. Applicable local codes and regulations.

1.08 ACCEPTABLE MANUFACTURERS:

- A. The wastewater pumping system and all related appurtenances shall be furnished by manufacturers who are fully experienced, reputable and qualified in the manufacture of the system components to be furnished. The manufacturers shall have ten years minimum, successful experience in the design and assembly of the products similar to the pumping system specified herein. The manufacturers shall have also satisfactorily furnished a minimum of ten pumps of the type described herein within the last five years. The system components shall be designed, constructed, and delivered in accordance with the best practices and methods.
- B. For specification purposes and for establishing a quality of materials to be used, certain equipment manufacturers, sizes and model numbers have been referenced. The pumping equipment design is based upon pumps and equipment provided by either Sulzer/ABS or Xylem (Flygt). Other reputable manufacturers that can meet the design criteria and qualifications stated herein will be considered as an equivalent product.

1.09 GRADES AND ELEVATIONS:

- A. The Drawings indicate, in general, the alignment, invert and finished grade elevations of all structures and utilities. The Engineer, however, may make such adjustments in grades and alignment as are found necessary in order to avoid interference and to adapt the utilities and piping to other special conditions encountered.

1.10 WARRANTIES:

- A. The Contractor shall warrant the equipment and materials and performance of the installation and equipment for a period of one (1) year from the date of acceptance. Any defect shall be repaired or replaced by the Contractor without any additional expense to the Owner during the warranty period.

PART 2 - PRODUCTS

2.01 WASTEWATER PUMPING SYSTEM:

- A. The Contractor shall furnish and install one (1) complete wastewater pumping system according to the following design data:

Item

Pump Data:

No. of pumps

2 Submersible Wastewater Pumps:

Xylem (Flygt) Model NP 3085 SH3;
Sulzer/ABS XFP 80C-CB1 PE35/4;
or approved equal

Type Non-Clog Sewage Pumps with
Guide Rail Removal System

Item

Capacity each pump @ design point	175 gpm @ 40 TDH
Hydraulic efficiency (minimum)	50%
Discharge size	3"
Speed each pump (minimum)	1750 RPM
Shut off head (minimum)	52 feet
Solids passing (minimum)	3" minimum
Motor HP (maximum)	4.7
Motor rated voltage	230/460
Phase	3
Service factor (minimum)	1.15
Drives	Variable frequency drives to be provided for phase conversion. Pumps to operate at constant speed.

Electrical Data (Station Utility Service):

Voltage	240/120
Phase	1

- B. The pumps shall be equipped as specified herein, complete with all appurtenances specified and shown in the Contract Drawings.
- C. Sewage Pumps:
 - 1. The pumps shall be as described above in Paragraph A.
 - 2. Pump construction shall be explosion-proof with features as follows:
 - a. Motor and pump housing shall be cast iron, ASTM A48 Class 35B
 - b. Motor bearings shall be heavy duty ball or roller bearings. Minimum L10 life shall be 50,000 hours from 50% of BEP flow to 150% of BEP flow.
 - c. All seals between mating parts shall be made through the use of Nitrile O-rings. Gaskets shall not be used.
 - d. Each pump shall have dual mechanical seals. The seals shall operate in a lubricant reservoir consisting of non-toxic oil. The mechanical seals shall have rotating and stationary seal faces of either silicon carbide or tungsten carbide. The seals shall not require routine maintenance, or adjustment, and shall not be dependent on the direction of rotation for proper sealing
 - e. The impeller shall be semi-open design. Enclosed impellers will not be accepted. The impeller shall be dynamically balanced to ISO 10816 standard. Impellers shall be cast iron, ASTM A48 Class 35B.
 - f. The pump shall include a bottom plate or suction cover. The bottom plate or suction cover shall include outward spiral shaped V-grooves or

cutting grooves. The bottom plate shall be cast iron, ASTM A48 Class 35B.

- g. Power and sensor cords shall be heavy duty and sealed watertight within the pump. Power cords and sensor connection cords shall be connected to the leads from the control panel located in the service enclosure using NEMA 4 junction boxes as shown on the drawings.
 - h. Each pump shall have a moisture sensing probe in the shaft seal oil chamber which shall light indicators on the control panel when moisture is detected and stop the motor. The motors shall have overheat protection through thermistors embedded in each phase of the motor windings, which shall trip a relay and stop the motor on overheat conditions and reset automatically.
- 3. The discharge of each pump shall be fitted with a sealing flange. The complete weight of the pump shall rest on the bottom support plate. No weight shall be supported on the guide rails or the discharge elbow. The discharge seal shall be provided either by the close tolerance of the metal-to-metal contact of the discharge elbow and pump flanges or by a profile gasket installed on the slide bracket.
 - 4. Pump Mounting Bases - A separate mounting plate shall be furnished for each pump. These plates shall include guide rail support and discharge elbow with flange to align with the pump sealing flange. Discharge elbows shall have 125 lb. standard flange and be minimum 3-inch pipe size. Plates and fittings shall be coated with tar base epoxy paint. Mounting bolts shall be stainless steel.
 - 5. The guide rails shall be stainless steel and provided with installation hardware (1 or 2 per pump) to allow the pumps to be installed from the ground surface. Installation hardware (braces, angles, bolts, etc.) shall be stainless steel. The guide hardware attached to the pumps shall be fitted with bronze or stainless steel at points of contact with the rails. Stainless steel lifting chains shall be provided and the upper end hooked near the access hatch with stainless steel hardware. Mounting bolts shall be stainless steel.

D. Pump Control Panel:

- 1. A pump control panel containing the pump controller, variable frequency drives (VFDs), wet well level control system and all the necessary hardware, internal wiring, relays and alarms to automatically operate the sewage pumps as specified herein and as shown on the Drawings shall be provided. The pump control panel shall have a 12 gauge painted steel NEMA 12 enclosure with a separate removable inside panel to protect electrical equipment. All indicating lights, reset buttons, and selector switches shall be mounted on enclosure door. All internal components shall be mounted and secured to the removable back plate assembly. All equipment and wiring shall be mounted within the enclosure and labeled for proper identification. All adjustments and maintenance shall be able to be done from the front of the control enclosure.
- 2. A lock hasp shall be provided on the outside door to allow the panel to be padlocked. The pump control panel shall be mounted within the NEMA 3R free-standing service enclosure as shown on the Drawings.

3. Panel wiring shall be general purpose, open type, neatly bundled and laced or installed in plastic wiring troughs. Wiring shall be No. 16 AWG minimum, and shall comply with the latest National Electrical Code. Power and low voltage DC signal wiring shall be routed in separate wiring troughs. Parallel troughs of different systems shall be separated by a minimum of six inches. All panel wiring to external equipment shall be terminated on screw-type terminal strips. Terminal blocks shall be arranged in vertical rows and separated into groups (power, AC control, DC signal, etc.) All terminals shall be labeled or otherwise identified for field connections. The terminal strips shall be provided with a minimum of 25 percent spares.
 4. A circuit breaker/disconnect switch shall be supplied for each pump. Disconnect switch shall be lockable in the OFF and ON position. An alternating relay shall be provided to alternate pumps on each successive cycle of operation. Starters shall have auxiliary contacts to operate both pumps on override condition and high level alarm. An interlock relay shall be provided to automatically reconnect the control circuit in case a circuit breaker trips on one pump.
 5. H-O-A switches, manual speed potentiometers with % speed meters and run lights shall be supplied for each pump and mounted on the panel face. A terminal strip shall be provided for connecting pump and control wires. Additional terminals shall be provided to connect alarm, heat sensors and seal failure wires. Elapsed time meters and pump failure to start lights shall be provided for each pump and panel mounted along with High level and low level alarm lights. Panel shall be UL listed.
 6. Each device on the control panel door shall have a permanent legend plate outlining the function. A main service legend plate shall be affixed to the top portion of the control panel door. Legend plates shall be constructed of engraved lamincord and screwed to cabinet door.
 7. A transformer shall be supplied as required to provide 120 volt service for the control circuits and for a 20 amp convenience outlet with ground fault interrupter. Provide a 100 watt thermostatically controlled anti-condensation heater in the panel.
 8. An alarm strobe light and horn shall be supplied and mounted on top of the free-standing service enclosure specified herein. The alarm light shall glow dim at all times except under alarm conditions when the light shall glow bright and flash. A silence button shall be located on the outside of the free-standing service enclosure. Alarm indications and lights shall be provided for the following conditions:
 - a. High water level
 - b. Low water level
 - c. Pump failure to start (separate for each pump)
 - d. Pump seal failure (separate for each pump)
 - e. Motor winding overheat condition (separate for each pump)
- E. Wet Well Level Control:
1. Provide non-fouling submersible pressure transducer including mounting hardware, cable, PVC stilling tube, fasteners and other necessary equipment to

continuously monitor liquid level within the wet well, and transmit a 4-20 mA dc signal proportional to liquid level to the pump controller.

2. The transducer shall be of welded 316 stainless steel construction with a NEMA 6P housing and integral diaphragm protector. Sensor shall include a vent filter to prevent moisture from entering the vent tube, and shall have an accuracy of plus or minus 0.25 percent over the full span.
3. The sensor shall be provided with sufficient length of polyurethane shielded cable and optional cable support brackets and hangers to adequately suspend the sensor at the intended depth, and for connection to the pump controller located in the pump house.
4. The level transducer shall be the KPSI Series 750 as manufactured by Pressure Systems, Inc., Hampton, VA; or approved equal.
5. The level transducer shall be used as the primary level sensing and pump control signal. When in “Primary Level Control”, the pump controls shall operate as follows:

<u>Pump On:</u>	Operate a pump in lead mode.
<u>Lag On:</u>	Operate a second pump if the lead pump fails or otherwise cannot handle the inflow.
<u>High Water Alarm:</u>	Shall activate an alarm signal if the water level rises to high level.
<u>Pumps Off:</u>	Discontinue the operation of both pumps when the water level is at the shutoff point.
<u>Low Water Alarm:</u>	Shall activate an alarm signal if water level falls to low level.

6. A float system as specified below shall also be provided for the pump station as a secondary level control system as follows:
 - a. The backup float system shall operate on relay logic. The backup float system relay logic must provide level control completely independent of the primary pump controller and level transducer.
 - b. Five (5) float switches (non-mercury type) shall be suspended from a detachable stainless steel bracket fastened inside the wetwell to the access frame. They shall be suspended at the proper depths to control the “Low Water Alarm” Level, “Off” Level, “Lead Pump On” Level, “Lag Pump On” Level, and “High Water Alarm” Level. Intrinsically safe relays shall be used for the float switches due to their hazardous location. Floats shall be wired back to the pump controller located in the pump house as shown on the drawings.
 - c. The control of the pump station shall switch from the level transducer system to the float control system when a high or low level condition occurs, or the operator chooses the secondary level control system. The control of the system shall remain on the float controls until the primary

level transducer system is reset or the operator switches back to the primary system.

