Bid Set No. _____

DOCUMENTS AND SPECIFICATIONS

FOR

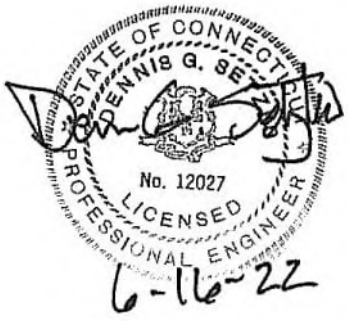
CONTRACT NO. 43

SEPTAGE RECEIVING STATION

BRANFORD, CONNECTICUT

June 2022

J.N. 60491951



AECOM

Rocky Hill, Connecticut

SEPTAGE RECEIVING STATION
BRANFORD, CONNECTICUT

T A B L E O F C O N T E N T S

DIVISION 2 - SITE WORK

DIVISION 3 – CONCRETE

DIVISION 9 - FINISHES

DIVISION 11 - EQUIPMENT

DIVISION 16 - ELECTRICAL

APPENDIX A – WAGE RATES

END OF TABLE OF CONTENTS

SECTION 00010

INVITATION TO BID

SEPTAGE RECEIVING STATION
IN THE
TOWN OF BRANFORD, CONNECTICUT

CONTRACT 43

OWNER: The Town of Branford, Connecticut, hereby gives notice that sealed Bids will be received for the Septage Receiving Station project. The work at the Branford Water Pollution Control Facility includes, but is not limited to, furnishing and installing a new septage receiving station to be located outside on a new concrete pad. New piping and electrical conduit, instruments, and wiring will also be furnished and installed as part of this contract.

The Work under the proposed Contract shall commence within 60 days after the date set forth in the Notice to Proceed and shall be completed within 300 days after start of Work.

TIME AND PLACE OF BID OPENING: Sealed Bids will be received until 1:30 p.m. Local Time on the 4th day of August, 2022, by the Purchasing Agent at the office of the Finance Department Office, Town Hall, 1019 Main Street, Branford, Connecticut 06405. After the official Bid closing time, the Bids will be publicly opened and read aloud at the Branford Town Hall basement conference room at 1019 Main Street, Branford, Connecticut.

BIDDING DOCUMENTS: Bidding documents for this project will be available for download at the Town of Branford website and at the CT DAS website. Printed bidding documents will not be offered for purchase for this project. A printed set of bidding documents are available for review during business hours from 8:30 a.m. to noon and from 1:00 p.m. to 4:30 p.m. after June 22, 2022, at the following location:

Town Engineer's Office
Town Hall
1019 Main Street
Branford, CT 06405

WAGE RATES: CONTRACTOR'S shall be required to pay not less than the prevailing wage rates on the Project as established by the State of Connecticut. Copies of these wage rates are incorporated in the Contract Documents. Each CONTRACTOR or Subcontractor performing Work on this Project shall comply in all respects with all laws governing the employment of labor, Social Security, and Unemployment Insurance of both the state and federal government.

BID SECURITY: Bid Security in the amount of not less than 5 percent of the Bid shall accompany each Bid in accordance with the Instructions to Bidders.

CONTRACT SECURITY: The Bidder to whom a Contract is awarded shall furnish a Performance Bond and a Payment Bond each in an amount equal to 100 percent of the Contract Price.

BID REJECTION/ACCEPTANCE: OWNER reserves the right to reject any and all Bids, waive informalities or minor defects in bidding or to accept the Bid or Bids, which best serve the interests of OWNER.

BID WITHDRAWAL: No Bid shall be withdrawn for a period of 90 days after the opening of Bids without consent of OWNER.

Published by authority of the Town of Branford, Connecticut.

By:

FIRST SELECTMAN
TOWN OF BRANFORD, CONNECTICUT

AECOM
Rocky Hill, Connecticut
Project No. **60491951**

END OF SECTION

DOCUMENT 00020

TOWN OF BRANFORD

OFFICE OF THE TREASUER

1019 Main Street
Post Office Box 150
Branford, CT 06405

(203) 488-8394
FAX: 315-3736

General Requirements for Bidding and Instructions to Bidders

NOTICE

Information provided in this section takes precedence if there are conflicts between this document 00020 and other sections of the bid documents

Information provided in these specifications is ***CONFIDENTIAL*** and is to be used only for the purpose of preparing a proposal. It is further expected that each bidder will read these specifications with care, for failure to meet every one or a combination of specified conditions may invalidate the proposal.

The Town reserves the right to reject any or all bids or any portion thereof and to accept the bid deemed to be in the best interest of the Town of Branford.

Bidders are requested to submit quotations on the basis of these specifications. Alternate quotations will receive consideration providing such alternatives are clearly explained.

The information contained herein is believed to be accurate and is based upon the latest available information but is not to be considered in any way as a warranty.

Revised 5/2012
Standard Form

SECTION I - General Terms and Conditions

A. Compliance with Laws

The bidder shall at all times observe and comply with all laws, ordinances and regulations of the federal, state and local governments, which may in any way affect the preparation or the performance of the contract.

B. Timetable

Price quoted must be valid for **90** days. Delivery and installation completion dates must be included in the bid proposal.

C. Consideration of Proposals

The Board of Selectmen, or a majority of them, reserve the right to select or reject alternate proposals; to waive informality in proposals; and to reject any and all bids, or accept such bid as shall in its judgement be to the best interest of the Town of Branford.

D. Bid Bond

1. A certified check or bank draft made payable to the "Treasurer, Town of Branford", or a satisfactory bid executed by the bidder and a surety company in an amount no less than five percent (5%) of the base bid, is required with each proposal.

2. Checks or drafts will be returned to unsuccessful bidders within ten (10) business days of the bid award.

3. See Specification Section 00410 for additional requirements.

E. Performance Bond

1. Successful bidders will be required to furnish a Performance Bond in the amount of 100% of the contract sum.

2. See Specification Section 00610 for additional requirements.

F. Protection of Work and Property

Successful bidders shall be responsible for protection of their equipment and materials against theft, damage or deterioration on the site.

G. Competency of Bidders

1. Bidders shall have had proven experience in the field of work.

2. Bidders shall submit with their bid a listing of recent work performed within the State of Connecticut of the size equal to or greater than the work being bid.

3. See Specification Section 00450 for additional requirements.

H. Alternates

1. Any alternates to specified materials or workmanship must be separately listed and described in detail.

2. Alternates will be considered in awarding the contract only if they provide, as a minimum requirement, all features contained in the specifications.

3. The Town of Branford reserves the sole right to determine through its agents the equality of alternate products and/or installation procedures.

I. Bid Requirements

1. Each bidder shall return two (2) hard copies and one (1) digital copy of the proposal sheet entitled “Form for General Bid”. Each bid proposal must be signed by an authorized agent of the bidder.

2. Each bidder must complete and have notarized the “Non-Collusion Affidavit of Bidder” form. This form must accompany all bids being submitted.

3. Each bidder must be in good standing with the Town of Branford.

4. Successful bidders must obtain any required governmental approvals.

J. Specifications – General

The contract shall include all labor and materials, tools and equipment and services required for proper performance of the work as specified hereinafter and as may be

required for proper completion of the work in accordance with the highest standards of the trades involved.

K. Examination of Site – Recommended, not required

Prior to submission of the bid, contractor shall visit the site and become thoroughly familiar with all conditions under which the work will be installed. The contractor will be responsible for any assumptions made regarding the site for the work to be performed.

SECTION II - Insurance Requirements

Bidder shall agree to maintain in force at all times during which services are to be performed the following coverages and shall name the Town of Branford as an Additional Insured on a primary and non-contributory basis to the Bidder's Commercial General Liability and Automobile Liability policies. **These requirements shall be clearly stated in the remarks section on the bidders Certificate of Insurance.** Insurance shall be written with Carriers approved in the State of Connecticut and with a minimum Best's Rating of A-. In addition, all Carriers are subject to approval by the Town of Branford.

		(Minimum Limits)
General Liability	Each Occurrence	$1,000,000
	General Aggregate	$2,000,000
	Products/Completed Operations Aggregate	$2,000,000
	-Include Waiver of Subrogation	
Auto Liability	Combined Single Limit	
	Each Accident	$1,000,000
Umbrella	Each Occurrence	$1,000,000
(Excess Liability)	Aggregate	$1,000,000
Workers' Compensation and	WC Statutory Limits	
Employers' Liability	EL Each Accident	$500,000
	EL Disease Each Employee	$500,000
	EL Disease Policy Limit	$500,000

Original, completed Certificates of Insurance must be presented to the Town of Branford prior to purchase order/contract issuance. Bidder agrees to provide replacement/renewal certificates at least 60 days prior to the expiration of the policy.

Refer to Specification Section 00800 for additional requirements.

Hold Harmless Requirements

The contractor shall, at all times, indemnify and save harmless the Town of Branford, its officers, agents, and servants on account of any and all claims, damages, losses, litigation expense, counsel fees and compensation arising out of injuries (including death) sustained by or alleged to have been sustained by the public, any or all persons affected by the contractor's work, or by the contractor, any subcontractor, material, men or anyone directly or indirectly employed by them or any one of them while engaged in the performance of this contract. The Town of Branford shall be named as an additional insured on said policy of public liability insurance to cover all claims against the Town arising out of said contract.

NON-COLLUSION AFFIDAVIT OF BIDDER

State of: _____

County of: _____, SS)

_____; being first duly sworn, deposes and says that:

1) S/he is (owner, partner, officer, representative or agent) of _____, the Bidder that has submitted the attached Bid:

2) S/he is fully informed regarding the preparation and contents of the attached Bid and of all pertinent circumstances regarding such Bid:

3) Such Bid is genuine and is not a collusive or sham Bid:

4) Neither the said Bidder nor any of its officers, partners, owner, agents, representatives, employees or parties in interest, including this affiant, has in any way colluded, conspired, connived, or agreed, directly or indirectly with any other Bidder, firm or person to submit a collusive or sham Bid in connection with the Contract for which the attached Bid has been submitted or to refrain from bidding in connection with such Contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other Bidder, firm or person to fix the price or prices in the attached Bid or of any Bidder, or to fix any overhead, profit or cost element of the bid price or the bid price of any other Bidder or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage with the Owner or any person interested in the proposed Contract.

5) The price quoted in the attached Bid is fair and proper and is not tainted by collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees, or parties in interest.

Signed: _____

Title: _____

Subscribed and sworn before me this _____ day of _____ , 20 _____ .

Notary Public: _____

My Commission expires _____ , 20_____ .

SECTION 00200

INSTRUCTION TO BIDDERS FOR CONSTRUCTION CONTRACTS

ARTICLE 1 – DEFINED TERMS

1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:

A. *Issuing Office* – The office from which the Bidding Documents are to be issued and where the bidding procedures are to be administered.

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

C. *Successful Bidder* - The lowest, responsible Bidder submitting a responsive Bid to whom Owner (on the basis of Owner's evaluation as hereinafter provided) makes an award.

ARTICLE 2 – COPIES OF BIDDING DOCUMENTS

2.01 BIDDING DOCUMENTS for this project will be available for download at the Town of Branford website and at the CT DAS website. Printed bid documents will not be offered for purchase for this project as stated in the advertisement or invitation to bid.

2.02 Complete sets of Bidding Documents shall be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

2.03 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 authorize or confer a license for any other use.

ARTICLE 3 – QUALIFICATIONS OF BIDDERS

3.01 To demonstrate Bidder’s qualifications to perform the Work, within 14 days of Owner’s request, Bidder shall submit written evidence such as financial data, previous experience, present commitments, and such other data as may be called for below.

A. The address and description of the Bidder’s place of business.

B. The number of years engaged in the contracting business under the present firm name, and the name of the state where incorporated.

C. A list of the property and equipment available to the Bidder to evaluate if the Bidder can complete the Work in accordance with the Bidding Documents.

D. A financial statement of the Bidder showing that the Bidder has the financial resources to meet all obligations incidental to the Work.

E. The Bidder's performance record giving the description, location, and telephone numbers of similar projects constructed in a satisfactory manner by the Bidder.

F. A list of projects presently under contract, the approximate contract amount, and percent of completion of each.

G. A list of contracts which resulted in lawsuits.

H. A list of contracts defaulted.

I. A statement of the Bidder indicating whether or not the Bidder has ever filed bankruptcy while performing Work of like nature or magnitude.

J. A list of officers of the firm who, while in the employ of the firm or the employ of previous firms, were associated with contracts which resulted in lawsuits, contracts defaulted or filed for bankruptcy.

K. The technical experience of personnel guaranteed to be employed in the responsible charge of the Work stating whether the personnel have or have not performed satisfactorily on other contracts of like nature and magnitude or comparable difficulty at similar rate of progress.

L. Such additional information as will assist Owner in determining whether the Bidder is adequately prepared to fulfill the contract.

3.02 Bidder is advised to carefully review those portions of the Bid Form requiring Bidder's representations and certifications.

3.03 Owner's decision as to qualification of the Bidders shall be final.

3.04 Ability and Experience of Bidder:

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

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

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

4.01 *Subsurface and Physical Conditions:*

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

B. It is agreed and understood that the Owner does not warrant or guarantee that the subsurface or other conditions, natural phenomena, existing pipes or other structures encountered during construction will be the same as those indicated on the Drawings or in the other Contract Documents.

C. It is agreed further and understood that no bidder or contractor shall use or be entitled to use any of the information made available to him or obtained in any examination made by him in any manner as a basis of or ground for any claim or demand against the Owner or the Engineer, arising from or by reason of any variance which may exist between the information made available and the actual subsurface or other conditions, natural phenomena, existing pipes or other structures actually encountered during the construction work, except as may otherwise be expressly provided for in the Contract Documents.

4.02 *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.

4.03 *Hazardous Environmental Condition*

A. Hazardous Environmental Conditions are not anticipated on this project.

4.04 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 subsurface or physical 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.

4.05 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. Bidder shall comply with all applicable Laws and Regulations relative to excavation and utility locates.

4.06

A. Reference is made to Article 7 of the Supplementary Conditions for the identification of the general nature of other work that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) that relates to the Work contemplated by these Bidding Documents. On request, Owner will provide to each Bidder for examination access to or copies of contract documents (other than portions thereof related to price) for such other work.

B. Paragraph 6.13.C of the General Conditions indicates that if an Owner safety program exists, it will be noted in the Supplementary Conditions.

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

A. examine and carefully study the Bidding Documents, and the other related data identified in the Bidding Documents;

B. visit the Site and become familiar with and satisfy Bidder as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;

C. become familiar with and satisfy Bidder as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work;

D. consider the information known to Bidder; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be

employed by Bidder, including applying any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents; and (3) Bidder's safety precautions and programs;

E. 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(s) bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents;

F. 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;

G. 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;

H. promptly 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

I. determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.

4.08 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 furnishing the Work.