- d. When in float control, the pump controls shall operate as follows:

The “Pump On” float shall operate a pump in lead mode. The “Lag Pump On” float switch shall operate the second pump if the lead pump fails or otherwise cannot handle the inflow. The “High Water Alarm” float switch shall activate an alarm signal if the water level rises to high level. An alarm shall be generated when either the low or high water alarms or pump overheating alarms are activated. An alarm light in the control panel and on the above-grade service enclosure shall also activate.

F. Station Piping and Valves:

1. Piping inside the existing wet well shall be ductile iron class 53 pipe. The Contractor shall furnish, install and properly support and brace all piping and valves against all hydraulic forces. Flexible couplings shall be provided as required. Piping and valves shall be sized and located as shown on the Drawings. Pipe restraints and mounting hardware shall be stainless steel.
2. The discharge line from each pump shall be provided with a check valve mounted to the pump discharge elbow and a buried gate valve to be located directly outside the station as shown on the drawings. Check valves shall be a ball type check with flanged ends as manufactured by ITT Flygt or an approved equal. Gate valves shall be resilient seat gate valves with flanged ends and valve box covers and extensions as manufactured by M&H, Clow, American Darling or approved equal.
3. Wall sleeve/pipe penetrations in the pump station and chambers shall be sealed and made watertight with the Link Seal system by Thunderline.

G. Pressure Gauges:

1. Gauge shall be a 4-1/2” diameter, black polypropylene case, acrylic lens, screwed ring, solid front, bronze bourdon tube, 1/2” NPT brass bottom connection, stainless steel movement, 1/2% accuracy full scale; ANSI B40.1 Grade 2A. H. O. Terice Co. Model 450LFB, Ametek, Helicoid, or equal.
2. Gauge shall have a range of from zero up to twice the normal pump pressure.
3. Gauge shall be provided with an external 1/2” NPT brass snubber to reduce the pressure pulsations to the gauge.
4. Provide a diaphragm protection seal on the gauge and snubber to prevent the fluid to be measured from clogging or corroding the bourdon tube of the gauge.
5. Diaphragm protection seal shall be of the clean-out design type which will allow cleaning of the lower diaphragm assembly without loss of the fill fluid between the gauge and seal and shall not require refilling or recalibration. The upper housing shall be steel and have a 1/2” NPT instrument connection. The lower housing shall be suitable for the service intended and shall have a 1/2” NPT process connection.

6. All gauge, snubber and seal assembly shall be mounted and filled with suitable fill fluid for intended service between the gauge and seal, and shall be tested to ensure proper operation prior to installation (air temperature to zero degrees Fahrenheit).
7. Gauge and seal assembly shall be complete with piping assembly below the seal to allow field testing and cleaning out of the lower diaphragm assembly. Piping assembly shall consist of 3 each 1/2" x 2" nipples, 1 each 1/2" "T", 2 each 1/2" NPT ball valves.
8. The diaphragm seal assembly shall be furnished completely assembled and tested with gauge, snubber, diaphragm seal, fill fluid and lower piping assembly.

2.02 DUCTILE IRON PIPE:

- A. Ductile iron pipe shall conform to the requirements of ANSI A21.50 American National Standard for the Thickness Design of Ductile Iron Pipe; ANSI A21.51 American National Standard for Ductile Iron Pipe Centrifugally Cast in Metal Molds or Sand-Lined Molds for Water or Other Liquids.
- B. Ductile iron pipe shall be flanged or mechanical joint pipe as manufactured by U.S. Pipe and Foundry Company, Clow or American Cast Iron Pipe Company. Ductile iron pipe and fittings with flanged ends shall be Class 53, and ductile iron pipe and fittings with mechanical joint ends shall be Class 52. Gaskets for mechanical and flanged pipe ends shall be oil resistant neoprene.
- C. All ductile iron pipe shall have double thickness cement lining as per ANSI 21.4, tar seal and tar coat.
- D. Fittings shall be mechanical or flanged joint ductile iron with oil resistant neoprene rubber gaskets, all in accordance with ANSI A21.10 and A21.11, with double thickness cement lining, tar seal and tar coat. Gaskets shall be neoprene. Compact fittings are not acceptable.
- E. Where required, at all bends, fittings, and valves, pipe and fittings shall be furnished with approved joint restraining appurtenances to keep the piping from pulling apart under pressure. Mechanical joints where restrained shall be Megalug Series 1100 as manufactured by EBAA Iron Sales, Inc., or approved equal. Systems using friction clamps and/or retainer glands with set screws will not be accepted.

2.03 POLYVINYL CHLORIDE VENT PIPE:

- A. The polyvinyl chloride (PVC) vent pipe shall be installed within the existing wet well as shown on the drawings.
- B. PVC vent pipe shall be Schedule 80, solvent weld joint type and shall meet the requirements of ASTM D-1784 and ASTM D-1785. Cell classification shall be 12454-B.
- C. The above ground vent outlet shall be fitted with a 12 mesh stainless steel screen woven from 0.028 inch diameter wire.

2.04 PROGRAMMABLE CONTROLLER:

- A. A controller shall be provided within the pump control panel for monitoring and controlling the wastewater pumps as specified herein. The controller shall be a microprocessor based multi-function unit and shall provide all of the necessary functions, process control and status indications as specified herein and as shown on the drawings.
- B. The controller shall be panel mounted suitable for field-configurable applications. A front keypad with LCD screen or operator interface touchscreen shall allow the operator to fully configure the controller. The configuration procedure shall be interactive and shall be shown alphanumerically on the controller's display. The controller shall be panel mounted within the pump control panel with the keypad accessible on the front panel.
- C. The controller shall provide 3-phase voltage monitoring, phase failure, under- and over-voltage protection, and motor protection. All starts, events, faults and settings will be logged and fully accessible through the LCD screen.
- D. The controller shall be capable of accepting up to twenty digital inputs and two 4-20mA analog inputs. The unit shall also provide up to seven contact outputs and one analog output.
- E. The controller shall be the Multi-Smart 3MP pump controller as manufactured by Multitrode, Inc., Boca Raton, FLA; Sentry pump controller as manufactured by USEMCO, Tomah, WI; or approved equal.

2.05 VARIABLE FREQUENCY DRIVES

- A. Variable frequency drives shall be provided to convert incoming 240/120 volt, 1 phase power and to operate the submersible pumps on 230 volt, 3 phase output.
- B. The variable frequency drives shall be installed within the Pump Control Panel.
- C. Variable frequency drives shall be F800 series as manufactured by Mitsubishi, or approved equal.
- D. The manufacturer of the VFD shall be a certified ISO 9001 and ISO 14000 facility. The VFD, including its internal electronic thermal overload protection circuit, shall be UL and cUL Listed in accordance to UL 508C - Power Conversion Equipment. UL / cUL labels shall be attached on the outside of each VFD as verification.
- E. The input power section shall utilize a full wave 6-pulse bridge design incorporating diode rectifiers. The diode rectifiers shall convert AC line power of fixed voltage and frequency to fixed DC voltage. This power section shall be insensitive to phase sequence of the AC line voltage. The DC bus shall have external connections for external braking and allow for customer common DC Bus for multiple drive regeneration. The output power section shall change fixed DC voltage to adjustable frequency AC voltage. This section shall utilize insulated gate bipolar transistors (IGBT's).
- F. The VFD shall employ a standard control panel with built-in parameter copy functionality. The VFD shall utilize one (1) connector slots for internally mounting plug-in options. The VFD shall employ a removable control terminal block. The VFD shall employ sink/source selectable control logic.
- G. The VFD shall be designed to operate in the following Ambient Temperature range: -10C to +50C (14 to 122F). The maximum relative humidity shall be 90% at 50C (122F), non-condensing.

- H. The VFD shall be UL 508C Listed for use on distribution systems with 65kArms available fault current, based upon the UL short-circuit test. Upon power-up and before operational control is allowed to begin, the VFD shall check for valid operation of memory, pre-charge circuit, fan operation, and option board communication. The VFD shall be protected against short circuits between the output phases & ground and the logic & analog outputs. The VFD shall have solid state I²t protection that is evaluated in accordance with UL 508C. The minimum adjustment range shall be from 0 to 150% of the current output of the VFD. The VFD shall include Metal Oxide Varistors (MOVs) wired to the incoming AC terminals. The VFD shall monitor the main circuit capacitors, control circuit capacitor, in-rush suppression circuit, and cooling fan and shall provide a pre-alarm so that maintenance can be scheduled. The VFD shall include parameter selectable input and output phase loss protection. The VFD basic insulation level shall be tested based upon ANSI/IEEE C62.41-1999.
- I. The VFD shall be factory pre-set to operate most common applications. Choice of four (4) types of acceleration and deceleration patterns shall be available: linear, S-curve shaped – two types, and backlash compensated. The acceleration and deceleration ramps shall be individually adjustable from 0.00 to 3600 seconds. The volts per hertz ratios shall be user selectable. The VFD shall store the last eight (8) alarm faults and data at time of fault. The data shall include output frequency, output current, output voltage and VFD operation time at fault occurrence.
- J. The VFD shall have adjustable accel/decel ramp profiles. The VFD shall have two (2) different selectable settings for accel/decel times, torque boost, base frequency, stall prevention frequency and current, and output frequency detection functions. The VFD shall have coast to stop functionality by parameter setting. The VFD shall automatically compute the motor's slip compensation.
- K. The VFD shall have two (2) output current detection functions which are able to trigger individual alarms: Zero current detection level and high output current detection.
- L. A six (6) key control panel, with setting dial, shall be mounted on each drive and shall be removable & interchangeable.
- M. Each VFD shall provide individual contacts to monitor and output for remote indication for the following items.
 - 1. Pump/motor run indication (dry contact closure on run).
 - 2. Instantaneous Electronic Trip (alarm) indication.
 - 3. Pump Operation Hour Meter
 - 4. Pump speed

PART 3 - EXECUTION

3.01 EXAMINATION:

- A. The Contractor shall inspect all pump components upon arrival at the job site to ensure that assemblies are in accordance with the approved shop drawing and that all required components for installation have been received.
- B. Inspect all assemblies for visible damage, defects, cracks, loose parts, or damage to coatings, and correct damage or replace components as applicable.

3.02 INSTALLATION OF WASTEWATER PUMPING SYSTEM:

- A. All workmanship and materials shall be of the highest quality.
- B. A factory representative(s) shall be on hand at the time of installation to instruct the Contractor on how to assemble the pumps and component parts.
- C. The Contractor shall install the pumps and related equipment in accordance with the manufacturer's recommendations and as indicated on the Drawings. Damage to the pumps or its appurtenances shall be repaired by the Contractor to the satisfaction of the Engineer and at no additional cost to the Owner. Piping shall be installed as indicated on the Drawings. Liquid level control elevations in the existing wet well shall be as indicated on the Drawings.

3.03 PUMPING EQUIPMENT TEST:

- A. The performance test at the manufacturer's facilities shall include such items as:
 - 1. Operational test of the pumps to assure that they will operate as designed.
 - 2. Complete pump control panel test. The control panel shall be tested for completeness in wiring, single pump operation, automatic operation, manual operation, duplex operation. Also included will be the complete operational test of the accessory equipment, such as the level control and alarm system, and their associated wiring. The manufacturer shall submit certified test results for approval.

3.04 START-UP SERVICE:

- A. The Contractor shall make certain that permanent electrical power is properly installed into the pump control panel, and all items of equipment shipped loose are properly and permanently installed.
- B. The Contractor shall provide the field services of a competent representative of the pumping equipment manufacturer(s) to:
 - 1. Check installation of the pumps and all equipment.
 - 2. Start up all equipment and assist in testing.
 - 3. Make all necessary adjustments and corrections.
 - 4. Provide instruction on operation and maintenance to the Owner's personnel.
- C. Such services for Paragraph B.4 of this subsection shall be a minimum of one (1) day, and time for all other services shall be as required to place the station in satisfactory operation as approved by the Owner and maintain it so throughout the guarantee period.
- D. The Contractor shall arrange for representatives of the various pump system manufacturers to be present as necessary.

- E. After approval of the installation by the pump system manufacturer, the Contractor shall conduct a field test at the site to determine whether or not the systems meet the specifications established in this Section. If a field test indicates a failure to meet the specifications, the failure shall justify rejection. In the case of rejection, rejected equipment shall be replaced or repaired (at the Owner's option) without additional compensation to the Contractor.

3.05 OPERATION AND MAINTENANCE MANUALS:

- A. Provide six (6) complete sets of manuals covering the operation and maintenance of the pumping equipment, valves and control equipment. Manuals shall be provided in a three-ring binder clearly labeled for the specific job and shall include wiring diagrams, layout diagrams and outline dimensions.

END OF SECTION

SECTION 15800
HEATING AND VENTILATION

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This Section includes furnishing all equipment, materials and labor to install the following:
1. Motorized Dampers
 2. Hangers and supports
 3. Roof exhaust fan and curb
 4. Tests and operations
 5. Instruction manual
- B. ELECTRICAL WORK:
1. The Contractor shall furnish and install all motors and motorized dampers.
 2. The Contractor shall furnish relays, selector switches, hand-off-automatic switches, thermostats, motor starters and sundries required for control of the heating and ventilating system.
 3. All wiring and conduit indicated on the Drawings for motor and control of the ventilation system shall be furnished and installed under Division 16 ELECTRICAL.
- C. The following are excluded from this section of the specifications:
- Cutting and patching
 - Field painting
 - Concrete and masonry work
 - Gas piping and connections
 - Electric wiring and conduit, except as noted
 - Base flashing at roof penetration for flues, etc.

1.02 RELATED WORK:

- A. Section 03300, CAST-IN-PLACE CONCRETE
- B. Section 09900, FIELD PAINTING AND COATING
- C. Section 10200, LOUVERS AND VENTS
- D. Division 16, ELECTRICAL

1.03 REFERENCE STANDARDS:

- A. "HVAC Duct Construction Standards" in this specification shall refer to the first edition of the "HVAC Duct Construction Standards - Metal and Flexible" manual as published by the Sheet

Metal and Air Conditioning Contractors' National Association, Inc. Associated text shall be part of the Figures and Tables referred to in the specification.

- B. "AMCA Standard 210" in this specification shall mean the "Test Code for Air Moving Devices" as published by the Air Moving and Conditioning Association.
- C. "NFPA-90" in this specification shall mean Standard 90A Installation of Air Conditioning and Ventilating Systems and/or Standard 90B Installation of Air Heating and Air Conditioning Systems, as appropriate, and as published by the National Fire Protection Association.

1.04 SYSTEM DESCRIPTION:

- A. It is the intent of this specification and the drawings to cause these systems to be furnished complete in every respect, and that all equipment needed shall be furnished in connection with such systems whether specifically mentioned or not.
- B. Electrical wiring and equipment required under this section, such as interlocking wiring, control wiring, power wiring, and any other electric work shall conform to the requirements under Division 16 ELECTRICAL of the specification.

1.05 QUALITY ASSURANCE

- A. All work and material shall conform to applicable codes, utility company standards, and the rules and regulations of the authorities having jurisdiction.
- B. The Contractor shall apply and pay for all inspection permits, certificates or inspection and license fees in connection with his work, and shall deliver the same to the Engineer at the completion of his work.
- C. All equipment delivered to the job is subject to Engineer's inspection. Any changes necessary because equipment delivered to this job is not in accordance with approved drawings, whether in equipment or in connections to it, or in structural changes to accommodate site, shall be at the Contractor's expense.

1.06 SUBMITTALS:

- A. Shop drawings of the following shall be submitted for review:
 - Hangers and supports
 - Dampers and motor operators
 - Exhaust fans
- B. Shop drawings shall consist of manufacturer's scale drawings, cuts, or catalogs, including descriptive literature and complete characteristics, code requirements, and motor drive. Shop drawings shall be identified by name and number of equipment, as indicated on contractor drawings or in the specifications. Catalog data submitted without proper identification of model number or type will not be accepted or acted upon by the Engineer. Information on shop drawings which applies to models or systems which do not specifically apply to the item shall be deleted.
- C. Review of the duct system will not be performed until shop drawings for the complete system have been submitted.
- D. Piping:

1. In addition to shop drawings, submit ASME Form P-4A for welded joints. Submit shop drawings in accordance with Section 01300. Shop drawings of piping work shall have a minimum scale of 3/8 inches to 1 foot and be developed from measurements taken at the project site.
 2. Before any welding is performed, the Contractor shall submit to the Owner, or his authorized representative, a copy of his Standard Welding Procedure Specification, and copies of welder's certifications for those welders assigned to this project.
- E. Pipe Hangers and Supports:
1. Manufacturer's data sheets on all proposed catalogued items indicating their intended use.
 2. Drawings covering all specially designed hanger assemblies and fabrications.
 3. Calculations showing location, loads, calculated travel, and sizes of all spring hanger and constant support assemblies.

1.07 SEQUENCING/SCHEDULING:

- A. Cooperate with contractors of other work to avoid interference of heating and ventilation work with that of other trades.
- B. Pertinent contract and shop drawings of other trades shall be consulted as required for proper coordination of work.
- C. Items required to be provided under this section for installation under another section of the specification shall be provided and delivered to the building site at the time required by the overall construction schedule, under this section. Such items shall be received, unloaded, suitably protected and stored if required, and installed under the appropriate sections of the specifications.

PART 2 - PRODUCTS

2.01 SHEET METAL:

- A. Galvanized sheet metal shall be new copper-bearing or prime grade galvanized steel sheets of lock-forming quality and shall have a galvanized coating of 1-1/4 ounces total for both sides of 1 sq. ft. of a sheet. Galvanized coating that will flake or peel under forming operations or laminated sheets will not be allowed.

2.02 FLEXIBLE CONNECTIONS:

- A. Provide sound isolating flexible connections on the inlet and outlet of all air moving equipment to which duct connections are made. Flexible connection shall be made absolutely airtight where connecting to ductwork and fan.
- B. For conventional duct systems not exposed to weather, high heat or corrosive agents, the flexible material shall be a heavy glass fabric double-coated with neoprene and weighing approximately 30 ounces per square yard.

- C. For connections exposed to sun and weather, the flexible material shall be a heavy glass fabric double-coated with hypalon and weighing approximately 26 ounces per square yard.
- D. For connections exposed to heat up to 500-deg. F, the flexible material shall be a heavy glass fabric coated with silicon rubber and weighing approximately 16 ounces per square yard.
- E. For connections exposed to heat up to 1,000-deg. F and at induced draft fans, the connections shall be made up of an inner layer of two thicknesses of wire inserted glass cloth weighing approximately 50 ounces per square yard and then covered with an outer layer of heavy glass fabric double coated with neoprene.
- F. Flexible material shall be similar to that made by Ventfabrics, Inc., Chicago, IL, or Duro Dyne National Corp., Farmingdale, NY, suitable for the service needed.

2.03 AUTOMATIC DAMPERS:

- A. Dampers shall be manufactured by Johnson Service Dd-1200 and D-1300 or Honeywell D-642 and D-643. Dampers shall be made up of damper sections not exceeding 16 square feet per section. Damper shafts shall be zinc plated steel. Dampers shall be in accordance with NFPA Standard 90-A for smoke dampers. All modulating dampers shall be sized and provided with linkage to provide linear flow characteristics under actual installed conditions. Linkage between damper sections shall be as specified under Damper Actuators.
- B. Dampers shall be of the louver type with neoprene or vinyl edged blades and end seals. Louver blades shall be #16 gage galvanized steel, maximum 8 inches in width. Where local codes require fire dampers on outside air intakes, dampers shall be 16 gage galvanized steel.
- C. Frames shall be minimum 4 inches reinforced flat galvanized steel with welded corners and stiffening and provisions for end seals. All rods shall be non-corrosive material with provision for positive interlocking of blades and operators on the shaft. Where local codes require fire dampers on the outside air intakes, rods shall not be of aluminum construction. All bearings shall be nylon or teflon. All hardware shall be non-corrosive material. Two position dampers may be of the parallel blade type. Modulation dampers shall be of the opposed blade type. Steel dampers located in outside air intakes shall have two coats of black enamel finish. Other steel dampers shall have one coat of black lacquer. Provide solid stops on all sides of the frames against which the louver shall close in order to provide maximum of two percent leakage at 5 inches static pressure. Dampers are to be installed by the Contractor.
- D. All damper operators shall be of the heavy duty oil submerging type, with sufficient power to overcome friction of damper linkage and with mounting arrangement for location outside of the air stream wherever possible.

2.04 ELECTRIC DAMPER OPERATORS:

- A. Electric Damper Operators: Shall be hydraulic or permanent split capacitor or shaded pole type with gear trains completely oil immersed and sealed. Spring return motors, where specified on the plans or in the operational sequence, shall have an integral spiral spring mechanism. The entire spring mechanism in its housing shall be easily removable for service or adjustment of limit switches, auxiliary switches, or feedback potentiometer.