ARTICLE 5 – SITE AND OTHER AREAS

5.01 The Site is identified in the Bidding Documents. 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.

5.02 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.

5.03 The Contractor shall not work on property requiring obtaining of an easement until the Owner has obtained the necessary easement.

5.04 The Contractor shall have no claim for additional compensation or damage on account of any delay in obtaining the necessary easements.

ARTICLE 6 – INTERPRETATIONS AND ADDENDA

6.01 All questions about the meaning or intent of the Bidding Documents are to be submitted to Engineer in writing. 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 Engineer as having received the Bidding Documents. Questions received less than ten days prior to the date for opening of Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

6.02 To receive consideration, such questions shall be submitted in writing to the Engineer, at least seven days before the established date for receipt of Bids. If the question involves the equality or use of products or methods, it must be accompanied by drawings, specifications or other data in sufficient detail to enable the Engineer to determine the equality or suitability of the product or method. In general, the Engineer will neither approve nor disapprove particular products prior to the opening of Bids; such products will be considered when offered by the Contractor for incorporation into the Work.

6.03 The Engineer will set forth as Addenda, which shall become a part of the Contract Documents, such questions received as above provided as in his sole judgment are appropriate or necessary and his decision regarding each. At least five days prior to the receipt of Bids, he will send a copy of these Addenda to those prospective bidders known to have taken out sets of the Drawings and other Contract Documents.

6.04 The Contractor agrees to use the products and methods designated or described in the Specifications as amended by the Addenda.

ARTICLE 7 – BID SECURITY

7.01 A Bid must be accompanied by Bid security made payable to Owner (“Treasurer, Town of Branford”) in amount of not less than 5 percent of the Bidder’s maximum Bid price and in the form of a certified check, bank draft, or a Bid Bond (on the form attached) issued by a surety meeting the requirements of Paragraphs 5.01 and 5.02 of the General Conditions.

7.02 Bid security of the unsuccessful Bidders who furnished certified checks or bank drafts will have them returned within 10 days after the bid award. Bond forms will be returned upon request.

ARTICLE 8 – CONTRACT TIMES

8.01 The times for Substantial Completion and readiness for final payment are to be set forth by Bidder in the Bid and will be entered into the Agreement (or incorporated therein by reference to the specific language of the Bid). Substantial Completion is desired within 240 days. The times will be taken into consideration by Owner during the evaluation of

Bids, and it will be necessary for the apparent Successful Bidder to satisfy Owner that it will be able to achieve Substantial Completion and be ready for final payment within the times designated in the Bid.

ARTICLE 9 – LIQUIDATED DAMAGES

9.01 Provisions for liquidated damages, if any, are set forth in the Agreement.

ARTICLE 10 – SUBSTITUTE AND "OR-EQUAL" ITEMS

10.01 The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration of possible substitute or "or-equal" items.

ARTICLE 11 – BASIS OF DESIGN AND MAJOR EQUIPMENT ITEMS

11.01 *Basis of Design*

A. Unless otherwise indicated, design of this Project is based upon the material or Supplier's equipment named first in the list of manufacturers in the Specifications. Engineer has performed an evaluation of other listed manufacturers for compliance with the requirements of the Contract Documents. When other manufacturers are listed, Contractor may be required to make modifications or adjustments, at Contractor's expense, to coordinate the installation of the furnished equipment with associated elements of Work, such as piping and electrical connections, or support and mounting provisions.

11.02 *Major Equipment Items*

A. Not Used

ARTICLE 12 – SUBCONTRACTORS, SUPPLIERS AND OTHERS

12.01 If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, individuals, or entities to be submitted to Owner in advance of a specified date prior to the Effective Date of the Agreement, the apparent Successful Bidder, and any other Bidder so requested, shall within five days after Bid opening, submit to Owner a list of all such Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work for which such identification is required. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, individual, or entity if requested by Owner. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit a substitute, without an increase in the Bid.

12.02 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers, individuals, or entities. Declining to make requested substitutions will not constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to revocation of such acceptance after the Effective Date of the Agreement as provided in Paragraph 6.06 of the General Conditions.

12.03 Contractor shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom Contractor has reasonable objection.

ARTICLE 13 – PREPARATION OF BID

13.01 The Bid Form is included with the Bidding Documents.

A. All blanks on the Bid Form shall be completed in ink and Bid Form signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form.

B. A Bid price shall be indicated for each Bid item listed therein. In the case of optional alternatives, the words “No Bid,” “No Change,” or “Not Applicable” may be entered.

C. The Bid shall contain an acknowledgement of the receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.

D. Postal and e-mail addresses and telephone number for communications regarding the Bid shall be shown.

E. All names shall be printed in ink below the signatures.

F. It is the responsibility of the Bidder to submit a neat, accurate, and complete Bid.

13.02 The Bidder, when signing the Bid(s) shall meet the following requirements:

A. Each Bidder shall provide two copies of the complete Bid package.

B. A Bid by an individual shall show Bidder's name and Bidder's official address.

C. A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature) accompanied by evidence of authority to sign. The official address of the partnership shall be shown.

D. A Bid by a corporation shall be executed in the corporate name by the president or a vice-president or other corporate officer accompanied by evidence of authority to sign. The corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown.

E. A Bid by a joint venture shall be executed by each joint venture in the manner indicated on the Bid form. The official address of joint venture shall be shown.

F. A Bid by a limited liability company shall be executed in the name of the firm by a member and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm shall be shown.

13.03 The Bid shall contain evidence of Bidder's authority and qualification to do business in the state where the Project is located, or Bidder shall covenant in writing to obtain such authority and qualification prior to award of the Contract and attach such covenant to the Bid. Bidder's state Contractor license number, if any, shall also be shown on the Bid form.

ARTICLE 14 – BASIS OF BID; COMPARISON OF BIDS

14.01 *Lump Sum*

A. Bidders shall submit a Bid on a lump sum basis as set forth in the Bid Form.

14.02 *Allowances*

A. For cash allowances the Bid price shall include such amounts as the Bidder deems proper for Contractor's overhead, costs, profit, and other expenses on account of cash allowances, if any, named in the Contract Documents, in accordance with Paragraph 11.02.B of the General Conditions.

14.03 *Supplementary Unit Prices*

A. Bidder shall submit a unit price for each item of Work listed in the Schedule of Supplementary Prices included in the Bid.

B. Owner shall have the right to reject any supplemental unit prices for additions to or deductions from the Work if the prices are considered excessive or unreasonable, or to accept any supplementary unit prices which may be considered fair and reasonable.

ARTICLE 15 – SUBMITTAL OF BID

15.01 Each bidder shall return two (2) hard copies of the bid form along with the Bid security and other documents identified.

A. A Bid shall be submitted no later than the date and the time prescribed and at the place indicated in the Invitation to Bid and shall be enclosed in a plainly marked package with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), the name and address of the Bidder, and shall be accompanied by the Bid security and other required documents. If the Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED." No oral, facsimile, or telephonic bids will be accepted. A mailed Bid shall be addressed to the address indicated on the Bid Form.

B. OWNER may consider informal any Bid not prepared and submitted in accordance with the provisions hereof.

C. Bidders are cautioned that it is the responsibility of each individual bidder to assure that his bid is in the possession of the responsible official or his designated alternate prior to the stated time and at the place of the Bid Opening. Owner is not responsible for bids delayed by mail and/or delivery services, of any nature.

15.02 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 and shall be enclosed in a plainly marked package with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), the name and address of 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 package plainly marked on the outside with the notation "BID ENCLOSED." A mailed Bid shall be addressed to Purchasing Agent, Office of the Finance Department, Town Hall, 1019 Main Street, Branford, CT 06405.

15.03 Bids received after the official Bid closure time will be returned to the Bidder unopened.

ARTICLE 16 – MODIFICATION AND WITHDRAWAL OF BID

16.01 A Bid may be modified or withdrawn by an appropriate document duly executed in the same manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids.

A. Withdrawn Bids may be resubmitted up to the time designated for the receipt of Bids provided that they are then fully in conformance with these Instructions to Bidders.

16.02 If within 24 hours after Bids are opened any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid, that Bidder will be disqualified from further bidding on the Work.

ARTICLE 17 – OPENING OF BIDS

17.01 Bids will be opened at the time and place indicated in the Advertisement or Invitation to Bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.

ARTICLE 18 – BIDS TO REMAIN SUBJECT TO ACCEPTANCE

18.01 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 the Bid security prior to the end of this period.

ARTICLE 19 – EVALUATION OF BIDS AND AWARD OF CONTRACT

19.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, 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 not be responsible. Owner may also reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make an award to that Bidder. 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.

19.02 More than one Bid for the same Work 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.

19.03 In evaluating Bids, Owner will consider whether 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.

19.04 In evaluating Bidders, Owner will consider the qualifications 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 must be submitted as provided in the Supplementary Conditions.

19.05 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders, proposed Subcontractors,

Suppliers, individuals, or entities proposed for those portions of the Work in accordance with the Contract Documents.

19.06 In the event that there is a discrepancy in the Bid between the lump sum or unit prices written in words and figures, the prices written in words shall govern. If the Contract is to be awarded, Owner will award the Contract to the Bidder whose Bid is in the best interests of the Project.

19.07 The Owner reserves the right to omit certain items in their entirety and other items in part as set forth in the Bid.

ARTICLE 20 – CONTRACT SECURITY AND INSURANCE

20.01 Article 5 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance and payment bonds and insurance. When the Successful Bidder delivers the executed Agreement to Owner, it shall be accompanied by such bonds.

ARTICLE 21 – SIGNING OF AGREEMENT

21.01 When Owner issues a Notice of Award to the Successful Bidder, it shall be accompanied by the required number of unsigned counterparts of the Agreement along with the other Contract Documents which are identified in the Agreement as attached thereto. Within 15 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.

21.02 The Notice of Award will be issued within 60 days after the Bids are received.

ARTICLE 22 – WAGE RATES

22.01 If the Contract amount exceeds $100,000, not less than the prevailing wage rates on public Work as established by the U.S. Department of Labor and the State in which Work is to be done shall be paid. Wages and rates are subject to the provisions of the Davis-Bacon Act. If the Contract amount is less than $100,000, prevailing wages rates are not applicable.

ARTICLE 23 – SALES AND USE TAXES

23.01 Provisions for the Bidder's responsibilities for sales and other taxes appear in Paragraph 6.10 of the General Conditions and as supplemented in the Supplementary Conditions. The Owner has tax exempt status; therefore, Contractor(s) shall forward this information to its Suppliers in order that the sale of such materials and equipment be properly recorded as a tax-exempt sale.

23.01 Materials purchased for permanent installation in the work will be exempt from the Connecticut Sales and Use Tax under the Connecticut Education, Welfare and Public

Health Tax Act. Each bidder shall take this exemption into account in calculating his bid for the work.

ARTICLE 24 – POST-BID SUBMITTALS

24.01 *Minority/Women's/Small Business Enterprises Participation* -– Not Used

ARTICLE 25 – RETAINAGE

25.01 Provisions concerning Contractor's rights to deposit securities in lieu of retainage are set forth in the Agreement.

ARTICLE 26 – CONTRACTS TO BE ASSIGNED

26.01 Not Used.

ARTICLE 27 – PARTNERING

27.01 Not Used.

ARTICLE 28 – OTHER CONTRACTS

28.01 Not Used.

ARTICLE 29 – FEDERALLY ASSISTED CONTRACT

29.01 Not Used.

ARTICLE 30 – FEDERAL WAGE RATES

30.01 Not Used.

END OF SECTION

DOCUMENT 00300

FORM FOR GENERAL BID

PROPOSAL OF: _____,
(hereinafter called "BIDDER"), organized and existing under the laws of the State of _____ doing business as _____
(a corporation, or a partnership, or an individual).

TO: THE FIRST SELECTMAN FOR THE TOWN OF BRANFORD, CONNECTICUT
(hereinafter the Town of Branford shall be called "OWNER").

In compliance with your Advertisement for Bids, BIDDER hereby proposes to perform all WORK for Contract No. 43, Septage Receiving Station, in strict accordance with the CONTRACT DOCUMENTS, within the time set forth therein and at the prices stated below.

BIDDER hereby agrees to commence WORK under this contract within 60 consecutive calendar days after a date to be specified in the NOTICE TO PROCEED and fully complete the project within 300 consecutive calendar days thereafter unless the time for completion is extended otherwise by the Contract Documents. Work performed beyond this CONTRACT TIME period (COMPLETION) will be subject to liquidated damages. BIDDER further agrees to pay as liquidated damages, the sum of $250.00 for each consecutive calendar day thereafter as provided in Article 15 of the General Conditions.

The Bidder agrees not to withdraw his bid within 90 days after the actual date of bid opening.

BIDDER acknowledges receipt of ADDENDA NO. ___ through ___.

The BIDDER agrees that, if he is selected as general contractor, he will within ten (10) days after presentation thereof by the awarding authority, execute a contract in accordance with the terms of this general bid and furnish a performance bond and a payment bond, each of a surety company qualified to do business under the laws of the State of Connecticut and satisfactory to the awarding authority. Each bond shall be in the sum of one hundred percent of the contract price, the premiums for which are to be paid by the general contractor and are included in the contract price.

BID ITEMS

A. BIDDER agrees to perform all the work, including all incidental labor, materials and equipment necessary for the satisfactory completion of the work and in full compliance with the contents and intent of the specifications and/or plans of the work, for the following prices listed below:

B. All prices, except item totals, shall be stated in both words and figures. In the event of a discrepancy between the price in words and the price in figures, the words shall govern. In the event of a discrepancy between the total of the items and the total stated, the total of the items shall govern.

C. Interlineation, alteration or erasure may void the bid. All prices shall be typewritten or written by hand in ink.

Item		Quantity	Extended Total
1.	For furnishing all labor, materials, and equipment and performing all operations required to complete the work of the Contract Documents which include all requirements of the contract documents including the specifications, Division 1 through 16, inclusive, drawings entitled "Contract 43, Septage Receiving Station" consisting of seven sheets, a sole source item of the septage receiving station which price is provided in the associated specification section, and all addenda.	L.S.	
	Dollars ($) Lump Sum		

TOTAL AMOUNT OF BID BASED ON LUMP SUM (Item 1 inclusive) – BASIS OF AWARD

Dollars ($).

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

BIDDER also certifies that he has visited the site, received and reviewed the plans and project manual (Information for Bidders, Forms for Bid, Bidding Documents, Conditions and Technical Specifications) DATE, and identified with the Engineer's Project No. 60491951, titled, Contract No. 43, Septage Receiving Station, Branford, Connecticut.