- B. Motors in outdoor locations and in outside air intakes shall have “O” ring gaskets to make them completely weatherproof and shall have internal heaters to allow normal operation at minus 40°F.
- C. Operators for dampers shall be provided for each automatic damper and shall be of sufficient capacity to operate the damper or valve under all conditions, and to guarantee tight close-off of valves, as specified, against system pressure encountered with sufficient reserve power to provide smooth position action. Damper motor operators shall be interlocked with the appropriate equipment as shown on the drawings.

2.05 STORM LOUVERS:

- A. Fixed aluminum storm louvers to be provided for the motorized dampers as shown on the drawings shall be as specified under Section 10200, LOUVERS AND VENTS.

2.06 EXHAUST FAN:

- A. New roof exhaust fan to replace the existing exhaust fan (EF-1) at the Knight Street Pump Station shall be a vertical, centrifugal type with backward-inclined wheels, belt or direct-driven by an electrical motor. Fan shall have weatherproof aluminum housing suitable for curb mounting. The housing shall be domed shaped with the motor space separated from the air stream and accessible from the outside. The fan and motor shall have permanently lubricated bearings. Bird screen shall be installed in the outlet from exhaust fan. Screen shall be of 1/2 inch spaced aluminum wire and shall be made up in removable frames. Fan shall be provided with roof curb as hereinafter specified. Motorized damper shall be installed in the roof curb. A disconnect switch located in the motor compartment or mounted on the fan in an acceptable location shall be provided with each fan. The entire assembly shall be mounted on rubber vibration isolators.
- B. Fan shall be complete with motors, magnetic motor starters and drives unless the fan is controlled by VFD. Fan shall deliver the specified air quantities at the specified pressures when tested in accordance with the requirements of AMCA and shall bear AMCA certified rating seal. Fan shall be statically and dynamically balanced.
- C. When V-belt drives are used, motor shall be provided with adjustable rails or bases. Motor sheaves shall be adjustable to provide not less than 20 percent speed variation. Sheaves shall be of the synchronized adjustment type. Belt guards shall be provided.
- D. Fan shall be provided with personnel screens or guards on both suction and supply ends except where ducts are connected to the fan, the screens need not be provided.
- E. Bearings shall be self-aligning, oil lubricated sleeve with constant level oilers with extended lines for one side oiling. Fan discharge shall have flanged connections.

2.07 ROOF FAN CURB:

- A. Curb for roof exhaust fan shall be supplied by the fan manufacturer. Curb shall be factory-fabricated of 0.081 inch sheet aluminum with all joints heliarc welded, or 18 gauge galvanized steel. Cants and roof flanges shall be an integral part of the curb. The inside of the curb shall be insulated with glass-fiber thermal and acoustical lining of 1-1/2 inch minimum thickness with a neoprene or equal coating for protection from erosion. The lining shall conform to NFPA 90A Standards with a flame spread and fuel contributed rating not exceeding 25, and a smoke developed rating not exceeding 10. Pressure-treated wood nailers shall be provided at the tops of the curbs. Curb shall be a minimum of 12-inches high.

2.08 HANGERS, SUPPORTS, GUIDES AND ANCHORS:

- A. Pipe hangers and supports, hanger rods, protection saddles and inserts shall be type numbers based on Manufacturer's Standardization Society SP-69, unless otherwise indicated.
- B. Pipe Covering Protection Saddles: Types 39 or 40.
- C. Pipe Hangers: Types 1, 41, and 43
- D. Spring Hangers: Types 49, 51, or 53.
- E. Anchors: Grinnell Fig. 197 or Fee & mason Fig. 159 or approved equal.
- F. Pipe Guides: Grinnell Fig. 256, C & P Fig. 1007, or Elcen Fig. 411159 or approved equal.

2.09 CONTROLS:

- A. The new roof exhaust fan EF-1 shall be connected to the existing system controls and shall have the same sequence of operations as the existing fan being replaced. The wiring and conduit shall comply with Division 16.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. All equipment and materials shall be installed in accordance with the shop drawings and manufacturer's instructions.
- B. Ductwork shall be installed in accordance with the HVAC Duct Construction Standards.

3.02 RECORD DRAWINGS:

- A. As the work progresses, legibly record (red line) all field changes on a set of project contract drawings. Prior to Substantial Completion of the project, submit the red lined prints to the Engineer.

3.03 OPERATIONS MANUAL:

- A. Upon completion of all work, and before final inspection and acceptance of the installation by the Engineer, six copies of a complete instruction manual, bound in booklet form and suitably indexed, shall be submitted to the Engineer for review. The manual shall be fully typewritten or printed; material written in longhand shall not appear in the manual. The manual shall contain the following:
 - 1. Brief description of each system covering basic operating characteristics
 - 2. List of all equipment, with manufacturer's name and model number of each item
 - 3. Manufacturer's literature describing each item of equipment
 - 4. Parts list for each major item of equipment
 - 5. Detailed step-by-step instructions for systems

3.04 INSTRUCTION OF OWNER'S PERSONNEL:

- A. After completion of all work and all tests, and at times designated by the Engineer, the Contractor shall provide the necessary skilled personnel to operate the entire installation for a period not less than four hours. During the operating period, the Contractor shall instruct the Owner's representatives in the complete operation, adjustment, and maintenance of the entire installation.

3.05 PAINTING:

- A. All painting of heating and ventilating equipment shall be provided in accordance with Section 09900.

END OF SECTION

SECTION 16010

ELECTRICAL WORK - GENERAL PROVISIONS

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. The work covered by this section of the specifications consists of furnishing all labor, equipment, appliances, materials and incidentals in connection with the installation of the complete electrical systems as herein specified and as shown on the drawings.
- B. It is not the intent that the drawings shall show every junction box, conduit, wire, fitting, device, accessory, etc., but the Electrical Subcontractor shall be required to furnish without additional expense all transportation, labor and materials necessary to complete the electrical systems in accordance with the best practice of the trade.
- C. Unless otherwise specified, materials of the same classifications, used for the same purpose shall be the product of the same manufacturer.
- D. In conjunction with other sections of Division 16, the work shall include furnishing and installing the following items:
 - 1. Electrical Service
 - 2. Grounding System
 - 3. Wires and Cables
 - 4. Miscellaneous Equipment
 - 5. Power and signal wiring, and conduit for process equipment, controls and instrumentation furnished under other divisions of the specifications as shown on the Drawings.
 - 6. Grounding and bonding of all electrical devices and equipment.
 - 7. Wiring devices (junction boxes, outlets, relays and contacts) complete with associated conduits and fittings.
 - 8. Core drilling for the Work of this Section.
 - 9. Demolition
 - 10. Cleaning.
 - 11. Create As-built drawings
 - 12. Furnish, install and maintain all electrical hoisting equipment, operating personnel and rigging that is necessary for the proper execution of the Work of this Section.
 - 13. Furnish, install and maintain all staging, planking and scaffolding that is necessary for the proper execution of the Work in this Section.

- E. Make all necessary connections at "packaged" equipment furnished under other sections and Divisions of these specifications.
- F. Make all connections to equipment and devices furnished under Division 16 and other sections of these specifications except as otherwise specified.
- G. Connect process and instrumentation cables furnished with field-mounted equipment under other sections and Divisions of these specifications.
- H. It is the intent of these specifications that the electrical system shall be suitable in every way for the service required. All material and all work which may be reasonably implied as being incidental to the work of this section shall be furnished at no extra cost to the Owner

1.02 RELATED WORK:

- A. The Electrical Subcontractor's attention is directed to the General Conditions, Supplementary Conditions.
- B. Section 01010, SUMMARY OF WORK
- C. Section 01735, CUTTING, CORING AND PATCHING
- D. Section 01736, AS-BUILT DRAWINGS
- E. Section 02050, DEMOLITION AND ALTERATIONS
 - 1. Disconnection, removal and disposal of designated electrical equipment shown on the Drawings shall be performed by the Electrical Subcontractor.
 - 2. Disconnection of existing equipment for removal or relocation shall be performed by the Electrical Subcontractor for removal by the Contractor.
- F. Excavation and backfilling required for underground electrical work is included under Division 2.
- G. Concrete work and reinforcing for electrical equipment pads is included under Division 3.
- H. Section 11303, SUBMERSIBLE WASTEWATER PUMPS AND APPURTENANCES
- I. Section 15800, HEATING AND VENTILATION

1.03 INTERPRETATION OF DRAWINGS:

- A. The Drawings are diagrammatic only and are not intended to show exact locations of outlets and conduit runs.
- B. The Electrical Subcontractor shall verify with the Owner's consulting engineer the exact locations and mounting heights of equipment prior to installation.
- C. Any work installed contrary to Contract Documents, or without approval by the Owner's consulting engineer, shall be changed or replaced as directed by the Owner's consulting engineer and no extra compensation will be allowed the Electrical Subcontractor for making these changes.

- D. The locations of equipment shown on the Drawings are approximate only. Exact locations shall be as approved by the Owner's consulting engineer and/or Owner's representative during construction. The Electrical Subcontractor shall obtain in the field all information relevant to the placing of electrical work and in case of any interference with other work, shall proceed as directed by the Owner's consulting engineer and shall furnish all labor and materials necessary to complete the work in an approved manner.
- E. Surface mounted panel boxes, junction boxes, conduit, etc., shall be supported by spacers to provide a clearance between wall and equipment.
- F. 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.
- G. The ratings of motors and other electrically operated devices together with the size shown for their branch circuit conductors and conduits are approximate only and are indicative of the probable power requirements insofar as can be determined in advance of the purchase of equipment. The ratings shown for motor branch circuit protective devices are the maximum ratings permitted. Lower ratings may be used where approved as being proper for the dynamic characteristics of the motor and its connected load.
- H. Unless otherwise specified, all conduits, wires, and cables and the support systems for the conduits and cables that are required to make the electrical connections to equipment shall be furnished and installed. All connections to equipment shall be made as shown, specified, and directed and in accordance with the approved shop and setting drawings.
- I. Where circuits are shown as "home-runs", all necessary fittings and boxes shall be provided for a complete raceway installation.
- J. The Electrical Subcontractor shall verify, in the field, all measurements necessary for his work and shall assume responsibility for their accuracy.

1.04 LOCAL CONDITIONS:

- A. The Electrical Subcontractor shall provide and place all sleeves for conduits penetrating floors, walls, partitions, etc.
- B. All cutting and patching shall be done in a thorough workmanlike manner.
- C. Before submitting proposals, the Electrical Subcontractor is expected to inspect the site and survey the conditions to be encountered in the performance of the work. Failure to familiarize himself with the conditions shall not relieve the Contractor's responsibility for full completion of the work in accordance with the provisions of the Contract.

1.05 PERMITS, FEES AND INSPECTION:

- A. All work shall meet or exceed the latest requirements of all national, state, county, municipal and other authorities exercising jurisdiction over electrical construction at this project.
- B. All required permits and inspections shall be obtained and paid for by the Electrical Subcontractor, and given to the Owner at the completion of the work.

1.06 CODES AND STANDARDS:

- A. Unless indicated or specified otherwise, materials and workmanship shall conform to the latest editions of the following codes, standards and specifications.
1. National Bureau of Standards Handbook H-30 National Electrical Safety Code
 2. State and Local Codes, and all other authorities having jurisdiction
 3. Underwriter's Laboratories, Inc. (UL)
 4. American National Standards Institute, Inc.
 5. Institute of Electrical and Electronic Engineers (IEEE)
 6. National Electrical Manufacturers Association (NEMA)
 7. National Board of Fire Underwriters
 8. Insulated Power Cable Engineers Associated Specifications
 9. American Society for Testing Materials Specifications
 10. National Electrical Code (NFPA 70)
 11. National Fire Alarm and Signaling Code (NFPA 72)

1.07 SUBMITTALS:

- A. Material and Equipment Schedules. In accordance with Section 01300, submit six complete brochures for approval of materials, fixtures, and equipment to be incorporated in the work. The list shall include manufacturer's name, catalog numbers, cuts, diagrams, drawings, and such other descriptive data as may be required. No consideration will be given to a partial submittal from time to time. Approval of materials will be based on manufacturer's published ratings. Any materials, fixtures and equipment listed that are not in accordance with the specification requirements will be rejected.
- B. Substitutions: Substitution of material or equipment shall be in accordance with the General Conditions. Equipment where specified by Make and Model # for coordination with existing equipment on the drawings shall not be substituted.
- C. Shop Drawings. Shop drawings shall be submitted in accordance with Section 01300. Shop drawings shall be submitted for, but not limited to the following:
1. Conduit
 2. Boxes and fittings
 3. Wires, cables and appurtenances
 4. Control devices and stations
 5. Grounding system
 6. Disconnect Switches

7. Circuit Breakers
- D. Submit the following information with all equipment shop drawings.
 1. Manufacturer's certified scale drawings, cuts, or catalogs, including installation details and manufacturer's name.
 2. Manufacturer's specifications, including certified performance characteristics and capacity ratings.
 3. Electrical wiring diagrams and controls, where applicable.
 4. Certificate of compliance with Code, where applicable.
 5. Detail of all conduit stub-up with conduit size and dimensions from columns or walls.
 - E. Equipment shop drawings and wiring diagrams must be prepared specifically for this installation. Standard factory wiring diagrams with a revision marked in ink for this installation will be accepted.
 - F. All control and wiring diagrams shall be complete with the following description:
 1. Sequence of operation
 2. Sequence of interlocking
 3. Operation of alarms
 4. Legend
 5. Wiring Numbers
 - G. All equipment shop drawings shall be properly identified and indicate the Article number of the specifications or the Drawing number which applies to the submitted item.
 - H. Shop drawings for the items listed above shall be submitted for approval in accordance with the preceding paragraphs. The Owner's consulting engineer, however, reserves the right to require submittal of shop drawings on any other material or equipment to be installed under this Section not specifically listed above.
- 1.08 MANUFACTURER'S SERVICES:
- A. Furnish manufacturer's services for testing and start-up of electrical equipment as specified in Division 16.
- 1.09 MINOR DEVIATIONS:
- A. The work as shown on the drawings is diagrammatic and is intended to show the work included and the arrangement of the various systems.
 - B. It is not intended that the accompanying plans and specifications cover every detail of the required installation. Furnish and install equipment, materials and labor as shown or specified, as are usually furnished, or as are needed to make a complete and satisfactory operating installation, whether mentioned or not, omitting only those items which are specifically excluded.

- C. Locations and mounting heights of equipment and/or devices as shown are approximately correct. The Owner's consulting engineer reserves the right to relocate any equipment or device prior to actual installation at no extra cost to the Owner.
- D. No deviation from layout shall be made without written approval from the Owner's consulting engineer.

1.10 TEMPORARY LIGHT AND POWER:

- A. The Electrical Subcontractor shall provide wiring and conduit for temporary light and power as specified in Section 01010.

1.11 ELECTRICAL REFERENCE SYMBOLS:

- A. Symbols shown on the drawings shall approximate location of fixtures, outlet boxes, and conduit runs, and other equipment, unless otherwise detailed. The exact location shall be governed by structural conditions and obstructions. This is not to be construed to permit redesigning systems. All outlets shall be interconnected as shown on the drawings. Locate and install all boxes and equipment where they will be readily accessible.

1.12 PHASE IDENTIFICATION:

- A. The entire system of wiring shall be phased by color code as follows:
 - 1. Wires No. 6 AWG and smaller shall have a continuous colored outer covering.
 - 2. Wires larger than No. 6 AWG shall be identified at all points of termination by gummed tape, plastic tape, etc., applied to the wire.
 - 3. Bus bars in motor control centers and panelboards shall be properly identified by color as herein specified.
 - 4. Code colors for wiring systems shall be:

<u>120/208 Volts</u>	<u>480 Volts</u>
Neutral – White	
Phase A – Black	Phase A – Brown
Phase B – Red	Phase B – Orange
Phase C - Blue	Phase C – Yellow

1.13 PROTECTION AND CLEANING OF EQUIPMENT:

- A. All electrical equipment, upon receipt, shall be adequately stored and protected from damage.
- B. After installation, all electrical equipment shall be protected to prevent damage during the construction period. Openings in conduits and boxes shall be closed to prevent entrance of foreign materials.
- C. The interior of boxes and cabinets shall be left clean. Exposed surfaces shall be cleaned and plate surfaces polished.

1.14 OPERATION AND MAINTENANCE MANUALS:

- A. The Electrical Subcontractor shall furnish the Owner with three (3) copies of complete operating and maintenance manuals. Manuals shall include all equipment, maintenance instruction, parts list, warranties, schematic diagrams of control systems, and lubrication charts.
- B. Manuals shall contain only that information which specifically applies to this project, and all unrelated material shall be deleted. During the instruction period, herein specified, this manual shall be used and explained. Each copy of manual shall be clearly indexed and include a directory of all subcontractors and maintenance contractors, indicate the area of their responsibility, and list the name and telephone numbers of the responsible member of each organization. This material shall have a clear plastic protective shield over each sheet of data.
- C. Each manual shall be bound in an expandable plastic covered hardbound binder. Binders shall be three (3) straight post type. Ring type binders will not be acceptable. The manual's front cover and side cover shall be gold-leaf stamped "Operation and Maintenance Manual -- Electrical Systems" along with the project title.

1.15 OPERATING AND MAINTENANCE INSTRUCTIONS:

- A. A competent Engineer shall be provided by the Electrical Subcontractor to instruct operating personnel in the operation and maintenance of equipment and systems.

1.16 SPARE PARTS DATA:

- A. The Electrical Subcontractor shall furnish a complete list of recommended spare parts and supplies for the equipment furnished with current unit prices and source of supply.

1.17 TESTS:

- A. The Electrical Subcontractor shall perform all tests at the completion of the work and the results furnished to the Owner and Engineer in writing. Tests shall include, but not be limited to: all systems test free of shorts or grounds, proper neutral connections, ground system resistance, all lighting fixtures with lamps in place for 10 hours.
- B. Upon completion of all work, the Electrical Subcontractor shall furnish, in duplicate, certificates of inspections from all inspectors and authorities having jurisdiction.
- C. Furnish all labor, material, instruments, supplies and services and bear all costs for the accomplishment of the tests.

1.18 GUARANTEE:

- A. The Electrical Subcontractor shall guarantee equipment and performance of the installation and equipment in accordance with the GENERAL CONDITIONS and DIVISION 1.

1.19 SERVICE AND METERING:

- A. The power company serving this project is NGRID. All utility fees and charges for relocating the existing meters and service at the East Natick I and East Natick II Pump Stations will be paid under the stipulated sum included in the Form for General Bid.
- B. The power company will be responsible for the following work at the East Natick I Pump Station under existing Work Request No. 25420889:

1. Disconnecting existing underground service
 2. Furnishing and installing new 4/c-1/0 277/480 overhead service from existing Pole #5 to pump station.
- C. The power company will be responsible for the following work at the East Natick II Pump Station under existing Work Request No. 25421030:
1. Replacing existing underground service from Pole# 10.2 to new meter location.
 2. Relocating existing meter and making final connections.
- D. The Electrical Subcontractor shall be responsible for the following work:
1. Make all arrangements with the power company for replacing existing electrical services, and furnish all labor and material required for the electrical services.
 2. Furnishing and installing secondary service, secondary cable, metering conduit and wiring as necessary.
 3. Installing meter base.
- E. All work and material for the secondary service shall be in accordance with the requirements of NGRID.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. The materials used in all systems shall be new, unused and as hereinafter specified. All materials where not specified shall be of the very best of their respective kinds. Samples of materials or manufacturer's specification shall be submitted for approval as required by the Engineer.
- B. Materials and equipment used shall be U.L. listed wherever such approved materials and equipment is available.
- C. Electrical equipment shall at all times during construction be adequately protected against mechanical injury or damage by water. If any apparatus has been damaged, such damage shall be repaired by the Electrical Subcontractor at his cost and expense. If any apparatus has been subject to possible damage 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.
- D. The Electrical Subcontractor's attention is directed to the requirements of the various sections of Division 16 for additional product specifications.

2.02 MANUFACTURER'S NAMEPLATES:

- A. All equipment shall have the manufacturer's name, address, model or type designation, serial number and all applicable ratings clearly marked thereon in a location which can be readily observed after installation. The required information may be die-stamped into the surface of the equipment or may be marked on durable nameplates permanently fastened to the equipment.

PART 3 - EXECUTION

3.01 PROTECTION OF ELECTRICAL EQUIPMENT:

- A. Protect electrical equipment from the weather, and water at all times during shipment, storage, and construction. Do not store equipment outdoors. Prevent moisture damage. Provide uniformly distributed source of heat in electrical equipment to prevent condensation and damage to electrical insulation systems. All damaged equipment shall be replaced at no additional cost to the Owner.

3.02 WORK IN EXISTING STRUCTURES:

- A. Temporary shutdowns of electrical services or systems shall be scheduled at least one week in advance with the Owner.

3.03 EQUIPMENT IDENTIFICATION:

- A. Identify equipment with the name of the equipment it serves. Nameplates shall be engraved, laminated plastic, not less than 1/16-in. thick by 3/4-in by 2-1/2-in. with 3/16-in. high white letters on a black background.
- B. Nameplates shall be screw mounted to NEMA 1 enclosures. Nameplates shall be bonded to all other enclosure types using an epoxy or similar permanent waterproof adhesive. Two sided foam adhesive tape is not acceptable. Where the equipment size does not have space for mounting a nameplate, the nameplate shall be permanently fastened to the adjacent mounting surface.
- C. Install permanent nameplates on all devices and equipment such as starters, relays, contactors, pushbuttons, indicating lights, and switches. Place nameplates in visible location after equipment installation.