The BIDDER 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 on the work and that he will comply fully with all laws and regulations applicable to awards made in the State of Connecticut, including the weekly submission of payroll records to the Owner. This bid must bear the written signature of the BIDDER or an authorized agent of the BIDDER. If the BIDDER is a corporation or a partnership, the bid must be signed by a duly authorized officer of such corporation or by a partner and the title of such officer must be stated.

Respectfully submitted: Date _____

By _____
(Signature and Title of Person Authorized to Sign Bid)

_____
(Name of General Bidder)

_____
(Business Street Address)

_____
(City and State)

Business Phone: (____)

(SEAL - If bid is by a corporation)

ATTEST _____

(ACKNOWLEDGEMENT OF PRINCIPAL, IF A PARTNERSHIP)

State of _____)
) SS-
County of _____)

On this _____ day of _____, 20_____, before me personally came and appeared _____, to me known, and known to me to be one of the members of the firms of _____ _____, described in and who executed the foregoing instrument and he acknowledged to me that he executed the same as and for the act and deed of said firm.

(Seal)

_____
(NOTARY PUBLIC)

(ACKNOWLEDGEMENT OF PRINCIPAL, IF AN INDIVIDUAL)

State of _____)
) SS-
County of _____)

On this _____ day of _____, 20_____, before me personally came and appeared _____, to me known, and known to me to be the person in and who executed the foregoing instrument and and acknowledged that he executed the same.

(Seal)

_____
(NOTARY PUBLIC)

(ACKNOWLEDGEMENT OF PRINCIPAL, IF AN LLC)

State of _____)
) SS-
County of _____)

On this _____ day of _____, 20_____, before me personally came and appeared _____, to me known, and known to me to be one of the members of the LLC of _____ _____, described in and who executed the foregoing instrument and he acknowledged to me that he executed the same as and for the act and deed of said LLC.

(Seal)

_____

(NOTARY PUBLIC)

DOCUMENT 00303

CERTIFICATION OF BIDDER REGARDING EQUAL EMPLOYMENT OPPORTUNITY

INSTRUCTIONS

This certification is required pursuant to Connecticut's Executive Order No. Three. The implementing rules and regulations provide that any bidder or prospective contractor, or any of their proposed subcontractors, shall state as an initial part of the bid or negotiations of the contract whether it has participated in any pervious contract or subcontract subject to the equal opportunity clause; and if so, whether it has filed all compliance reports due under applicable instructions.

Where the certification indicates that the bidder has not filed a compliance report due under applicable instructions, such bidder shall be required to submit a compliance report within seven calendar days after bid opening. No contract shall be awarded unless such report is submitted.

CERTIFICATION BY BIDDER

Bidder's Name: _____

Address and Zip Code: _____

_____

1. Bidder has participated in a previous contract or subcontract subject to the Equal Opportunity Clause.

   __ Yes __ No (If answer is yes, identify the most recent contract.)

2. Compliance reports were required to be filed in connection with such contract or subcontract.

3. Bidder has filed all compliance reports due under applicable instructions, including SF-100.

   __ Yes __ No (If answer is yes, identify the most recent contract.)

4. If answer to Item 3 is "No", please explain in detail on reverse side of this certification.

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

_____

Name and Title of Signer (Please Type)

_____ _____

Signature Date

SECTION 00410

BID BOND

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

BIDDER *(Name and Address)*:

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

OWNER *(Name and Address)*:
Town of Branford, CT
1019 Main Street
Branford, CT 06405

BID
Bid Due Date:
Description: Septage Receiving Station

BOND
Bond Number:
Date *(Not earlier than Bid due date)*:
Penal sum _____ $ _____
(Words) (Figures)

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

BIDDER	**SURETY**
_____ (Seal)	_____ (Seal)
Bidder's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	By: _____
Signature	Signature (Attach Power of Attorney)
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	Attest: _____
Signature	Signature
_____	_____
Title	Title

Note: Above addresses are to be used for giving any required notice. Provide execution by any additional parties, such as joint venturers, if necessary.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond shall be Owner's sole and exclusive remedy upon default of Bidder.

2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.

3. This obligation shall be null and void if:

3.1 Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or

3.2 All Bids are rejected by Owner, or

3.3 Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).

4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent.

6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after Bid due date.

7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.

8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.

10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

DOCUMENT 00450

BIDDER QUALIFICATIONS STATEMENT

(Bidder shall complete this statement and submit it with his bid)

SUBMITTED BY:

Name of Organization:_____
(Print or Type Name of Bidder)

Name of Individual:_____

Title:_____

Business Address:_____

_____

Telephone No.:_____

Fax No.:_____

Ladies and Gentlemen:

The undersigned certifies under oath the truth and correctness of all statements and of all answers to questions made herein.

(Note: Attach additional sheets as required)

1.0 Bidder's General Business Information

1.1 Check if:

☐ Corporation ☐ Partnership ☐ Joint Venture ☐ Sole Proprietorship

☐ Limited Liability Company

If Corporation:

A. Date and State of Incorporation:

_____

B. List of Executive Officers:

Name Title

_____

_____

_____

_____

If Partnership:

A. Date and State of Organization: _____

B. Names of Current and General Partners: _____

_____

_____

C. Type of Partnership

☐ General ☐ Publicly Traded ☐ Limited

☐ Other (describe): _____

If Joint Venture:

A. Date and State of Organization: _____

B. Name, Address, and Form of Organization of Joint Venture Partners: (Indicate managing partner by an asterisk*):

_____

_____

_____

If Sole Proprietorship:

A. Date and State of Organization: _____

B. Name and address of Owners:_____

_____

_____

2.0 How many years has your organization been in business as a general contractor?_____

3.0 If your organizational structure has changed within the past five years, provide data as listed above in Item 1.0 for your previous organization(s).

4.0 We normally perform _____percent of the work with our own forces. List work normally subcontracted._____

_____

5.0 Has any construction contract to which you have been a party been terminated by the owner; have you ever terminated work on a project prior to its completion for any reason; has any surety which issued a performance bond on your behalf ever completed the work in its own name or financed such completion on your behalf; has any surety expended any monies in connection with a contract for which they furnished a bond on your behalf? If the answer to any portion of this question is "yes", furnish details of all such occurrences including the name of the owner, architect or engineer; and surety, and the name and date of the project.

☐ No. ☐ Yes, Details provided.

6.0 Has any officer or partner of your organization ever been and officer or partner of another organization that had any construction contract terminated by the owner; terminated work on a project prior to its completion for any reason; has any surety which issued a performance bind complete the work in its own name or financed such completion; or has any surety expended monies in connection with a contract for which they furnished a bond? If the answer to any portion of this question is "yes", furnish details of all such occurrences including the name of the owner, architect or engineer; and surety, and the name and date of the project.

☐ No. ☐ Yes, Details provided.

7.0 In the last five years, has your organization or any predecessor organization failed to substantially complete a project in a timely manner? If the answer to this question is "yes", furnish details of all such occurrences including the name of the owner, architect or engineer; and surety, and the name and date of the project.

☐ No. ☐ Yes, Details provided.

8.0 On Schedule A attached, list the name, location, and description of the project, owner, architect, or engineer, contract price, percent complete, and scheduled completion of the major construction projects your organization currently has in progress. Provide name, address, and telephone number of a reference for each project listed.

9.0 On Schedule B attached, list the name, location, and description of the project, owner, architect, or engineer, contract price, percent complete, and date of completion and percent of work with your own forces of major projects of the same general nature as this project which your organization has completed within the past five years. Provide name, address, and telephone number of a reference for each project listed.

10.0 On Schedule C attached, list the name and construction experience of the principal individuals of your organization directly involved in construction operations.

11.0 List the states and categories in which your organization is legally qualified to do business.

_____

12.0 Provide the following for your surety:

12.1 Surety Company: _____

12.2 Agent: _____

A. Address: _____

B. Telephone Number: _____

13.0 Provide the following with respect to an accredited banking experience institution familiar with your organization.

13.1 Name of Bank: _____

13.2 Address: _____

13.3 Account Manager: _____

13.4 Telephone Number: _____

14.0 Provide the name, address, and telephone number of an individual who represents a major equipment / material supplier whom the owner may contact for a financial reference:

_____

_____

15.0 Dated at _____, this _____ day of

_____, 20___.

Bidder:_____
(Print or Type Name of Bidder)

By: _____ (Seal, if corporation)

Title: _____

Attachments A, B, and C

----------(Affidavit for Individual)----------

_____ being duly sworn, deposes and says that:
a) all of the foregoing qualification is true, complete, and accurate.

----------(Affidavit for Partnership)----------

_____ being duly sworn, deposes and says that:
a) he/she is a member of the partnership of _____;
b) he/she is familiar with the books of said partnership showing its financial condition;
c) all of the foregoing qualification is true, complete, and accurate.

----------(Affidavit for Corporation)----------

_____ being duly sworn, deposes and says that:
a) he/she is a _____ of _____;
(Title) (Full name of Corporation)
b) he/she is familiar with the books of said Corporation showing its financial condition;
c) all of the foregoing qualification is true, complete, and accurate.

----------(Affidavit for LLC)----------

_____ being duly sworn, deposes and says that:
a) he/she is a member of the LLC of _____;
b) he/she is familiar with the books of said LLC showing its financial condition;
c) all of the foregoing qualification is true, complete, and accurate.

----------(Acknowledgment)----------

_____ being duly sworn, deposes and says that he/she is
_____ of _____;
(Title) (Name of Bidder)
that he/she is duly authorized to make the foregoing affidavit and that he/she makes it on behalf of
☐ himself / herself; ☐ said partnership; ☐ said corporation: ☐ said LLC.

Sworn to before me this _____day of _____ 20___, in the County

of _____, State of _____.

_____
(Notary Public)

My commission expires _____

(Seal)

ATTACHMENT A

SCHEDULE A
PROJECTS IN PROGRESS

Name, Location and Description of Project	Owner	Architect or Engineer	Contract Price	Percent Complete	Scheduled Completion	Reference / Contact Include Address and Phone

SCHEDULE B
PROJECTS COMPLETED

Name, Location and Description of Project	Owner	Architect or Engineer	Contract Price	Percent with Own Forces	Reference / Contact Include Address and Phone

SCHEDULE C
PERSONNEL

Name	Position	Date Started with This Organization	Date Started in Construction	Prior Positions and Experience in Construction

END OF SECTION

SECTION 00510

NOTICE OF AWARD (EJCDC C-510)

Notice of Award

Date: _____

Project: Septage Receiving Station	
Owner: Town of Branford	Owner's Contract No.: 43
Contract:	Engineer's Project No.: 60491951
Bidder:	
Bidder's Address: ***[send Notice of Award Certified Mail, Return Receipt Requested]***	

You are notified that your Bid dated [_____] for the above Contract has been considered. You are the Successful Bidder and are awarded a Contract for the Branford Septage Receiving Station project.

The Contract Price of your Contract is [_____] [_____] Dollars ($[_____]).

[_____] copies of the proposed Contract Documents (except Drawings) accompany this Notice of Award.

[_____] sets of the Drawings will be delivered separately or otherwise made available to you immediately.

You must comply with the following conditions precedent within 15 days of the date you receive this Notice of Award.

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

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

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

_____
Owner

By: _____
Authorized Signature

_____
Title

Copy to Engineer

SECTION 00520

AGREEMENT

THIS AGREEMENT is by and between the Town of Branford, Connecticut ("Owner") and _____ ("Contractor").

Owner and Contractor hereby agree as follows:

ARTICLE 1 – WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

At the Branford Water Pollution Control Facility, furnish and install a septage receiving station and appurtenances. Work to also include pipe installation, concrete pad installation, paving, instruments, electrical work, equipment installation, testing and site restoration.

ARTICLE 2 – THE PROJECT

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

Contract No. 43: Septage Receiving Station

ARTICLE 3 – ENGINEER

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

3.01 The Project has been designed by AECOM (Engineer) who will issue clarifications and interpretations in accordance with Paragraph 9.08 of the General Conditions.

3.02 Owner will provide a site representative who is to act as Owner's representative, assume duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents except as described in Paragraph 3.01.

ARTICLE 4 – CONTRACT TIMES

4.01 *Days to Achieve Substantial Completion and Final Payment*

The Work will be substantially completed within 300 days after the date when the Contract Times commence to run as provided in Paragraph 2.03 of the General Conditions

and completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions within 360 days after the date when the Contract Times commence to run.

4.02 *Liquidated Damages*

A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Owner $250 for each day that expires after the time specified in Paragraph 4.02 above for Substantial Completion until the Work is substantially complete. After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by Owner, Contractor shall pay Owner $250 for each day that expires after the time specified in Paragraph 4.02 above for completion and readiness for final payment until the Work is completed and ready for final payment.

4.03 Permitting Contractor or Surety to continue and finish the Work or any part of the Work after the times specified for completion, or after the date to which the times for completion may have been extended, shall in no way operate as a waiver on the part of Owner of its rights under the Contract.

ARTICLE 5 – CONTRACT PRICE

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

A. For all Work a Contract Price of: $_____

All specific cash allowances are included in the above price in accordance with Paragraph 11.02 of the General Conditions.

ARTICLE 6 – PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

A. Contractor shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 *Progress Payments; Retainage*

A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment on or about the 1st day of each month during performance of the Work as provided in Paragraph 6.02.A.1 below. All such payments will be measured by the schedule of values established as provided in Paragraph 2.07.A of the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements.

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Engineer may determine or Owner may withhold, including but not limited to liquidated damages, in accordance with Paragraph 14.02 of the General Conditions.

a. 95 percent of Work completed (with the balance being retainage). If the Work has been 50 percent completed as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, then as long as the character and progress of the Work remain satisfactory to Owner and Engineer, there will be no additional retainage; and

b. 95 percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).

B. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 100 percent of the Work completed, less such amounts as Engineer shall determine in accordance with Paragraph 14.02.B.5 of the General Conditions and less 200 percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the tentative list of items to be completed or corrected attached to the certificate of Substantial Completion.

6.03 *Final Payment*

A. Upon final completion and acceptance of the Work in accordance with Paragraph 14.07 of the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 14.07.

B. Retainage. The Owner may retain out of the moneys otherwise payable to the Contractor hereunder a percentage of 2 percent and may expend the same, in the manner hereinafter provided, in making such repairs, corrections or replacements in the Work as the Owner, in its sole judgment, may deem necessary.

If at any time within the said period of guarantee any part of the Work requires repairing, correction or replacement, the Owner may notify the Contractor in writing to make the required repairs, correction or replacements. If the Contractor neglects to

commence making such repairs, correction, or replacements to the satisfaction of the Owner within three (3) days from the date of receipt of such notice, or having commenced fails to prosecute such work with diligence, the Owner may employ other persons to make the same. The Owner shall pay the cost and expense of the same out of the amounts retained for that purpose. Upon the expiration of the said period of guarantee, provided that the Work at that time is in good order, the Contractor will be entitled to receive the whole or such part of the sum last aforesaid, if any, as may remain after the cost and expense of making said repairs, correction or replacements, in the manner aforesaid, have been paid therefrom.