3.04 ELECTRICAL DEMOLITION:

- A. All electrical equipment and material disconnected shall be removed and disposed of in accordance with applicable Federal and State regulations.
- B. Extent of Demolition:
 - 1. Demolition includes de-energizing and disconnecting all electrical and related equipment within the areas shown on the Drawings or specified as being demolished.

3.05 INSTALLATION:

- A. All work shall be executed in full accordance with the National Electrical Code and local rulings. Should any work be performed contrary to said rulings, ordinances and regulations, this Electrical Subcontractor shall bear full responsibility for such violations and assume all costs arising therefrom.
- B. Load Balance:
 - 1. Electrical loads shall be balanced across panelboard busses. Loads between phases shall not vary more than 20 percent.

- C. Before starting the work, confer with all other trades relative to the location of pipes, ducts, and apparatus or fixtures to be installed by them and select locations for the work which will avoid possible conflicts with the work of other trades involved. All differences or conflicting conditions concerning the work shall be called to the attention of the Engineer for adjustment before starting work. For such work performed or materials installed in violation of the above clause the work shall be readjusted to the complete satisfaction of the Engineer at the sole expense of the Electrical Subcontractor.
- D. Cleanup:
 - 1. The Electrical Subcontractor shall cooperate with other workmen and with the General Contractor in the daily removal of debris from the work site.
 - 2. The Electrical Subcontractor shall leave "broom clean" all areas where he has interrupted or completed his work.
 - 3. He shall cooperate with the General Contractor in good housekeeping procedures.
 - 4. At the completion of his work, prior to the final inspection, the Electrical Subcontractor shall clean all devices, plates, fixtures, lenses, switches, cabinets, exposed conduits, fittings, etc. and shall have the premises in a thoroughly clean condition.

3.06 RECORD DRAWINGS:

- A. As the work progresses, legibly record (red line) all field changes on a set of project contract drawings. Prior to Substantial Completion of the project, submit the red lined prints to the Engineer.

3.07 SLEEVES AND FORMS FOR OPENINGS:

- A. Provide and place all sleeves for conduits penetrating floors, walls and partitions. Locate all slots for electrical work and form before concrete is poured.
- B. Obtain shop drawings and templates from equipment vendors.
- C. Seal all openings, sleeves, penetration and slots.

3.08 CUTTING AND PATCHING:

- A. The Electrical Subcontractor shall be responsible for coring and drilling holes up to 4-1/2 inches in diameter to complete Electrical Work. Holes greater than 4-1/2 inches in diameter shall be cored and drilled by the Contractor.
- B. All cutting and patching required to install the Work of DIVISION 16 - ELECTRICAL as shown on the drawings shall be performed by the Contractor in accordance with Section 01735. The Electrical Subcontractor shall coordinate all cutting and patching operations with the Contractor prior to starting the Work.
- C. When existing conduits are cut at the floor line of wall line, they shall be filled with grout.

3.09 MAINTAINING EQUIPMENT IN NEW AND AS DELIVERED CONDITION:

- A. Electrical equipment shall not be stored outdoors. Electrical equipment shall be stored in dry permanent shelters. .
- B. Equipment that has been damaged shall be replaced at no additional cost to the Owner.

3.10 TESTS AND ADJUSTMENTS:

- A. Test all systems furnished under Division 16 and repair or replace all defective work. Make all necessary adjustments to the systems and equipment and instruct the Owner's personnel in the proper operation of the systems and equipment. The Owner reserves the right to videotape the instruction sessions for future use in training.

END OF SECTION

SECTION 16011

MISCELLANEOUS ELECTRICAL EQUIPMENT

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. The Electrical Subcontractor shall furnish and install all miscellaneous equipment as shown on the drawings and as specified hereinafter.
- B. The Electrical Subcontractor's attention is directed to the requirements of Section 16010, ELECTRICAL WORK - GENERAL PROVISIONS.

1.02 SUBMITTALS:

- A. Manufacturer's data and descriptive literature shall be submitted for all material specified hereinafter.
- B. Shop drawings, complete with wiring diagrams showing all standard and optional features for the service switchboard shall be submitted.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Except as otherwise specified, nameplates shall be black and white laminated plastic having engraved letters extending through the black face into the white layer. Warning nameplates shall be red and white laminated plastic having engraved, 1-inch high letters extending through the red face into the white layer.
- B. General purpose receptacles shall be 20 ampere, 125 volt, 2 pole, 3 wire, grounding type with totally-enclosed molded brown body, binding screw terminals, grounding screw terminal, phosphor bronze contacts and cap retention clips. Receptacles shall be heavy duty, Specification Grade and meet Federal Specification W-C-596-C. Provide ground fault interrupting receptacles where shown on the drawings.
- C. Wall switches shall be heavy duty, specification grade, toggle action, flush mounting quiet type. All switches shall conform to the latest revision of Federal Specification WS 896. Wall switches shall be 20 ampere, 120/277 volt or 120 volt, and single, 2, 3 or 4 pole as required.
- D. Circuit breakers shall be thermal-magnetic, molded case type, 120, 240 or 480 volt, single, 2 or 3 pole with frame and trip ratings as shown on the drawings. All circuit breakers shall have a minimum interrupting capacity of 22,000 RMS amperes symmetrical. Breakers shall be furnished in NEMA Type 1 enclosures, except as otherwise shown on the drawings, having external operating handles and full cover interlock. Main circuit breakers shall be UL listed for use as service entrance equipment. All circuit breakers shall be with interlock with open position. Breakers shall be as manufactured by General Electric Co., Square D Co., Eaton Cutler-Hammer, Siemens or equal.

E. EQUIPMENT SUPPORTS:

1. Support for mounting lighting fixtures, panelboards, starters, and other electrical distribution and control equipment shall be continuous slot channels with inner clamping ridges. Channels and fittings shall be formed from low carbon steel strip, hot dipped galvanized and field painted. Nuts shall be case-hardened steel with serrated grooves.
2. Support equipment shall be as manufactured by Unistrut Building Systems, Van Huffel Tube Corp., or shall be acceptable equivalent product. Support sizes and arrangements shall be as required for the equipment being supported.

F. Device Plates:

1. Plates for indoor flush mounted devices shall be of the required number of gangs for the application involved and shall be Type 302 high nickel (18-8) stainless steel of the same manufacturer as the devices.
2. Plates for indoor surface mounted device boxes shall be cast metal of the same material as the box.
3. Oversized plates shall be installed where standard plates do not fully cover the wall opening.
4. Device plates for switches mounted outdoors or indicated as weatherproof shall be gasketed, cast aluminum with provisions for padlocking switches "On" and "Off".
5. Multiple surface mounted devices shall be ganged in a single, common box and provided with an adapter, if necessary, to allow mounting of single gang device plates on multigang cast boxes.
6. Engraved device plates shall be provided where indicated.
7. Weatherproof, gasketed cover for GFI receptacle mounted in a FS/FD box shall be Arrow-Hart, Harvey Hubbell, Inc.; Pass & Seymour, Inc. or equal.

- G. Disconnect switches shall be heavy-duty, NEMA Type HD quick-make, quick-break, 460 volt, 3 pole with visible blades and full cover interlock. Current ratings and enclosure types shall be as shown on the drawings. Disconnect switches shall be locked in the open position. Motor disconnect switch shall be horsepower rated NEMA 3R. Disconnect switch shall be equipped with minimum 1-NO and 1-NC "make before break" auxiliary contacts. Switches shall be as manufactured by General Electric Co., Square D Co., Eaton Cutler-Hammer, Siemens or equal.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Perform work in accordance with the National and Rhode Island Electrical Codes.
- B. Nameplates shall be permanently installed on all distribution and control equipment. Nameplates shall identify the distribution equipment and indicate the load served by control equipment.

- C. Electrical equipment shall be supported in an acceptable manner. A safety factor of not less than two shall be applied to all equipment supports.

END OF SECTION

SECTION 16110

RACEWAYS

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. The Electrical Subcontractor shall furnish and install the complete raceway systems, with all accessories, fittings, boxes, etc., as shown on the drawings and as specified hereinafter.
- B. The Electrical Subcontractor's attention is directed to the requirements of Section 16010, ELECTRICAL WORK - GENERAL PROVISIONS.

1.02 SUBMITTALS:

- A. Manufacturer's data and descriptive literature shall be submitted for all materials specified hereinafter.

1.03 APPLICATIONS:

- A. All wiring shall be installed in rigid steel conduit, except as otherwise shown on the drawings or specified hereinafter.
- B. PVC conduit shall be used for conduit to be placed underground and/or embedded in concrete unless otherwise indicated.
- C. PVC coated, rigid steel conduit shall be used for all installations in chemical containment and hazardous areas.
- D. Fittings, exposed switch, outlet and control station boxes and other exposed boxes 4" square and smaller shall be cast or malleable iron.
- E. Except as otherwise shown on the drawings, terminal, junction and pull boxes larger than 4" square shall be sheet steel.
- F. PVC coated boxes and fittings shall be used for chemical containment areas.
- G. PVC fittings shall be used with PVC conduit.
- H. Liquidtight, flexible metal conduit shall be used for all connections to equipment subject to vibration.
- I. No conduit smaller than 3/4" electrical trade size shall be used, except as otherwise shown on the drawings. Box sizes shall not be less than that required by the National Electrical Code.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Rigid steel conduit shall be heavy-gauge steel, hot-dipped galvanized per ASTM A123 inside and outside over the entire length including threads and shall have an additional

factory-applied sealing finish inside and outside. Conduit shall be as manufactured by Youngstown Sheet and Tube Co.; Allied Tube and Conduit Corp.; Wheeling-Pittsburg Steel Corp., or equal. Rigid steel conduit shall be furnished with a coupling on one end and thread protector on the other.

- B. PVC conduit shall be rigid polyvinyl chloride, Schedule 40, meeting the requirements, of UL 651 and NEMA TC-2, as manufactured by Carlon, Phillips Petroleum Co.; Triangle Pipe and Tube Co., Inc.; or approved equal.
- C. Liquidtight, flexible metal conduit shall consist of a flexible, corrosion resistant metal core with an extruded, watertight, synthetic jacket. Conduits smaller than 1-1/2" shall have a continuous ground conductor under the jacket. Conduit shall be sealtite Type UA manufactured by Anaconda Metal Hose Div., or as manufactured by American Flexible Conduit Co., Inc.; Universal Metal Hose Co.; or equal.
- D. **BOXES AND FITTINGS:**
 - 1. Sheet metal boxes shall have continuously welded seams, ground smooth. Steel boxes shall be hot-dipped galvanized after welding. Box bodies shall be flanged and shall be without holes or knockouts. Bodies shall be not less than 14 gauge metal and covers shall be not less than 12 gauge metal. Covers shall be gasketed and fastened with stainless steel hardware. Boxes shall be as manufactured by Hoffman Engineering Co.; Superior Switchboard & Devices; Sun Metal Products Div; or equal.
 - 2. Cast or malleable iron boxes and fittings shall have cadmium-zinc finish with cast covers and stainless steel screws as manufactured by the Crouse-Hinds Co.; Appleton Electric Co.; L.E. Mason Co.; or equal.
 - 3. PVC fittings shall be as manufactured by Carlon, an Indian Head Co.; Raco, Inc.; Robroy Industries; or equal.
 - 4. Conduit elbows shall be of the same material and construction as the conduits to which they are connected.
 - 5. Conduit hubs shall be as manufactured by Myers Electric Products, Inc.; Raco, Inc.; Appleton Electric Co.; or equal.
 - 6. Fittings used with liquidtight, flexible conduit shall be of the screw-in, compression type with sealing ring. Fittings larger than 1-1/4" shall be furnished with integral ground lugs. Fittings shall be as manufactured by Thomas and Betts Co.; Crouse-Hinds Co.; Appleton Electric Co.; or equal.
- E. Hangers, rods, backplates, beam clamps, etc. shall be hot-dipped galvanized iron or steel. They shall be as manufactured by the Appleton Electric Co.; Thomas and Betts Co.; Unistrut Corp.; or equal.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Exposed conduits shall be run parallel to or at right angles to walls. Conduit runs shall be straight and true. Conduit shall be supported by means of one-hole pipe clamps. One-screw backplates shall be installed where required to raise conduits from the surface. Multiple, horizontal runs shall be supported on trapeze hangers with steel

horizontal members and threaded rods not less than 3/8 inches diameter. Hangers shall be attached to structural steel by means of beam clamps. Spot type inserts shall be used in concrete.

- B. Conduit bends shall be carefully made to prevent distortion of the circular cross-section. No conduit run shall have more than the equivalent of three 90 degree bends between pulling points. Changes in direction shall be made with bends, standard elbows and pull boxes. Bends in parallel runs shall be concentric.
- C. The ends of all conduits shall be tightly plugged during construction until wires are to be pulled. Spare conduits shall be furnished with threaded caps.
- D. Conduits shall be terminated at pressed steel boxes and ungasketed sheet metal enclosures with double locknuts and suitable bushings. Bushings installed on conduits containing ground wires shall be grounding type. Conduits shall be terminated at gasketed sheet metal enclosures with conduit hubs.
- E. Steel conduit connections shall be made with threaded fittings.
- F. Wire shall not be pulled until the conduit system is complete in all details.
- G. Pull wire shall be installed in all telephone conduits. Pull wire shall be 1/8" polypropylene with not less than 200 pound tensile strength.
- H. Direct-buried underground conduits shall be placed not less than 3 feet below finished grade or surface on a 4" layer of sand extending the full width of the trench. Conduits shall be spaced not less than 2" from other conduits. Underground conduits shall be covered with a 4" layer of sand. Additional backfill and surface finish shall be as specified under other sections of the specifications. See drawings for details of underground conduit to be installed in concrete duct banks.
- I. Warning tape shall be installed over underground conduit runs except where conduits run under structural features. Tape shall be installed 12" below finished grade or surface.
- J. Underground conduit runs shall follow the drawings and shall run in straight lines as far as possible. Where deviation from a straight line becomes necessary, bends shall be of sufficient radius for the proper rodding and installation of cable. Changes in direction of runs exceeding a total of 10 degrees, either vertical or horizontal, shall be made by long sweep bends having a minimum radius of curvature of 25 ft, except that manufactured bends may be used at ends of short runs of 100 ft or less, and then only at or close to the end of the run. The long sweep bends may be made up of one or more curved or straight sections and/or combinations thereof. Manufactured bends shall have a minimum radius of 36 in. where a larger radius cannot be used.
- K. The Electrical Subcontractor shall furnish one set of marked copies of contract drawings, showing the exact routing and depths of all underground conduit, and bends deviating from a straight line, shall be referenced dimensionally from fixed objects or structures.

END OF SECTION

SECTION 16120
WIRES AND CABLES

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. Furnish, install and test all wires, cable and appurtenances as shown on the drawings and as specified hereinafter.
- B. The Electrical Subcontractor's attention is directed to the requirements of Section 16010, ELECTRICAL WORK - GENERAL PROVISIONS.

1.02 SUBMITTALS:

- A. Samples of proposed wire shall be submitted for review. Each sample shall have the size, type of insulation and voltage stenciled on the jacket.
- B. Acceptable samples will be sent to the project locations for comparison by the Engineer with the wire actually installed.
- C. Installed, unacceptable wire shall be removed and replaced at no additional cost to the Owner.
- D. Manufacturer's data and descriptive literature shall be submitted for all wire and cable.

1.03 APPLICATIONS:

- A. Building wire for power and lighting circuits shall be Type XHHW or THWN.
- B. Building wire for control, indicating and metering circuits shall be Type THWN, No. 14 AWG, 19-strand.
- C. Ground wires shall be Type XHHW or THWN, green.
- D. Except for control, indication, metering, telephone and signal wiring, no conductor smaller than No. 12 AWG shall be used. Wire sizes shall be not less than required by the applicable electrical code.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Conductors shall be annealed, 98 percent conductivity, soft-drawn copper.
- B. All conductors No. 10 AWG and larger shall be stranded.

2.02 BUILDING WIRE:

- A. Type XHHW wire shall be 600 volt, cross-linked polyethylene insulated, as manufactured by Pirelli Cable Corp., Collyer Insulated Wire Co.; the Okonite Co., or equal.

- B. Type THWN wire shall be 600 volt, thermoplastic insulated with nylon jacket, as manufactured by Pirelli Cable Corp., Collyer Insulated Wire Co.; the Okonite Co., or equal.

2.03 SIGNAL CABLE:

- A. Instrumentation signal cable shall be twisted pair, No. 16 AWG, stranded conductor, 600 volt polyethylene insulated, aluminum tape 100 percent shielded, polyvinyl chloride jacketed with a No. 18 AWG stranded copper drain wire, UL Style 2106, Belden Corp., Cat. No. 8719, or equal.
- B. Digital control wire shall be No.14 AWG NEC type THHN/THWN, stranded as manufactured by the Okonite Co.; Carol Cable Co. Inc.; Pirelli Cable Corp. or equal.
- C. Multi-conductor control cable, where shown on the Drawings, shall be stranded, No. 14 AWG, 600 Volt, polyvinyl chloride insulated, nylon jacket over insulation, polyvinyl chloride jacket overall, Type TC as manufactured by the Okonite Co.; Pirelli Cable Corp. or equal.

2.04 WIRE MARKERS:

- A. Wire markers shall be self-adhesive, vinyl coated, polyester film.

2.05 TERMINALS:

- A. Wire terminals shall be insulated, crimp type with tin plated, copper flanged fork and serrated barrel.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. All conductors shall be carefully handled to avoid kinks or damage to insulation.
- B. Lubrication shall be used to facilitate wire pulling. Lubricants shall be U.L. listed for use with the insulation specified.
- C. Crimp type terminals shall be used at all screw type control wire terminals.
- D. All wires and cables shall be uniquely identified control with wire markers at each termination and splice.
- E. Except where direct buried, install all wire and cable in raceways.

3.02 TEST:

- A. All feeder wires shall be tested with a megohm meter after installation. Test shall be made at no less than 500-volts. Submit a written test report of the results to the Engineer.

END OF SECTION

SECTION 16160

ABOVE GROUND SERVICE ENCLOSURE

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes

1. Furnish and install aluminum above ground service enclosure for the new wastewater pumping system installed at the East Natick II Pump Station site as shown on the drawings and referenced in the specifications.

- B. Obtain local electrical inspector's approval of cabinet design before fabrication and sign-off following installation.

1.02 RELATED WORK

A. Section 01300 – SUBMITTALS

B. Section 09900 – FIELD PAINTING AND COATING

C. Section 11303 – SUBMERISBLE WASTEWATER PUMPS AND APPURTENANCES

1.03 REFERENCES

A. UL - Underwriter's Laboratories Inc.

B. NEMA - National Electrical Manufacturers Association

C. ANSI - American National Standards Institute

1.04 SUBMITTALS

A. Submit the following information to the Engineer for review in accordance with Section 01300:

1. Submit complete descriptive literature, catalog cuts, and other data necessary for the Engineer to ascertain that the proposed equipment and materials comply with specification requirements. Catalog cuts submitted for approval shall be legible and clearly identify equipment being submitted.
2. Submit Drawings of the NEMA 3R free-service enclosure showing the locations of the pump control panel, electrical panels and components, and the relocated SCADA equipment within the cabinet. The size of the enclosure shall be worked out with each control manufacturer to accommodate the supplied control panels and electrical equipment.
3. Submittals for individual systems and equipment assemblies which consist of more than one item or component shall be made for the system or assembly as a whole. Partial submittals will not be considered for approval.
4. Information that confirms compliance with contract requirements. Include the manufacturer's name, model or catalog numbers, catalog information, technical

data sheets, shop drawings, pictures, nameplate data and test reports as required.

5. Elementary and interconnection wiring diagrams for communication and signal systems, control system and equipment assemblies. All terminal points and wiring shall be identified on wiring diagrams.
6. Spare parts list which shall include those replacement parts recommended by the equipment manufacturer, quantity of parts, current price and availability of each part.
7. The contractor shall furnish detailed and dimensioned submittals of the above-ground control enclosure and internal equipment mounting layout to the Engineer before fabrication and commencement of the work. The Engineer may choose to perform a prefabrication inspection at the factory.
8. Three-ring bound maintenance manuals shall be complete and shall be furnished in a loose leaf binder or in the manufacturer's standard binder.
 - a. Information shall be sufficient to enable a qualified technician to perform normal first line maintenance and repair. The manuals shall cover any wiring and electrical devices external to the cabinet if they are in any way connected to the cabinet so that circuits are shown completely.
9. Three-ring bound operation manuals shall be clear and concise and shall describe, in detail, the information required to properly operate the equipment specified.
10. Approvals will be based on completed submission of manuals together with shop drawings before the commencement of the work.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Above Ground Enclosure
 1. Hennessy Products
 2. Lee Products Inc.
 3. Hoffman Engineering Co.
 4. Or Approved Equal.