ARTICLE 7 – INTEREST

7.01 All moneys not paid when due as provided in Article 14 of the General Conditions shall bear interest at the maximum rate allowed by law at the place of the Project.

ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS

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

A. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.

B. Contractor has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Contractor has considered the information known to Contractor; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Contract Documents; and (3) Contractor's safety precautions and programs.

E. Based on the information and observations referred to in Paragraph 8.01.E above, Contractor does not consider that 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 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.

H. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

I. In connection with the performance of Work under this Contract, Contractor agrees not to discriminate against any employee or applicant for employment because of age, race, religion, color, handicap, sex, physical condition or developmental disability. This provision 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. Contractor further agrees to take affirmative action to ensure equal employment opportunities for persons with disabilities. Contractor agrees to post in conspicuous places, available for employees and applicants for employment, notices setting forth the provisions of the nondiscrimination clause. Form of notice is included in the Project Forms.

ARTICLE 9 – CONTRACT DOCUMENTS

9.01 *Contents*

A. The Contract Documents consist of the following:

1. This Agreement (pages 00520-1 to 00520-8, inclusive).

2. Performance bond (pages 00610-1 to 00610-4, inclusive).

3. Payment bond (pages 00615-1 to 00615-3, inclusive).

4. General Conditions (pages 00700-1 to 00700-62, inclusive).

5. Supplementary Conditions (pages 00800-1 to 00800-17, inclusive).

6. Technical Specifications as listed in the table of contents of the Project Manual.

7. Drawings consisting of seven drawings with each drawing bearing the following general title “Contract 43 Septage Receiving Station”.

8. Addenda (numbers _____ to _____, inclusive).

9. Exhibits to this Agreement (enumerated as follows):

a. Contractor’s Bid (pages _____ to _____, inclusive).

b. Documentation submitted by Contractor prior to Notice of Award (pages _____ to _____, inclusive).

10. Wage Rates, if applicable.

11. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:

a. Notice to Proceed (pages _____ to _____, inclusive).

b. Work Change Directives.

c. Change Orders.

B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).

C. There are no Contract Documents other than those listed above in this Article 9.

D. The Contract Documents may only be amended, modified, or supplemented as provided in Paragraph 3.04 of the General Conditions.

ARTICLE 10 – MISCELLANEOUS

10.01 *Terms*

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

10.02 *Assignment of Contract*

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

10.03 *Successors and Assigns*

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

10.04 *Severability*

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

10.05 *Contractor's Certifications*

A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 10.05:

1. "corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process or in the Contract execution;

2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and

4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement. Counterparts have been delivered to Owner and Contractor. All portions of the Contract Documents have been signed or have been identified by Owner and Contractor or on their behalf.

OWNER:	CONTRACTOR
_____	_____
By: _____	By: _____
Title: _____	Title: _____

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

[**CORPORATE SEAL**]

Attest
.

Title:

Address for giving notices:

Attest:

Title:

Address for giving notices:

License No.:

(Where applicable)

(If Owner is a corporation, attach evidence of authority to sign. If Owner is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of this Agreement.)

END OF SECTION

SECTION 00550

NOTICE TO PROCEED (EJCDC C-550)

Notice to Proceed

Date: _____

Project: Septage Receiving Station	
Owner: Town of Branford	Owner's Contract No.: 43
Contract:	Engineer's Project No.: 60491951
Contractor:	
Contractor's Address: ***[send Certified Mail, Return Receipt Requested]***	

You are notified that the Contract Times under the above Contract will commence to run on [_____]. On or before that date, you are to start performing your obligations under the Contract Documents. In accordance with Article 4 of the Agreement, the number of days to achieve Substantial Completion is 322, and the number of days to achieve readiness for final payment is 352.

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

Also, before you may start any Work at the Site, you must:

Submit shop drawings

_____ _____
Owner

Given by:

_____ _____
Authorized Signature

_____ _____
Title

_____ _____
Date

Copy to Engineer

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

SECTION 00610

PERFORMANCE BOND (EJCDC C-610)

CONTRACTOR *(name and address)*

SURETY *(name and address of principal place of business)*:

OWNER *(name and address)*:
Town of Branford, 1019 Main Street, Branford, CT 06405

CONSTRUCTION CONTRACT
Effective Date of the Agreement:
Amount: $
Description *(name and location)*: Septage Receiving Station, Branford Water Pollution Control Facility

BOND
Bond Number:
Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:
Amount:
Modifications to this Bond Form: ☐ None ☐ See Paragraph 16

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

CONTRACTOR AS PRINCIPAL	**SURETY**
_____ *(seal)*	_____ *(seal)*
Contractor's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	**By:** _____
Signature	Signature *(attach power of attorney)*
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	**Attest:** _____
Signature	Signature
_____	_____
Title	Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

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

2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.

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

3.1 The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;

3.2 The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

3.3 The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

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

5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

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

5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

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

5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:

7.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

7.2 additional legal, design professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and

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

8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.

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

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

11. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within

two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum periods of limitations available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

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

14. Definitions

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

14.2 Construction Contract: The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

14.3 Contractor Default: Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

14.4 Owner Default: Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

14.5 Contract Documents: All the documents that comprise the agreement between the Owner and Contractor.

15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

16. Modifications to this Bond are as follows:

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

SECTION 00615

PAYMENT BOND (EJCDC C-615)

CONTRACTOR *(name and address)*:

SURETY *(name and address of principal place of business)*:

OWNER *(name and address)*: Town of Branford, 1019 Main Street, Branford, CT 06405

CONSTRUCTION CONTRACT

Effective Date of the Agreement:
Amount:
Description *(name and location)*: Septage Receiving Station, Branford Water Pollution Control Facility

BOND

Bond Number:
Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:
Amount:
Modifications to this Bond Form: ☐ None ☐ See Paragraph 18

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

CONTRACTOR AS PRINCIPAL	**SURETY**
_____ *(seal)*	_____ *(seal)*
Contractor's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	**By:** _____
Signature	Signature *(attach power of attorney)*
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	**Attest:** _____
Signature	Signature
_____	_____
Title	Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

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

2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.

4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.

5. The Surety's obligations to a Claimant under this Bond shall arise after the following:

    5.1 Claimants who do not have a direct contract with the Contractor,

        5.1.1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and

        5.1.2 have sent a Claim to the Surety (at the address described in Paragraph 13).

    5.2 Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).

6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.

7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

    7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

    7.2 Pay or arrange for payment of any undisputed amounts.

    7.3 The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

8. The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

9. Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

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

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

12. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, or

(2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

13. Notice and Claims to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

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

15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

16. **Definitions**

16.1 **Claim:** A written statement by the Claimant including at a minimum:

1. The name of the Claimant;
2. The name of the person for whom the labor was done, or materials or equipment furnished;
3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;
4. A brief description of the labor, materials, or equipment furnished;
5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;
7. The total amount of previous payments received by the Claimant; and
8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.

16.2 **Claimant:** An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms of "labor, materials, or equipment" that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

16.3 **Construction Contract:** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

16.4 **Owner Default**: Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

16.5 **Contract Documents:** All the documents that comprise the agreement between the Owner and Contractor.

17. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

18. Modifications to this Bond are as follows:

SECTION 00630 **CHANGE ORDER**

CHANGE ORDER (EJCDC C-941) **NO. [____]**

Date of Issuance: _____ Effective Date: _____

Project: Septage Receiving Station	Owner: Town of Branford	Owner's Contract No.: 43
Contract:		Date of Contract:
Contractor:		Engineer's Project No.: 60491951

The Contract Documents are modified as follows upon execution of this Change Order:

Description:

Attachments (list documents supporting change):

CHANGE IN CONTRACT PRICE:	**CHANGE IN CONTRACT TIMES:**
Original Contract Price: $_____	Original Contract Times: ☐ Working days ☐ Calendar days Substantial completion (days or date): _____ Ready for final payment (days or date): _____
[Increase] [Decrease] from previously approved Change Orders No. _____ to No. $_____	[**Increase] [Decrease**] from previously approved Change Orders No. _____ to No. _____: Substantial completion (days): _____ Ready for final payment (days): _____
Contract Price prior to this Change Order: $_____	Contract Times prior to this Change Order: Substantial completion (days or date): _____ Ready for final payment (days or date): _____
[Increase] [Decrease] of this Change Order: $_____	[Increase] [Decrease] of this Change Order: Substantial completion (days or date): _____ Ready for final payment (days or date): _____
Contract Price incorporating this Change Order: $_____	Contract Times with all approved Change Orders: Substantial completion (days or date): _____ Ready for final payment (days or date): _____

RECOMMENDED:	ACCEPTED:	ACCEPTED:
By: _____	By: _____	By: _____
Engineer (Authorized Signature)	Owner (Authorized Signature)	Contractor (Authorized Signature)
Date: _____	Date: _____	Date: _____

Approved by Funding Agency (if applicable):

_____ Date: _____

Change Order

Instructions

A. GENERAL INFORMATION

This document was developed to provide a uniform format for handling contract changes that affect Contract Price or Contract Times. Changes that have been initiated by a Work Change Directive must be incorporated into a subsequent Change Order if they affect Price or Times.

Changes that affect Contract Price or Contract Times should be promptly covered by a Change Order. The practice of accumulating Change Orders to reduce the administrative burden may lead to unnecessary disputes.

If Milestones have been listed in the Agreement, any effect of a Change Order thereon should be addressed.

For supplemental instructions and minor changes not involving a change in the Contract Price or Contract Times, a Field Order should be used.

B. COMPLETING THE CHANGE ORDER FORM

Engineer normally initiates the form, including a description of the changes involved and attachments based upon documents and proposals submitted by Contractor, or requests from Owner, or both.

Once Engineer has completed and signed the form, all copies should be sent to Owner or Contractor for approval, depending on whether the Change Order is a true order to the Contractor or the formalization of a negotiated agreement for a previously performed change. After approval by one contracting party, all copies should be sent to the other party for approval. Engineer should make distribution of executed copies after approval by both parties.

If a change only applies to price or to times, cross out the part of the tabulation that does not apply.

SECTION 00650

CERTIFICATE OF SUBSTANTIAL COMPLETION (EJCDC C-625)

Certificate of Substantial Completion

Project: Septage Receiving Station	
Owner: Town of Branford, Connecticut	Owner's Contract No.: 43
Contractor:	Engineer's Project No.: 60491951

This [tentative] [definitive] Certificate of Substantial Completion applies to:

☐ All Work under the Contract Documents: ☐ The following specified portions of the Work:

Date of Substantial Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor, and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Project or portion thereof designated above is hereby declared and is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below.

A [tentative] [definitive] list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance and warranties shall be as provided in the Contract Documents except as amended as follows:

☐ Amended Responsibilities ☐ Not Amended

Owner's Amended Responsibilities:

Contractor's Amended Responsibilities:

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

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

Executed by Engineer	Date
Accepted by Contractor	Date
Accepted by Owner	Date

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

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

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American Council of Engineering Companies

The Associated General Contractors of America — Skill Responsibility Integrity

ASCE American Society of Civil Engineers

PE National Society of Professional Engineers
Professional Engineers in Private Practice

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CONSTRUCTION SPECIFICATIONS INSTITUTE

These General Conditions have been prepared for use with the Suggested Forms of Agreement Between Owner and Contractor (EJCDC C-520 or C-525, 2007 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 Narrative Guide to the EJCDC Construction Documents (EJCDC C-001, 2007 Edition). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (EJCDC C-800, 2007 Edition).

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents 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 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 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.

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.

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

37. *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.

38. *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.

39. *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.

40. *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.

41. *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.

42. *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.

43. *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.

44. *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.

45. *Successful Bidder*—The Bidder submitting a responsive Bid to whom Owner makes an award.

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

47. *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 Subcontractor.

48. *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.

49. *Unit Price Work*—Work to be paid for on the basis of unit prices.

50. *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.

51. *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 words and terms discussed in Paragraph 1.02.B through F are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives:*

1. The Contract Documents include the terms "as allowed," "as approved," "as ordered," "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of 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 that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

A. 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; Designation of Authorized Representatives*

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit instructions, receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

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 reasonably may be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the indicated 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, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the 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 discovers, or has actual knowledge of, 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 (a) any applicable Law or Regulation , (b) any standard, specification, manual, or code, or (c) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 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 had actual knowledge 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, or code, or the instruction of any Supplier (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 shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions; or

2. reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer.

B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

3.06 *Electronic Data*

A. Unless otherwise stated in the Supplementary Conditions, the data furnished by Owner or Engineer to Contractor, or by 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 known to Owner of explorations and tests of subsurface conditions at or contiguous to the Site; and

2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the 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 officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

4.03 *Differing Subsurface or Physical Conditions*

A. *Notice:* If Contractor believes that any subsurface or physical condition 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, neither Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall 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 provided by others; and

2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:

   a. reviewing and checking all 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:* The Supplementary Conditions identify those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at the Site.

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the 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 officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.

C. Contractor shall not be responsible for 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. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to

permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 4.06.E.

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 written notice to Contractor: (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, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (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, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition 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 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 or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed each bond.

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 and loss payee 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 and loss payee 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.

C. Failure of Owner to demand such certificates or other evidence of Contractor's full compliance with these insurance requirements or failure of Owner to identify a deficiency in compliance from the evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.

D. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor.

E. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

5.04 *Contractor's Insurance*

A. Contractor shall purchase and maintain such 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, be written on an occurrence basis, include as additional insureds (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, members, partners,

employees, agents, consultants, and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;

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

4. 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);

5. 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

6. include completed operations coverage:

   a. Such insurance shall remain in effect for two years after final payment.

   b. 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, members, 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 a loss payee;

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

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 loss payee to whom a certificate of insurance has been issued.

B. Owner shall purchase and maintain such equipment breakdown 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, members, 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 a loss payee.

C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this 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 loss payee 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 this 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 as loss payees (and the officers, directors, members, 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 loss payees thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.

B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial 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, members, 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 loss payees, 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.

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; and

3) it has a proven record of performance and availability of responsive service.

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 if 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 by 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 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 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; and

      4) 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 a Change Order in the case of a substitute and 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 so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

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 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 a loss payee 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, Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by 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, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.

C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

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 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, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any 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. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

1. all persons on the Site or who may be affected by the Work;

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, 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. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.

D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

E. All damage, injury, or loss to any property referred to in Paragraph 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 Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts

any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

F. Contractor's duties and responsibilities for safety and 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 accepted Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

1. *Shop Drawings:*

a. Submit electronic copies as 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:*

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:

a. 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;

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

c. determined and verified the suitability of all materials offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

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

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review 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 Drawings 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 officers, directors, members, partners, employees, agents, consultants, and subcontractors 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, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable .

B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 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, members, partners, employees, agents, consultants and subcontractors arising out of:

1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or

2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

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 through 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, provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and 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 such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected. 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 wrongful actions or inactions.

C. Contractor shall be liable to Owner and any other contractor under direct contract to Owner for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's wrongful 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 with respect to 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 relating to existing surface or subsurface structures at the Site.

8.06 *Insurance*

A. Owner's responsibilities, if any, with 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 with 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. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents.

8.12 *Compliance with Safety Program*

A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed pursuant to Paragraph 6.13.D.

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.

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 believes 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.

9.10 *Compliance with Safety Program*

A. While at the Site, Engineer's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Engineer has been informed pursuant to Paragraph 6.13.D.

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.D.

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

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 Times 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 not include any of the costs itemized in Paragraph 11.01.B, and shall include only the following items:

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, 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, as imposed by Laws and Regulations.

    e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

    f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 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, express and courier services, 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, expediters, 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.

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 to 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 Paragraphs 12.01.C.2.a and 12.01.C.2.b 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 their officers, directors, members, partners, employees, agents, consultants, or subcontractors 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. 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, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

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 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, Contractor shall, if requested by Engineer, uncover such Work 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 written 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 for 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 of the executed Work as an experienced and qualified design professional, and on Engineer's

review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

a. the Work has progressed to the point indicated;

b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and any other qualifications stated in the recommendation); and

c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or

b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

a. to supervise, direct, or control the Work, or

b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or

d. to make any examination to ascertain how or for what purposes Contractor has used the 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 remedies the reasons for such action.

3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1 and subject to interest as provided in the Agreement.

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 remove its property and 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, Owner, and Engineer will follow the procedures of Paragraph 14.04.A through D 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.6;

   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 might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

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 repeated 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 the 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

ARTICLE 1. DEFINITIONS

SC-1.01

Defined Terms:

Insert the following language before the word “Agreement” in the first sentence of the definition 1.01A.12 entitled "Contract Documents" in the General Conditions:

Invitation to Bid, Instructions to Bidders, and

ARTICLE 2. PRELIMINARY MATTERS

SC-2.01

Copies of Documents:

Delete paragraph 2.01B of the General Conditions in its entirety and insert the following in its place:

B. Before any work at the site is started, Contractor shall deliver to Owner, with a copy to Engineer, certificates of insurance (and other evidence of insurance requested by Owner) which Contractor is required to purchase and maintain in accordance with the requirements of Article 5.

1. Contractor shall include and identify on the certificate of insurance, indemnification as required by Article 6.20.

2. Engineer shall furnish to the Contractor, the form for Certificate of Insurance to be completed.

SC-2.02

Copies of Documents:

Delete Paragraph 2.02.A. in its entirety and insert the following in its place:

A. Owner shall furnish Contractor up to **3** printed or hard copies of the Drawings and Project Manual and one set in electronic format. Additional printed copies will be furnished upon request at the cost of reproduction.

SC-2.03

Commencement of Contract Times; Notice to Proceed:

Delete the last sentence of Paragraph 2.03.A. in its entirety and insert the following in its place:

In no event will the Contract Times commence to run later than the 61st day after the day of Bid opening or the 30th day after the Effective Date of the Agreement, whichever date is earlier.

SC-2.05

Before Starting Construction:

Amend the first sentence of Paragraph 2.05.A.3. by inserting the words "except for Unit Price Work" at the beginning of the sentence.

ARTICLE 3. CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

SC-3.01

Intent:

Add a new paragraph immediately after paragraph 3.01A of the General Conditions which is to read as follows:

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

2. Sections of Division 1 - General Requirements govern the execution of the work of all sections of the specifications.

SC-3.03

Reporting and Resolving Discrepancies:

Add the following language as Paragraph 3.03.A.4.:

4. A request for written interpretation or clarification of the Contract Documents shall be submitted on the Contract Clarification/Interpretation Request form provided in the Project Forms section.

ARTICLE 4. AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; REFERENCE POINTS

SC-4.04

Underground Facilities:

Delete the following words from line 5 of paragraph 4.04B.2 of the General Conditions:

"or not shown or indicated with reasonable accuracy"

SC-4.05

Reference Points:

Add a new paragraph at the end of paragraph 4.05A of the General Conditions which is to read as follows:

B. Engineer may check the lines, elevations, reference marks, batter boards, etc., set by Contractor, and Contractor shall correct any errors disclosed by such check. Such a check shall not be considered as approval of Contractor's work and shall not relieve Contractor of the responsibility for accurate and satisfactory construction and completion of the entire Work. Contractor shall furnish personnel to assist Engineer in checking lines and grades.

SC-4.06

Hazardous Environmental Conditions at Site:

Delete Paragraphs 4.06.A. and 4.06.B. in their entirety and insert the following in their place:

A. No reports or drawings related to Hazardous Environmental Conditions at the Site are available.

B. Not used.

ARTICLE 5. BONDS AND INSURANCE

SC-5.01

Performance, Payment, and Other Bonds:

Add the following language at the end of Paragraph 5.01.C:

> In addition, no further progress payments under the Agreement will be made by Owner until Contractor complies with the provisions of this paragraph.

SC-5.02

Licensed Sureties and Insurers:

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

Insurance companies shall be carriers approved in the State if Connecticut and have an A- or better rating by Best's Insurance Guide Rating. In addition, all carriers are subject to approval by the Town of Branford.

SC-5.03

Certificates of Insurance:

Delete paragraph 5.03B of the General Conditions.

SC-5.04

Contractor's Insurance:

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

C. The limits of liability for the insurance required by Paragraph 5.04 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

1. Worker's Compensation, and related coverage under Paragraphs 5.04.A.1 and 5.04.A.2 of the General Conditions:

a. State:	Statutory
b. Applicable Federal (e.g., Longshoreman's):	Statutory

c. Employer's Liability:

EL Each Accident	$500,000
EL Disease Each Employee	$500,000
EL Disease Policy Limit	$500,000

2. Contractor's General Liability under Paragraphs 5.04.A.3 through 5.04.A.6 of the General Conditions which shall include completed operations and product liability coverage's and eliminate the exclusion with respect to property under the care, custody, and control of Contractor or provide equivalent coverage under Builders Risk:

a. General Aggregate: $ **2,000,000**

b. Products/Completed Operations Aggregate: $ **2,000,000**

c. Each Occurrence (Bodily Injury and Property Damage): $ **1,000,000**

d. Excess or Umbrella Liability

Umbrella	Each Occurrence	**$ 1,000,000**
(Excess Liability)	Aggregate	$ **1,000,000**

3. Automobile Liability under Paragraph 5.04.A.6 of the General Conditions:

a. Bodily Injury:

Each Person	$ **2,000,000**
Each Accident	$ **1,000,000**

b. Property Damage:
Each Accident $ **2,000,000**

4. The Contractual Liability coverage required by Paragraph 5.04.B.3 of the General Conditions shall provide coverage for not less than the following amounts:

a. Bodily Injury:

Each Accident	$ **1,000,000**
Annual Aggregate	$ **2,000,000**

b. Property Damage:

Each Accident	$ **1,000,000**
Annual Aggregate	$ **2,000,000**

5. Original, completed Certificates of Insurance must be presented to the Town of Branford prior to purchase order/contract issuance. Bidder agrees to provide replacement/renewal certificates at least 60 days prior to the expiration of the policy.

6. Bidder shall agree to maintain in force at all times during which services are to be performed the following coverages and shall name the Town of Branford and AECOM as an Additional Insured on a primary and non-contributory basis to the Bidder's Commercial General Liability and Automobile Liability policies. These requirements shall be clearly stated in the remarks section on the bidders Certificate of Insurance. Insurance shall be written with Carriers approved in the State of Connecticut and with a minimum Best's Rating of A-. In addition, all Carriers are subject to approval by the Town of Branford.

ARTICLE 6. CONTRACTOR'S RESPONSIBILITIES

SC-6.03

Services, Materials, and Equipment:

Add the following new paragraph(s) immediately after Paragraph 6.03.C.:

D. Basis of Design

1. Unless otherwise indicated, design of this Project is based upon the material or Supplier's equipment named first in the list of manufacturers in a Specification section. Engineer has performed an evaluation of other listed manufacturers for compliance with the requirements of the Contract Documents.

2. When other manufacturers are listed, Contractor may be required to make modifications or adjustments, at Contractor's expense, to coordinate the installation of the furnished equipment with associated elements of Work, such as piping and electrical connections, or support and mounting provisions.

E. For material or equipment listed in the Specifications, Contractor shall provide Supplier A.

1. Contractor shall provide material or equipment of Supplier A unless one of the following conditions is satisfied.

a. Required equipment or material cannot be provided within the Contract Time, but not as a result of Contractor's failure to pursue Work timely or coordinate various activities properly.

b. Packaging of several items of equipment from single source will provide maintenance and coordination advantages to Owner.

c. Contractor proposes to provide one of the other items of material or equipment listed with cost savings to Owner.

2. If Contractor feels that one of above conditions can be met, Contractor shall submit documentation to substantiate condition before requesting approval of submittals. Engineer will be sole judge of acceptance.

3. If substitute material or equipment is accepted by Owner, the substitute material or equipment shall be provided and the Contract Price will be adjusted by a Change Order.

4. If substitute material or equipment is not acceptable, the material or equipment of Supplier A shall be furnished for the amount included in the Lump Sum Contract Price.

SC-6.06

Concerning Subcontractor's, Suppliers, and Others:

Renumber subparagraph 6.06F to 6.06G and subparagraph 6.06G to 6.06H and add new subparagraph as follows:

F. Owner or Engineer may furnish to any such Subcontractor, Supplier, or other person or organization, to the extent practicable, information about amounts paid to Contractor in accordance with Contractor's Applications for Payment on account of the particular Subcontractor's, Suppliers, other person's, or other organization's Work.

SC-6.09

Concerning Laws and Regulations:

Add the following new paragraph(s) immediately after Paragraph 6.09.C.:

D. MINIMUM WAGE RATES (CONNECTICUT):

1. A schedule of minimum wage rates issued by the Commissioner of Labor for the State of Connecticut, in accordance with Chapter 558 of the General Statutes of Connecticut, are included in these specifications. Building Heavy and Highway Construction Rates apply to this project. It is the responsibility of the Contractor before bid opening to request, if necessary, any additional information on State Wage Rates for those

tradespeople who are not covered by the applicable Stage Wage Determination but who may be employed for the proposed work under this contract.

2. Particular attention is directed to the following excerpt from Section 31-53a of the General Statutes of Connecticut.

    a. "The wages paid on an hourly basis of any mechanic, laborer or workman employed upon the work herein contracted to be done and the amount of payment or contribution paid or payable on behalf of each such employee to any employee welfare, fund, as defined in Section 31-78 of the general statutes, shall be at a rate equal to the rate customary or prevailing for the same work in the same trade or occupation in the town in which such public works project is being constructed. Any contractor who is not obligated by agreement to make payment or contribution on behalf of such employees to any such employee welfare fund shall pay to each employee as part of his wages the amount of payment or contribution for his classification, on each pay day.

3. Upon award of the contract, the Contractor shall complete the "Contractor's Wage Certification Form" and forward it to the Wage and Workplace Standards Division of the Connecticut Labor Department. During the progress of the work, the Contractor shall, on a weekly basis, submit to the Owner certified payroll and a statement of compliance on Form WWS-CPI, a copy of which is attached to the wage rates schedule.

SC-6.10

Taxes:

Add a new paragraph immediately after Paragraph 6.10.A.:

B. Owner is exempt from payment of sales and compensating use taxes of the State of Connecticut and of cities and counties thereof on all materials to be incorporated into the Work.

    1. Owner will furnish the required certificates of tax exemption to Contractor for use in the purchase of supplies and materials to be incorporated into the Work.

    2. Owner's exemption does not apply to construction tools, machinery, equipment, or other property purchased by or leased by Contractor, or to supplies or materials not incorporated into the Work.

SC-6.12

Record Documents:

Delete the last sentence of Paragraph 6.12.A. in its entirety and insert the following in its place:

Upon Substantial Completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to Engineer for Owner.

SC-6.16

Emergencies:

Add the following new paragraph immediately after Paragraph 6.16.A.:

B. In emergencies affecting the safety or protection of persons or property or maintenance of temporary construction at the Site or adjacent thereto, and Contractor cannot be reached, Owner may act to attempt to prevent threatened damage, injury, or loss. Owner will give Contractor and Engineer prompt written notice of such action and the cost of the correction or remedy shall be charged against Contractor. A Change Order will be issued to document the change in Contract Price.

SC-6.17

Shop Drawings and Samples:

Add the following new paragraphs immediately after Paragraph 6.17.E.:

F. Contractor shall furnish required submittals with sufficient information and accuracy in order to obtain required approval of an item with no more than three submittals. Engineer will record Engineer's time for reviewing subsequent submittals of Shop Drawings, samples, or other items requiring approval and Contractor shall reimburse Owner for Engineer's charges for such time.

G. After Engineer has reviewed and approved a Shop Drawing or Sample, Contractor shall provide the material or equipment approved. Engineer will not review subsequent submittals of a different manufacturer or Supplier unless Contractor provides sufficient information to Engineer that the approved material or equipment is unavailable, time of delivery will delay the construction progress but not as a result of Contractor's failure to timely pursue the Work or to coordinate various activities properly, or Owner requests a different manufacturer or Supplier.

ARTICLE 7. OTHER WORK AT THE SITE

SC-7.04

Damages to the Work or Property:

Add the following new paragraph at the end of Article 7 of the General Conditions:

A. Should Contractor cause damage to the work or property of any separate contractor at the site, or should any claim arising out of Contractor's performance of the Work at the site be made by any separate contractor against Contractor, Owner, Engineer, Engineer's Consultants, or any other person, Contractor shall promptly attempt to settle with such other contractor by agreement, or to otherwise resolve the dispute by arbitration or at law. Contractor shall, to the fullest extent permitted by Laws and Regulations, indemnify and hold Owner, Engineer, and Engineer's Consultants, harmless from and against all claims, damages, losses, and expenses (including, but not limited to, fees of engineers, architects, attorneys, and other professionals, and court and arbitration costs) arising directly, indirectly, or consequentially out of any action, legal or equitable, brought by any separate contractor against Owner, Engineer, or Engineer's Consultants, to the extent based on a claim arising out of the Contractor's performance of the Work. Should a separate contractor cause damage to the Work or property of Contractor or should the performance of Work by any separate contractor at the site give rise to any other claim, Contractor shall not institute any action, legal or equitable, against Owner, Engineer or Engineer's Consultants, or permit any action against any of them to be maintained and continued in its name or for its benefit in any court or before any arbiter which seeks to impose liability on or to recover damages from Owner, Engineer, or Engineer's Consultants, on such damage or claim. If Contractor is delayed at any time in performing or furnishing Work by any act or neglect of a separate contractor and Owner and Contractor are unable to agree to the extent of any adjustment in Contract Times attributable thereto, Contractor may make a claim for an extension of times in accordance with Article 12. An extension of the Contract Times shall be Contractor's exclusive remedy with respect to Owner, Engineer, and Engineer's Consultants, for any delay, disruption, interference or hindrance caused by any separate contractor. This paragraph does not prevent recovery from Owner, Engineer, or Engineer's Consultant, for activities that are their respective responsibilities.

ARTICLE 8. OWNER'S RESPONSIBILITIES

SC-8.06

Insurance:

Delete paragraph 8.06 of the General Conditions in its entirety.

SC-8.13

Owner's Project Representative:

Add the following new paragraph immediately after Paragraph 8.12.:

A. Owner will furnish a site representative, assistants, and other field staff to observe performance and progress of the Work.

B. The duties and responsibilities of Owner's site representative are described as follows:

1. Become familiar with the Contract Documents to observe the progress and quality of the executed Work, and to determine, in general, if the Work is proceeding in accordance with the Contract Documents.

2. Promptly forward to Engineer, reports from Contractor indicating conflict, error, ambiguity, or discrepancy in the Contract Documents to enable Engineer to issue a written clarification or interpretation as provided for in Paragraph 9.04 of the General Conditions.

3. Provide Engineer with copy of Site Representatives' daily log.

ARTICLE 9. ENGINEER'S STATUS DURING CONSTRUCTION

SC-9.03

Project Representative:

Add the following new paragraph immediately after Paragraph 9.03.A.:

B. Owner will provide a site representative whose responsibilities and duties are described in Paragraph SC 8.13.

SC-9.07

Determinations for Unit Price Work:

Delete the last sentence of Paragraph 9.07.A. in its entirety and insert the following in its place:

"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 and not subject to appeal."

SC-9.10

Compliance with Safety Program:

Add the following new paragraph immediately after Paragraph 9.10.A.:

B. In the event Engineer determines that Contractor's safety plans, programs, and procedures do not provide adequate protection for Engineer, Engineer may direct its employees to leave the Project Site or implement additional safeguards for Engineer's protection. If taken, these actions will be in furtherance of Engineer's responsibility to its own employees only, and Engineer will not assume any responsibility for protection of any other persons affected by the Work. In the event Engineer observes situations which appear to have potential for immediate and serious injury to persons, Engineer may warn the persons who appear to be affected by such situations. Such warnings, if issued, shall be given based on general humanitarian concerns, and Engineer will not, by the issuance of any such warning, assume any responsibility to issue future warnings or any general responsibility for protection of persons affected by the Work.

ARTICLE 10 - CHANGES IN THE WORK; CLAIMS

SC-10.01

Authorized Changes in the Work:

Add the following new subparagraph immediately after Paragraph10.01.B.:

1. By submission of a Claim Contractor certifies that the claim is made in good faith, that the supporting data are accurate and complete to the best of Contractor's knowledge and belief, and that the amount or time requested accurately reflects the Contract adjustment for which Contractor believes Owner is liable.

SC-10.03

Execution of Change Orders:

Add the following new paragraph immediately after Paragraph10.03.A.3.:

4. Change Orders will be prepared on the form included in the Project Forms of the Project Manual.

SC-10.05

Claims:

Amend Paragraph 10.05.B. by deleting the words “30 days” in the first sentence and inserting the words “10 days” in their place, and deleting the words “60 days” in the third sentence and inserting the words “30 days” in their place.

Amend the sixth sentence of Paragraph 10.05.B. by deleting the words “believes it.”

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

SC-11.01

Cost of the Work:

In the second sentence of paragraph 11.01A.1 delete the word "superintendents".

SC-11.02

Allowances:

Add the following new paragraph immediately after Paragraph 11.02.B.:

C. *Quantities Allowances*: The allowances include the quantity of material or equipment to be installed or removed from the Site; and

1. Contractor agrees that:

a. Contractor’s cost for unloading and handling on the Site, labor, installation costs, overhead, profit, and other expenses contemplated for the allowance shall have been included in the Contract Price and not in the allowances.

b. Contractor’s cost for removing and loading material or equipment on the Site, transporting and fees for disposal on or off Site, overhead, profit, and other expenses contemplated for the Allowance shall have been included in the Contract Price.

c. Contractor’s cost for furnishing and installing material or equipment to replace the removed material or equipment shall include cost for furnishing and installing the material or equipment, labor, installation costs, overhead, profit and other expenses contemplated for the allowance shall have been included in the Contract Price.

2. No demand for additional payment on account of any of the foregoing will be valid.

Renumber Paragraphs 11.02.C. and D. to 11.02.D respectively.

ARTICLE 12. CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

SC-12.01

Change in Contract Price

Delete Paragraph 12.01.B.2. in its entirety and insert the following in its place:

2. When the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which includes an allowance for overhead and profit in accordance with Paragraph 12.01.C.2); or

SC-12.01

Change of Contract Price:

Delete the semicolon at the end of Paragraph 12.01.C.2.c., and add the following language:

", provided, however, that on any subcontracted work the total maximum fee to be paid by Owner under this subparagraph shall be no greater than 27 percent of the cost incurred by the Subcontractor who actually performed the work";

SC-12.02

Change of Contract Times:

Add the following new paragraph immediately after Paragraph 12.02.B.:

C. Time extensions provided under Paragraph 12.03 of the General Conditions will only be allowed for controlling items of Work (critical path).

SC-12.03

Delays:

Delete Paragraph 12.03.B. in its entirety and insert the following in its place:

B. If Owner, Engineer, or other contractors or utility owners performing other work for the 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 Times. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work with the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.02.B.

ARTICLE 14. PAYMENTS TO CONTRACTOR AND COMPLETION

SC-14.02

Progress Payments:

Amend the first sentence of Paragraph 14.02.A.1. by striking out the words "20 days" and inserting the words "30 days" in their place.

Add the following language at the end of Paragraph 14.02.A.2.:

Owner may at any time require Contractor to furnish lien waivers for labor and materials covered by specified Applications for Payment.

SC-14.02

Progress Payments:

Amend Paragraph 14.02.C.1. by striking out the words "Ten days" and inserting the words "Twenty days" in their place.

SC-14.07

Final Payment:

Amend the first sentence of Paragraph 14.07.A.1. by striking out the words "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,"

Amend Paragraph 14.07.A.2.a. by striking out the words ", including but not limited to evidence of insurance required by Paragraph 5.04.B.6."

SC-14.07

Final Payment:

Add the following new paragraph after paragraph 14.07A.3 of the General Conditions.

4. The amount of retainage with respect to final payment will be as stipulated in the Agreement.

ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

SC-15.04

Contractor May Stop Work or Terminate:

Amend Paragraph 15.04.A. by striking out the words "30 days" in two places and inserting the words "60 days" in their places, and by striking out the words "seven days" and inserting the words "10 days" in their place.

Amend Paragraph 15.04.B. by striking out the words "30 days" in two places and inserting the words "60 days" in their places, and by striking out the words "seven days and inserting the words "10 days" in their place.

ARTICLE 16. DISPUTE RESOLUTION

SC-16.01

Methods and Procedures:

Add a new sentence at the end of paragraph 16.01A of the General Conditions which is to read as follows:

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

ARTICLE 17. MISCELLANEOUS

SC-17.06

Delete paragraph 17.06 in its entirety and replace with the following:

17.06 Headings:

A. The headings or titles of any article, paragraph, subparagraph, section, subsection, or part of the Contract Documents shall not be deemed to limit or restrict the article, paragraph, section, or part.

SC-17.07

Legal Address of Contractor:

Add new paragraph immediately after paragraph 17.06 of the General Conditions as follows:

A. Contractor's business address and his office at or near the site of the Work are both hereby designated as places to which communications shall be delivered. The depositing of any

letter, notice, or other communication in a postpaid wrapper directed to the Contractor's business address in a post office box regularly maintained by the Post Office Department or the delivery at either designated address of any letter, notice, or other communication by mail or otherwise shall be deemed sufficient service thereof upon Contractor, and the date of such service shall be the date of receipt. The first-named address may be changed at any time by an instrument in writing, executed and acknowledged by Contractor and delivered to Engineer. Service of any notice, letter, or other communication upon the Contractor personally shall likewise be deemed sufficient service.

SC-17.08

Engineering and Inspection Costs and Expenses:

Add a new paragraph immediately after paragraph 17.07 of the General Conditions which is to read as follows:

A. The Contractor shall be responsible and liable for all engineering and inspection costs and expenses incurred by the Owner caused by, or related in any way to, the failure of the Contractor to perform its services in the time and manner set forth in the Agreement, the General Conditions and the Supplemental Conditions. The Owner may charge to the Contractor, and may deduct from the periodical payments and the final payment for the Contractor's work, the full amount of such engineering and inspection costs and expenses including Owner's and Engineer's costs.

    1. The Engineer's charges will be based on the Engineer's actual labor and expenses at the same rate the Owner is charged.

B. For any engineering costs and expenses beyond the regular eight-hour day and for any time work on Saturday, Sunday, or holidays, the charges for such personnel will be one and one-half times the rate established above.

END OF SECTION

SECTION 01010

SUMMARY OF WORK

PART 1 - GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of this Contract generally consists of furnishing and installing a septage receiving station and associated appurtenances at the Branford Water Pollution Control Facility (WPCF). The Work at the WPCF includes furnishing and installing new septage receiving equipment, pouring new concrete pads and associated pipe supports, providing a new asphalt driveway, piping, electrical, enclosures and required appurtenances as shown on the Contract Drawings and outlined in these specifications.

B. The Contractor shall be responsible for furnishing all materials and appurtenances required to complete the project as shown on the Contract Documents.

C. All work within the Town jurisdiction shall not commence until approval is received by the Contractor from the Town in which the work under this contract is being performed.

1.02 RELATED REQUIREMENTS:

A. See Section 01015 and Section 01500 for limitations and procedures governing temporary use of Owner's facilities.

1.03 WORK SEQUENCE:

A. Operation of the existing WPCF must be maintained throughout the duration of the Project.

B. Work sequence requirements include the following:

1. Do not begin work until plans have been submitted and approved and until all erosion control and environmental measures are in place.

2. Obtain all permits and approvals before commencing any work.

1.04 ACCESS TO AND USE OF THE SITE:

A. General: The Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.

B. Use of Site:

1. Limit use of Project site for the work and storage of materials and equipment to allow the Owner's use in operating and maintaining the WPCF.

2. The Contractor shall coordinate with Owner necessary access for normal maintenance requirements.

3. The Contractor shall submit proposed locations for the construction trailers for review and approval by the Engineer and Owner. The Contactor will also be allowed to use designated, reasonably sized areas for lay down areas.

4. Contactor shall assume full responsibility for security of all his and his subcontractor's materials and equipment stored on site.

5. If directed by the Owner, the Contractor shall move any stored items which interfere with the operations of the Owner.

6. The Contractor shall obtain and pay for use of additional storage or work areas if needed to perform the work.

7. The Contractor shall provide temporary sanitary facilities for construction personnel as specified in Section 01500.

8. Driveways, Walkways and Entrances: Keep driveways, parking areas, loading areas and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times except when these areas are under construction. When work is completed on these specific areas, return unobstructed use to the Owner. Do not use these areas for parking or storage of materials unless authorized by the Owner.

a. Schedule deliveries to minimize use of driveways and entrances by construction operations.

b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

C. Condition of Existing Buildings: Maintain portions of existing buildings affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

1.05 WORK RESTRICTIONS:

A. Work Restrictions, General: Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

B. On-Site Work Hours: Limit work at the WPCF to normal business working hours of 7:00 a.m. to 3:30 p.m., Monday through Friday, unless otherwise indicated.

1. Weekend Hours: Only on an emergency basis and with prior written approval by the Owner.

2. Early Morning Hours: Only on an emergency basis and with prior written approval by the Owner.

3. Hours for Utility Shutdowns: coordinated and with prior written approval by the Owner.

C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:

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

2. Obtain the Engineer's and Owner's written permission before proceeding with utility interruptions.

D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.

1. Notify the Engineer and Owner not less than two days in advance of proposed disruptive operations.

2. Obtain the Engineer's and Owner's written permission before proceeding with disruptive operations.

E. Controlled Substances: Use of alcohol products and other controlled substances on Project site is not permitted.

1.06 SPECIFICATION AND DRAWING CONVENTIONS:

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

2. Specification requirements are to be performed by the Contractor unless specifically stated otherwise.

B. Division 1 General Requirements: Requirements of sections in Division 1 apply to the Work of all sections in the Specifications.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

(Not Used)

END OF SECTION

SECTION 01015

SEQUENCE OF CONSTRUCTION OPERATIONS

PART 1 - GENERAL

1.01 INTRODUCTION:

A. This section presents information related to the anticipated construction sequencing that will be required to maintain plant operations during construction. For clarity, this section is presented by major structure or area however it should be recognized that numerous construction activities will take place simultaneously. Coordination of these activities is the Contractor's responsibility.

B. Flows shall be maintained during construction.

C. Plant functions are to be maintained throughout the contract period, unless otherwise specified, so no deterioration in the quality of treated effluent will occur. At no time will discharge of flows without screening, degritting, pumping, primary treatment, secondary treatment, and disinfection and flow measurement be allowed as a result of the Contractor's operations. Plant recording of instrument data will not be inhibited.

D. Other responsibilities of the Contractor are described in the Specifications and Drawings.

1.02 SEQUENCE OF CONSTRUCTION:

A. The construction sequence described herein includes significant work items. The sequence is not intended to describe all proposed work; rather, it is intended to describe where sequence is critical to plant operations.

B. The Contractor shall give Owner a 14-day notice when requesting that a process unit be taken offline, so that Owner may plan his operations accordingly.

C. Within 15 days after the Notice to Proceed, the Contractor shall submit to the Engineer a schedule and sequence of construction for the Work under this Contract. The schedule shall indicate the anticipated timing of construction of new facilities, as well as modification of existing structures and equipment. The schedule shall also indicate the anticipated availability of all new processes and related systems and the anticipated occupancy of all structures. In addition to this, at least 14 days prior to the construction of any work or part hereof which will interfere with the existing facilities, the Contractor shall submit to the Engineer a detailed schedule and sequence of this proposed construction. The detailed schedule and sequence shall include the time

period and nature of the interference and what temporary measures or facilities will be utilized to accomplish the work and minimize the interruption.

D. The detailed schedule and sequence shall also include a description of temporary systems if applicable.

E. Descriptions shall be provided to confirm to compliance with the requirements specified herein including type of equipment, controls, alarms, and provisions for standby units in the event of a failure of primary units and provisions in the event of a failure of primary power system. The Contractor's detailed schedule and sequence of proposed work shall incorporate a written plan of the electrical and controls work.