2.02 SERVICE ENCLOSURE

- A. Provide a free-standing, pad-mounted service enclosure with 1-inch thick exterior type plywood mounting board, hinged doors with door handles and cylinder key locks. The service cabinet shall be mounted and secured to an elevated steel platform as shown on the Drawings. The enclosure shall allow free and clear access from one side to all electrical devices without obstructing any of the individual equipment and control panels mounted within the enclosure.

- B. The enclosure shall be made of heavy gauge sheet aluminum in conformance with NEMA 3R standards and shall be provided with a synthetic rubber gasket and a baked gray enamel finish over rust inhibiting primer. The enclosure shall be rain proof and sleet (ice) resistant. The construction, materials of all components, and coating systems shall comply with the applicable provisions of the National Electric Code.
- C. The enclosure dimensions shall be determined by the physical size of the equipment to be installed with working clearances in conformance with National Electrical Code requirements. Minimum length shall be 72-inches. The doors shall have semi-flush type cylinder lock and catch, vault handle and 3-point catch complete with lock. The lock shall be arranged to fasten door at top, bottom, and center. Door hinges shall be concealed. Two keys shall be supplied for each lock. All locks shall be keyed alike.
- D. All panels and electrical equipment shall be mounted by the Contractor under Division 16, Electrical. Interconnecting wiring and conduit between the individual control panels and equipment within the enclosure for the electrical systems is not necessarily shown on the Drawings. All such wiring, controls and materials, not shown but required for the operation of the systems as specified, shall be furnished and installed by the Contractor under Division 16, Electrical. Conduit and wiring from the cabinet to the new submersible pumps and controls within the existing wet well, and other external terminals shall be furnished and installed by the Contractor under Division 16, Electrical.
- E. The cabinet shall be designed with a sloped top to prevent the accumulation of water and snow on its top surface. The cabinet shall be able to withstand the environment to which it is subjected. The cabinet shall thoroughly protect the internal equipment, components and controls from the rain, dust, corrosion, vandalism, and other conditions found in an outdoor environment. The cabinet shall be used to house instrumentation, electrical and other related equipment.
- F. The Contract Drawings are intended to be a schematic of the equipment to be installed within the enclosure and not an exact layout. The Contractor shall provide as part of the shop drawing submission, a ¼-inch scale drawing of the service enclosure detailing the location and arrangement of all the items to be mounted within the cabinet. The submittal data shall also include construction details, interior framing, and door and hardware details.
- G. Cabinet Ventilation
 - 1. Cabinet ventilation shall be provided by a fan located in the fan plenum area in the top of the above-ground control enclosure and by louvered vents located in the front door with a removable air-filter.
 - 2. Louvers shall satisfy NEMA rod entry test for 3R ventilated enclosures.
 - 3. A reusable wire mesh filter shall be provided for each cabinet that will cover the vents and shall be held firmly in place with bottom and side brackets and a spring-loaded upper clamp.
 - 4. Exhaust air will be vented out between the top of the cabinet and door.
 - a. The exhaust area shall be screened with a material having a maximum hole diameter of 0.125 inches.
 - 5. The fan plenum area shall have a removable fan plate.

- 6. The fan ventilation system will be operated from a thermostat and be designed to handle a minimum of 100 cubic feet of air per minute.

- H. The enclosure shall be provided with not less than three strip heaters to minimize condensation totaling approximately 750 watts. Each heater shall be provided with a thermostat.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. The Contractor shall arrange for the Engineer and Owner to view the initial completed above ground service enclosure before installation at the project site.

3.02 ERECTION

- A. Cabinet Mounting

- 1. The cabinet shall be mounted and secured on a new elevated steel platform as shown on the Contract Drawings.
- 2. The back of the cabinet shall be located a minimum of six (6) inches away from the platform railing when mounted.

3.03 INSTALLATION

- A. It is the Contractor's responsibility to properly locate all equipment within the above-ground enclosure to maintain proper working clearances, heat dissipation, environmental controls and associated equipment, and proper equipment operation per the manufacturer's recommendations. In all cases the Contractor shall furnish detailed shop drawings showing all locations of equipment including dimensions to the Engineer for review before fabrication and commencement of the work.

END OF SECTION

SECTION 16196
GROUNDING SYSTEM

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. The Electrical Subcontractor shall furnish, install and test the complete grounding system, including all equipment, materials and incidentals, in strict accordance with applicable electrical code, as shown on the drawings and as specified hereinafter.
- B. The Electrical Subcontractor's attention is directed to the requirements of Section 16010, ELECTRICAL WORK - GENERAL PROVISIONS.

1.02 SUBMITTALS:

- A. Manufacturer's data and descriptive literature shall be submitted for all material specified hereinafter in accordance with Section 01300.

PART 2 - PRODUCT

2.01 MATERIALS:

- A. Conduit shall be as specified under Section 16110.
- B. Wire shall be as specified under Section 16120.
- C. Ground rods shall be copper - clad steel, 3/4 in. diameter x 10 ft. minimum length, except as otherwise shown on the drawings.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Grounding electrode conductors shall be run in rigid steel conduits where required for protection and where shown on the drawings. The protecting conduits shall be bonded to the grounding electrode conductors at both ends.
- B. Equipment grounding conductors shall be run with feeders and branch circuit conductors where required and where shown on the drawings. Isolated boxes, enclosures and metal conduit sections shall be bonded to the grounding conductors by means of ground lugs or grounding bushings.
- C. Liquidtight flexible metal conduit, larger than 1-1/4 in., shall be furnished with bonding jumpers. Jumpers shall be external to the conduit and connected to grounding fittings. Jumpers shall be run parallel with the conduit, not spiral wound, and held with plastic tie wraps.
- D. All enclosures containing equipment to which electrical connections are made, motor and transformer frames, metallic raceway systems, electrical equipment supports and exposed structural steel shall be grounded.

- E. Exposed ground connections shall be made with suitable ground clamps. Concealed or buried connections shall be made by pressure crimp connectors.
- F. Underground conductors shall be laid slack.
- G. Ground rods shall be driven vertically into undisturbed soil to a depth such that the top of the rod shall be two foot below finished grade.

3.02 TESTS:

- A. Test the resistance of the interconnected systems. All test equipment shall be provided under this Section. Dry season resistance of the interconnected system shall not exceed five ohms. If such resistance cannot be obtained with the system as shown, provide additional grounding as directed by the Engineer, at no additional cost to the Owner.

END OF SECTION

SECTION 16470

PANELBOARDS

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. The Electrical Subcontractor shall furnish and install the panelboards, with all necessary incidentals, as shown on the drawings and as specified hereinafter.
- B. The Electrical Subcontractor's attention is directed to the requirements of Section 16010, ELECTRICAL WORK - GENERAL PROVISIONS.

1.02 SUBMITTALS:

- A. Shop drawings shall be submitted as specified in Section 01300.
- B. Shop drawings complete with dimensional data, overall and component ratings, manufacturer's literature and circuit breaker characteristic curves shall be submitted for the panelboard.

PART 2 - PRODUCTS

2.01 RATING:

- A. Panelboard ratings shall be as shown on the Drawings. All panelboards shall be rated for the intended service.

2.02 STANDARDS:

- A. Panelboard shall be in accordance with the Underwriter's Laboratories, Inc., "Standard for Panelboards" and "Standard for Cabinets and Boxes" and shall be so labeled where procedures exist. Panelboard shall also comply with NEMA Standards for panelboards and the latest National Electrical Code.

2.03 CONSTRUCTION:

- A. Panelboard shall be factory-assembled, dead-front type.
- B. INTERIORS:
 - 1. All interiors shall be complete with buses, dead-front shield, circuit breakers, wire connectors, etc. All wire connectors, except screw terminals, shall be of the anti-turn, solderless type and all shall be suitable for copper or aluminum wire of the sizes indicated.
 - 2. Interiors shall be so designed that circuit breakers can be replaced without disturbing adjacent breakers and without removing the main bus connectors and shall be so designed that circuits may be changed without machining, drilling or tapping.
 - 3. Branch circuits shall be arranged using double row construction. Branch circuits shall be numbered by the manufacturer.

4. A manufacturer installed nameplate shall be provided listing panel type, number of circuit breakers and ratings.

C. BUSES:

1. Bus bars for the mains neutrals and grounds shall be copper. Full size neutral bars shall be included. Bus bar taps shall be arranged for sequence phasing of the branch circuit devices. Bussing shall be braced throughout to conform to industry standard practice governing short circuit stresses in panelboards. Phase bussing shall be full height without reduction in size. Cross connectors shall be copper.
2. Neutral and equipment ground busses shall have a suitable lug for each circuit breaker and single pole space provided.
3. Spaces for future circuit breakers shall be bussed for the maximum device that can be fitted into them.

D. BOXES:

1. Boxes shall be galvanized, factory painted, code gauge steel without knockouts. Boxes shall be of sufficient size to provide a minimum gutter space of 4-in. on all sides.
2. Surface mounted boxes shall have internal and external finish as hereinafter specified. Surface mounted boxes shall be field punched for conduit entrances.
3. At least 4 interior mounting studs shall be provided.

E. TRIM:

1. Hinged doors covering all circuit breaker handles shall be included in panel trim.
2. Door shall have semi-flush type cylinder lock and catch, except that doors over 48-in. in height shall have a vault handle and 3-point catch, complete lock, arranged to fasten door at top, bottom and center. Door hinges shall be concealed. Two keys shall be supplied for each lock. All locks shall be keyed alike; directory frame and card having a transparent cover shall be furnished on each door.
3. The trim shall be fabricated from code gauge sheet steel. Trims shall be fastened with quarter-turn clamps.
4. All exterior and interior steel surfaces of the panelboard shall be properly cleaned and finished with ANSI Z55.1, No. 61 light gray paint over a rust-inhibiting phosphatized coating.

F. CIRCUIT BREAKERS:

1. Panelboards shall be furnished with circuit breakers having frame sizes and trip settings as shown on the drawings.
2. Circuit breakers shall be thermal-magnetic, molded case, bolt-in type with interrupting capacities of not less than 10,000 amperes RMS, symmetrical at rated voltage.

2.04 ACCEPTABLE MANUFACTURERS:

- A. Panelboards shall be A series as manufactured by General Electric Co.; Eaton Cutler-Hammer; Square D Co.; Siemens; or approved equal.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Boxes for surface mounted panelboards shall be installed with at least 1/2 in. air space between the box and the wall.
- B. Circuit directories shall be typed, indicating circuit numbers and circuit designations actually connected and shall be permanently affixed to the inside of the cover.
- C. Furnish and install a nameplate on the front of each panelboard indicating the panelboard designation.

END OF SECTION