F. The schedules as accepted shall be adhered to except as deviations therefrom are expressly permitted by the Engineer. Schedules shall be updated and resubmitted as specified and as requested by the Engineer.

G. The Owner and the Engineer reserve the right to reschedule such work at any time if, in their judgment, weather conditions, flow conditions or other factors would adversely affect the plant operation and performance during the conduct of the work.

H. The Contractor should note that any work requiring shutdown or modification of existing facilities requires prior written acceptance of the proposed schedule and sequence noted above.

1.03 OTHER PROVISIONS:

A. In general, the Contractor shall make whatever provisions are necessary to protect and maintain the continued operation of the existing facilities. Such provisions shall include, but are not necessarily be limited to, such items as:

1. Protection of the structural integrity of all existing structures, including structures scheduled for demolition until such times as they can be demolished as permitted.

2. Installation of suitable temporary piping and pumping equipment to replace piping and pumping equipment which is to be demolished, in part, in order to construct new facilities. Such provisions shall include, installation of suitable temporary electrical work including controls, alarms, standby power, etc., the heating and insulation of such temporary piping as necessitated by weather and exposure to the elements all as necessary to maintain existing wastewater treatment functions.

3. Maintenance of the access road to the WPCF to provide convenient access to the existing facilities at all times. The Contractor shall keep the access road reasonably free of dust, ruts and construction traffic.

1.04 CONSTRUCTION RESTRICTIONS:

A. For the purposes of this Specification, the term “operational” or “in service” denotes that a process and all related appurtenances are available and capable of being used by the Owner for its intended purpose.

B. Temporary systems may be proposed by the Contractor but are subject to the approval of Owner and Engineer.

C. The Owner and Engineer shall be notified at least 14 days in advance prior to taking portions of the facility offline.

D. Operation of the flow control gates and valves necessary to isolate individual equipment, systems or portion of systems for work shall be performed by or under the direction of appropriate WPCF personnel. The Contractor shall do preparatory work to ensure the gates, valves and other equipment are operational and free of leaks that would interfere with the work.

E. The Contractor is responsible for disposal of grit and residuals in channels that are drained and cannot be removed via the current treatment plant process. This residual grit and residuals will be removed to an on-site location.

F. When tankage or equipment is taken out of service for work, the Contractor’s activities shall not affect the appurtenant equipment or functionality of units that remain online.

G. Additional construction restrictions are described below.

1.05 CONCURRENT CONTRACT WORK:

A. The Contractor shall coordinate his work with the work of the other contractors in such a manner as to prevent interferences with the work of other contractors.

1.06 ELECTRICAL DISTRIBUTION SYSTEM WORK – GENERAL:

A. All electrical work shall be scheduled to allow for continuous electrical operation of existing facilities or bypass pumping shall be provided if applicable. If temporary electrical services are required to maintain the operation of existing facilities, details of proposed temporary measures shall be submitted to the Engineer for approval. Contractor shall provide and maintain all such temporary electric service except as explicitly indicated otherwise.

1.07 INSTRUMENTATION SYSTEM WORK – GENERAL:

A. All work shall be scheduled to allow for continuous operation of instrumentation devices and controls. If temporary control wiring or instrumentation services are required to maintain the operation of existing facilities, details of proposed temporary measures shall be submitted to the Engineer for approval. Contractor shall provide and maintain all such temporary services except as explicitly indicated otherwise

1.08 SEPTAGE RECEIVING:

A. As part of the work, septage will continue to be received at the WPCF at the Truck Loading Building. Contractor shall make provisions to stage his work so as not to interfere with septage deliveries. Driveway access must be maintained.

END OF SECTION

SECTION 01025

MEASUREMENT AND PAYMENT

PART1.0. GENERAL

1.01 SCOPE

A. The purpose of this section is to define the method of measurement and payment for each of the unit prices or lump sums listed in the Proposal. If no quantity or bid item appears in the Proposal for any of the following described items, no work of that description is anticipated on the project.

B. The Contractor shall acquaint himself with all work associated with each payment item and shall have no claim for additional compensation due to his unfamiliarity with the requirements of various items.

C. The Contractor's attention is directed to the fact that no payment will be made for any item until the Contractor has submitted all required documentation as required by the Contract Documents and such documentation has been reviewed and approved by the Engineer.

D. The Contractor's attention is directed to the fact that no payment will be made for additional materials that are not installed on the project.

1.02 PAYMENT ITEMS

Item	Description
1.	Septage Receiving Station

BASIS OF MEASUREMENT AND PAYMENT

ITEM 1. SEPTAGE RECEIVING STATION

A. General.

1. For furnishing all labor, materials, and equipment and performing all operations required to complete the work of the Contract Documents which include all requirements of the contract documents including the specifications, Division 1 through 16, inclusive, drawings entitled "Contract 43, Septage Receiving Station" consisting of seven sheets, and all addenda. The lump sum price bid shall be considered as fair compensation for all labor, equipment, tools and materials necessary to complete the work as specified, which shall include furnishing and installing a new septage receiving station, concrete pads, asphalt paving, piping, valves, fittings, electrical, enclosures and instrumentation work and other materials required for a complete operating system.

PART 2 PRODUCTS (Omitted)

PART 3 EXECUTION (Omitted)

END OF SECTION

SECTION 01030

SPECIAL REQUIREMENTS

PART 1 GENERAL

1.01 SCOPE

A. The work of this section includes the furnishing of all labor, materials, tools and equipment required by the Contractor to perform special requirements as specified herein.

1.02 MEASUREMENT AND PAYMENT

A. Measurement and payment for work described in this section will be made in accordance with the provisions of SECTION 01025, MEASUREMENT AND PAYMENT and as follows:

1. All costs associated with locating, maintaining location marks, repairing utilities broken due to the Contractors operations, time delays relative to existing utilities and all other work associated with utilities shall be included for payment under the applicable division of Item 1 in the DOCUMENT 00300, FORM FOR GENERAL BID.

1.03 SPECIFICATIONS AND DRAWINGS

A. All work shall conform to these specifications and the accompanying figures entitled:

CONSTRUCTION PLANS

FOR

SEPTAGE RECEIVING STATION

BRANFORD, CONNECTICUT

CONTRACT NO. 43

dated June, 2022 consisting of these contract documents seven drawings, all made by the Engineer, on file with the Owner, and any changes, drawings, plans, and directions that may be furnished from time to time by the Engineer.

1.04 PROGRESS OF WORK

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

B. The Contractor shall furnish to the Engineer a progress schedule for the work prior to the start of construction.

1.05 CHANGE IN AMOUNT OF WORK

A. The Owner reserves the right to increase or decrease the amount of any item of the work listed as may be found desirable or necessary during the carrying out of this contract and the unit prices quoted in the DOCUMENT 00300, FORM FOR GENERAL BID shall apply without change to such variation in the quantity of each of the bid items to the extent provided by law.

1.06 SCOPE OF WORK AND SEQUENCE OF CONSTRUCTION

A. The scope of this project includes furnishing and installing a new septage receiving station outside the Branford Water Pollution Control Facility including all associated mechanical and electrical work.

B. The Contractor shall furnish, install, and operate any piping, equipment, and appurtenances necessary to provide temporary services needed to maintain uninterrupted flow through the WPCF at all times throughout the duration of the project.

C. The Owner reserves the right to schedule the Contractor to construct at any locations within the project area. At the same time the Owner may schedule the suspension of construction at any location.

D. The Contractor shall meet all requirements/conditions of all permits during the construction of this project. All costs associated with this work shall be borne by the Contractor and included in the prices bid for this project.

E. The Contractor's attention is directed to the fact that cleanup/restoration of all disturbed areas shall be completed each week. Cleanup/restoration consists of but not limited to restoration of the area to preconstruction conditions, removal of all excess materials, removal of all pipe, fittings, etc., removal of all construction equipment and materials, and removal of all construction debris.

1.07 VISIT TO THE SITE

A. Before submitting a bid, the Contractor shall visit the site, examine existing conditions and thoroughly acquaint himself with the work effort required to perform the work. It is not mandatory that the Contractor visit the site.

B. The Contractor shall study the drawings and compare the same with the information gathered during his examination of the sites, as no extra compensation will be authorized for extra work caused by his unfamiliarity with the site(s) and/or drawings or the conditions peculiar to this job.

1.08 TECHNICAL SPECIFICATIONS

A. Where reference is made to ASTM, AWWA, AASHTO specification or other association, it is understood that the latest revisions as of the date of this specification shall apply.

1.09 PERMITS, FEES AND BONDS

A. The Contractor shall obtain and comply with all required permits, pay all fees and provide all bonds necessary to complete the work as specified. The Contractor shall be solely responsible for performing any necessary acts and providing any materials required in order to comply with any and all terms and conditions set forth in any permits and licenses.

1.10 SUBMITTALS

A. The Contractor shall submit to the Engineer for approval, shop drawings, certificates of compliance and/or catalog cuts for all items to be furnished under this contract. All submittals shall be in compliance with the DOCUMENT 00700, GENERAL CONDITIONS.

B. The Contractor shall utilize Transmittal Forms supplied by the Engineer for all required submittals.

1.11 TWENTY-FOUR HOUR EMERGENCY SERVICE

A. The Contractor shall maintain a 24-hour, 7-day a week telephone service. The Contractor's emergency personnel and equipment shall be within 30 minutes travel time to the project site(s) in order to handle any emergency situation. A list of the personnel and their telephone numbers and cell phone numbers, shall be submitted to the Engineer, the Owner and to the local Police and Fire Departments.

B. This requirement shall apply during the entire length of the project. This list shall be submitted on the Contractor's letterhead and shall state that should an emergency arise during the implementation of this project, these people are to be contacted. The Contractor shall submit this letter to the Engineer prior to initiating construction.

1.14 HOURS OF OPERATION

A. The Contractor including all subcontractors, materialmen, and all others relating to this project shall conform to the following work schedule:

1. No outdoor activity on or adjacent to the site will be permitted before 7:00 a.m. or after 3:30 p.m.

2. All outdoor activity shall be confined to Monday through Friday except for emergency conditions which shall be reviewed and approved by the Owner in advance.

1.15 DISPOSAL OF DEBRIS

A. During the prosecution of the work, the Contractor shall maintain the work site and adjoining areas in a neat and orderly manner and shall not allow the accumulation of construction debris. A rubbish container shall be kept at the site at all times and be emptied as required to prevent odors and vermin.

B. The Contractor shall remove all debris from the site and legally dispose of the debris in accordance with Federal/State/Local Regulations. Should the Contractor neglect or refuse to maintain the site free of accumulated debris, the Owner reserves the right to have the service performed by others and cost thereof deducted from monthly progress payment requests.

C. At the conclusion of the work, the Contractor shall remove and haul away any surplus excavation, broken pavement, lumber, equipment, temporary structures, and any other refuse remaining from the construction operations, and shall leave the entire site of the work in a neat and orderly condition.

1.16 RECORD DRAWINGS

A. During the course of the work the Contractor and applicable subcontractors shall continually maintain a set of legible marked up prints, drawings and sketches showing any changes made during the construction process. This set of prints shall be incorporated into one complete set of prints by the Contractor following completion of work. The

Contractor shall make any revisions required by the Engineer in order to make the drawings complete. After acceptance by the Engineer, the reproducible mylars shall be given to the Engineer.

B. These record drawings shall be complete in every way and shall show the full extent of the executed work. Special attention shall be given to concealed work which would be difficult to measure at a later date. Change orders, addenda items and field changes should be noted where applicable. Additional specific requirements relative to record drawings may be called for in the individual sections of these specifications.

1.17 CONTINUOUS OPERATING CRITERIA

A. The Contractor shall conduct his operations in such a manner and sequence which shall neither result in a disruption of the amenities, nor interfere with the functional organization and workings of existing facilities.

B. The Owner will operate and maintain all existing systems and equipment. The Contractor shall notify and coordinate with the Owner to affect all temporary modifications in operation required for construction within, or interfacing with, the existing facilities. The Contractor shall be responsible for the operation and maintenance of all proposed facilities until such time as they are accepted by the Owner.

PART 2 PRODUCTS

Not Applicable.

PART 3 EXECUTION

Not Applicable.

END OF SECTION

SECTION 01045

CUTTING, CORING AND PATCHING

PART 1 - GENERAL

1.01 DESCRIPTION:

A. This section covers the cutting, coring, rough and finish patching of holes and openings in existing and new construction.

B. All cutting, coring, and rough patching shall be performed by the Contractor. Finish patching shall be the responsibility of the Contractor and shall be performed by the trade associated with the application of the particular finish.

1.02 ALTERATIONS, CUTTING, AND PROTECTION:

A. Survey and record condition of existing facilities to remain in-place that may be affected by alteration operations. After alteration work is complete, survey conditions again and restore existing facilities to pre-alteration condition.

B. Perform Work of moving, removal, cutting, and patching with trades qualified to perform Work in manner causing least damage to each type of Work.

C. Cut finish surfaces such as masonry, tile, plaster or metals, by methods to terminate surfaces in a straight line at a natural point of division.

D. Protect existing finishes, equipment, and adjacent Work which is to remain, from damage.

E. Provide shoring, needling, and bracing to keep structures structurally secure and free of damaging deflection during cutting or coring operations.

1.03 QUALITY ASSURANCE:

A. Comply with the requirements specified in Section 01400.

B. Adhere strictly to the manufacturer’s current printed recommendations regarding temperature at time of application for all work involving epoxy, cement base coating and protective coating.

C. Use only products of the specified Repair Mortar System Manufacturer(s) or equal.

D. Any changes in the specified repair mortar work methods shall be allowed only with the written acceptance of the Engineer.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Concrete repair mortar shall be a non-shrink, commercial formulation requiring only the addition of water with minimum 28-day compressive strength of 5,000 psi.

B. Provide a non-shrink cementitious repair mortar material as manufactured by:

1. Sika Repair 224 manufactured by Sika Corporation,

2. MasterEmaco S 488CI manufactured by BASF Corporation,

3. Restokrete Underlayment No. F-120 by Sauereisen, Inc.,

4. Or equal.

C. Materials for finish patching shall be equal to those of adjacent construction.

PART 3 - EXECUTION

3.01 GENERAL:

A. All cutting and coring shall be performed in such a manner as to limit the extent of patching.

B. All holes cut through concrete and masonry walls, slabs or arches shall be core drilled unless otherwise accepted. No structural members shall be cut without acceptance of the Structural Engineer of Record and all such cutting shall be done in a manner directed by the SER. No holes may be drilled in beams or other structural members. All work shall be performed by mechanics skilled in this type of work.

C. Rough patching shall be such as to bring the cut or cored area flush with existing construction unless otherwise shown. Finish patching shall match existing surfaces.

D. Reinforcing steel cut by cutting and coring operations shall be coated with a three-component, solvent free, moisture tolerant, epoxy-modified cementitious product specifically formulated as an anti-corrosion coating; installed in accordance with the manufacturer’s printed instructions.

3.02 CUTTING:

A. Inspect existing conditions of Work, including components subject to damage or movement during cutting or patching.

B. Do not cut or notch structural members without specific written acceptance of the Engineer.

C. Cutting shall be performed with a concrete saw and diamond saw blades of proper size.

D. Corners of square or rectangular openings shall be cored. Do not overcut corners of openings. Corners shall be chipped out square, if required, so as not to cause cracking at the corners.

E. Provide for control of slurry generated by sawing operation on both sides of element.

F. When cutting reinforced concrete, the cutting shall be done so as not damage bond between the concrete and reinforcing steel left in structure. Cut shall be made so that steel neither protrudes nor is recessed from face of the cut.

G. Adequate bracing and/or shoring of area to be cut shall be installed prior to start of cutting. Check area during sawing operations for cracking and provide additional bracing as required to prevent a partial release of cut area during sawing operations.

H. Provide equipment of adequate size to remove cut panel.

3.03 CORING:

A. Coring shall be performed with an accepted non-impact rotary tool with diamond core drills. Size of holes shall be suitable for pipe, conduit, sleeve, equipment or mechanical seals to be installed.

B. Provide protection for existing equipment, utilities and critical areas against water or other damage caused by drilling operation.

C. Slurry or tailings resulting from coring operations shall be removed from the area following drilling.

3.04 PATCHING:

A. Prepare surfaces to receive cementitious repair mortar in accordance with manufacturer’s instructions.

B. Mix the cementitious repair mortar material components in accordance with the manufacturer’s instructions. Concrete surfaces should be surface saturated dry (SSD) with no standing water prior to mortar application.

C. Work a wet scrub coat of the mortar per the manufacturer’s recommendations into the pores and voids in the substrate and over the substrate prior to mortar application by trowel.

D. Apply the cementitious repair mortar using a steel trowel to work the material into the surface. Fill voids from deepest to shallowest areas as the application work proceeds. Strictly follow the manufacturer’s application requirements.

E. Once the repair areas are filled with repair mortar, strike off the mortar level with the surrounding concrete substrate. Do not leave a broom finish. Finish with a steel trowel until closed up at the surface and flat.

F. Cure the repair mortar in strict accordance with the manufacturer's instructions.

3.05 CLEANING:

A. Perform periodic and final cleaning as specified in Section 01740, and:

1. Clean Owner-occupied areas daily.

2. Clean spillage, overspray, and heavy collection of dust in Owner-occupied areas immediately.

B. At completion of alterations work in each area, provide final cleaning and return space to condition suitable for use by Owner.

C. Remove debris from site each day. Removed material, except that listed or marked by Engineer for retention, becomes property of Contractor.

3.06 CONTRACT CLOSEOUT:

A. Provide in accordance with Section 01700.

END OF SECTION

SECTION 01069

STATE AND FEDERAL REQUIREMENTS

1.01 MINIMUM WAGE RATES:

A. A schedule of minimum wage rates issued by the Commissioner of Labor for the State of Connecticut, in accordance with Chapter 558 of the General Statutes of Connecticut, is included in Appendix A.

B. Particular attention is directed to the following excerpt from Section 31-53a of the General Statutes of Connecticut.

1. “The wages paid on an hourly basis of any mechanic, laborer or workman employed upon the work herein contracted to be done and the amount of payment or contribution paid or payable on behalf of each such employee to any employee welfare, fund, as defined in Section 31-78 of the general statutes, shall be at a rate equal to the rate customary or prevailing for the same work in the same trade or occupation in the town in which such public works project is being constructed. Any contractor who is not obligated by agreement to make payment or contribution on behalf of such employees to any such employee welfare fund shall pay to each employee as part of his wages the amount of payment or contribution for his classification, on each pay day."

C. This Project and the Work performed thereon is subject to federal prevailing wage rate laws (“Davis Bacon Act”) as well as the previously noted prevailing wage laws of the State of Connecticut. This project will include federal Building, Heavy and Highway category wage decisions. The Contractor and all Subcontractors shall be responsible for paying the higher of the applicable federal prevailing wages and the applicable state prevailing wages. A copy if the current prevailing wage determination issued by the Connecticut Department of Labor is included in the Contract Documents along with a copy of the current prevailing wage determination issued by the U.S. Department of Labor. The acceptance of the Bidder of these wage determinations is a condition of any award of the Contract. By submitting a Bid for this project, the Bidder is deemed to have accepted such wage determinations. Because of the application of both federal and state wage laws to this Project, the Contractor should be aware that the Contractor will be obligated to certify payroll and issue compliance statements in accordance with both federal and state procedural requirements.

D. It is the responsibility of the Bidder, before bid opening, to request, if necessary, any additional information on State and Federal Wage Rates for those tradespeople who are not covered by the applicable Wage Determinations, but who may be employed for the proposed work under this Contract. In the event of a conflict between the State and Federal wage rates, the higher rate for a given labor category shall apply.

E. Upon award of the contract, the Contractor shall complete the “Contractor’s Wage Certification Form” and forward it to the Wage and Workplace Standards Division of the

Connecticut Labor Department. During the progress of the work, the Contractor shall, on a weekly basis, submit to the Owner certified payroll and a statement of compliance on Form WWS-CPI, a copy of which is attached to the wage rates schedule.

SUPPORTING DOCUMENTATION
FOR STATE AND FEDERAL REQUIREMENTS

Contents

Executive Order No. 3

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STATE OF CONNECTICUT

BY HIS EXCELLENCY

THOMAS J. MESKILL

GOVERNOR

EXECUTIVE ORDER NO. THREE

WHEREAS, sections 4-61d(b) and 4-114a of the 1969 supplement to the general statutes require nondiscrimination clauses in state contracts and subcontracts for construction on public buildings, other public works and goods and services, and

WHEREAS, section 4-61e(c) of the 1969 supplement to the general statutes requires the labor department to encourage and enforce compliance with this policy by both employers and labor unions, and to promote equal employment opportunities, and

WHEREAS, the government of this state recognizes the duty and desirability of its leadership in providing equal employment opportunity, by implementing these laws,

NOW, THEREFORE, I, THOMAS J. MESKILL, Governor of the State of Connecticut, acting by virtue of the authority vested in me under section twelve of article fourth of the constitution of the state, as supplemented by section 3-1 of the general statutes, do hereby ORDER and DIRECT, as follows, by this Executive Order:

I

The labor commissioner shall be responsible for the administration of this Order and shall adopt such regulations as he deems necessary and appropriate to achieve the purposes of this Order. Upon the promulgation of this Order, the commissioner of finance and control shall issue a directive forthwith to all state agencies, that henceforth all state contracts and subcontracts for construction on public buildings, other public works and goods and services shall contain a provision rendering such contract or subcontract subject to this Order, and that such contract or subcontract may be cancelled, terminated or suspended by the labor commissioner for violation of or noncompliance with this Order or state or federal laws concerning nondiscrimination, notwithstanding that the labor commissioner is not a party to such contract or subcontract.

II

Each contractor having a contract containing the provisions prescribed in section 4-114a of the1969 supplement to the general statutes, shall file, and shall cause each of his subcontractors to file, compliance reports with the contracting agency or the labor commissioner, as may be directed such reports shall be filed within such times and shall contain such information as to employment policies and statistics of the contractor and each subcontractor, and shall be in such form as the labor commissioner may prescribe. Bidders or prospective contractors or subcontractors may be required to state whether they have participated in any previous contract subject to the provisions of this Order or any preceding similar Order, and in that event to submit on behalf of themselves and their proposed subcontractors compliance reports prior to or as an initial part of their bid or negotiation of a contract.

III

Whenever the contractor or subcontractor has a collective bargaining agreement or other contract or understanding with a labor organization or employment agency as defined in section 31-122 of the general statutes, the compliance report shall identify the said organization or agency and the contracting agency or the labor commissioner may require a compliance report to be filed with the contracting agency or the labor commissioner, as may be directed, by such organization or agency, signed by an authorized officer or agent of such organization or agency, with supporting information, to the effect that the signer's practices and policies, including but not limited to matters concerning personnel, training, apprenticeship, membership, grievance and representation, and upgrading, do not discriminate on grounds of race, color, re1igious creed, age, sex or national origin, or ancestry of any individual, and that the signer will either affirmatively cooperate in the implementation of the policy and provisions of this Order, or that it consents and agrees that recruitment, employment and the terms and conditions of employment under the proposed contract shall be in accordance with the purposes and provisions of the Order.

IV

The labor commissioner may by regulation exempt certain classes of contracts, subcontracts or purchase orders from the implementation of this Order, for standard commercial supplies or raw materials, for less than specified amounts of money or numbers of workers or for subcontractors below a specified tier. The labor commissioner may also provide by regulation for the exemption of facilities of a contractor which are in all respects separate and distinct from activities of the contractor related to the performance of the state contract, provided only that such exemption will not interfere with or impede the implementation of this Order, and provided further, that in the absence of such an exemption, all facilities shall be covered by the provisions of this Order.

V

Each contracting agency shall be primarily responsible for obtaining compliance with the regulations of the labor commissioner with respect to contracts entered into by such agency or its contractors. All contracting agencies shall comply with the regulations of the labor commissioner in discharging their primary responsibility for securing compliance with the provisions of contracts and otherwise with the terms of this Order and of the regulations of the labor commissioner issued pursuant to this Order. They are directed to cooperate with the labor commissioner and to furnish the labor commissioner such information and assistance as he may require in the performance of his functions under this Order. They are further directed to appoint or designate from among the personnel of each agency, compliance officers, whose duty shall be to seek compliance with the objectives of this Order by conference, conciliation, mediation, or persuasion.

VI

The labor commissioner may investigate the employment practices and procedures of any state contractor or subcontractor and the practices and policies of any labor organization or employment agency hereinabove described, relating to employment under the state contract, as concerns nondiscrimination by such organization or agency as hereinabove described, or the labor commissioner may initiate such investigation by the appropriate contract agency, to determine whether or not the contractual provisions hereinabove specified or statutes of the state respecting them have been violated. Such investigation shall be conducted in accordance with the procedures established by the labor commissioner and the investigating agency shall report to the labor commissioner any action taken or recommended.

VII

The labor commissioner shall receive and investigate or cause to be investigated complaints by employees or prospective employees of a state contractor or subcontractor or members or applicants for membership or apprenticeship or training in a labor organization or employment agency hereinabove described, which allege discrimination contrary to the contractual provisions specified hereinabove or state statutes requiring nondiscrimination in employment opportunity. If this investigation is conducted for the labor commissioner by a

contracting agency, that agency shall report to the labor commissioner what action has been taken or is recommended with regard to such complaints

VIII

The labor commissioner shall use his best efforts, directly and through contracting agencies, other interested federal, state and local agencies, contractors and all other available instrumentalities, including the commission on human rights and opportunities, the executive committee on human rights and opportunities, and the apprenticeship council under its mandate to provide advice and counsel to the labor commissioner in providing equal employment opportunities to all apprentices and to provide training, employment and upgrading opportunities for disadvantaged workers, in accordance with section 31-51(d) of the l969 supplement to the general statutes, to cause any labor organization or any employment agency whose members are engaged in work under government contracts or referring workers or providing or supervising apprenticeship or training for or in the course of work under a state contract or subcontract to cooperate in the implementation of the purposes of this Order. The labor commissioner shall in appropriate cases notify the commission on human rights and opportunities or other appropriate state or federal agencies whenever it has reason to believe that the practices of any such organization or agency violate equal employment opportunity requirements of state or federal law.

IX

The labor commissioner or any agency officer or employee in the executive branch designated by regulation of the labor commissioner may hold such hearings, public of private, as the labor commissioner may deem advisable for compliance, enforcement or educational purposes under this Order.

X

(a) The labor commissioner may hold or cause to be held hearings, prior to imposing ordering or recommending the imposition of penalties and sanctions under this Order. No order for disbarment of any contractor from further state contracts shall be made without affording the contractor an opportunity for a hearing. In accordance with such regulations as the labor commissioner may adopt, the commissioner or the appropriate contracting agency may

(1) Publish or cause to be published the names of contractors or labor organizations or employment agencies as hereinabove described which it has concluded have complied or failed to comply with the provisions of this Order or the regulations of the labor commissioner in implementing this Order.

(2) Recommend to the commission on human rights and opportunities that in cases in which there is substantial or material violation or threat thereof of the contractual provision or related state statutes concerned herein, appropriate proceedings be brought to enforce them, including proceedings by the commission on its own motion under chapter 563 of the general statutes and the enjoining, within the limitations of applicable law, of organizations, individuals or groups who prevent directly or indirectly or seek to prevent directly or indirectly compliance with the provisions of this Order.

(3) Recommend that criminal proceedings be brought under chapter 939 of the general statutes.

(4) Cancel, terminate, suspend or cause to be cancelled, terminated, or suspended in accordance with law any contract or any portion or portions thereof for failure of the contractor or subcontractor to comply with the nondiscrimination provisions of

the contract. Contracts may be cancelled, terminated, suspended absolutely or their continuance conditioned upon a program for fixture compliance approved by the contracting agency.

(5) Provide that any contracting agency shall refrain from entering into any further contracts or extensions or modifications of existing contracts with any contractor until he has satisfied the labor commissioner that he has established and will carry out personnel and employment policies compliant with this Order.

(6) Under regulations prescribed by the labor commissioner each contracting agency shall make reasonable efforts within a reasonable period of time to secure compliance with the contract provisions of this Order by methods of conference conciliation, mediation or persuasion, before other proceedings shall be instituted under this Order or before a state contract shall be cancelled or terminated in whole or in part for failure of the contractor or subcontractor to comply with the contract provisions of state statute and this Order.

(b) Any contracting agency taking any action authorized by this Order, whether on its own motion or as directed by the labor commissioner or pursuant to his regulations shall promptly notify *him* of such action. Whenever the labor commissioner makes a determination under this Order, he shall promptly notify the appropriate contracting agency and other interested federal, state and local agencies of the action recommended. The state and local agency or agencies shall take such action and shall report the results thereof to the labor commissioner within such time as he shall specify.

XI

If the labor commissioner shall so direct, contracting agencies shall not enter into contracts with any bidder or prospective contractor unless he has satisfactorily complied with the provisions of this Order, or submits a program, for compliance acceptable to the labor commissioner, or if the labor commissioner so authorizes, to the contracting agency.

XII

Whenever a contracting agency cancels or terminates a contract, or a contractor has been disbarred from, further government contracts because of noncompliance with the contract provisions with regard to nondiscrimination, the labor commissioner or the contracting agency shall rescind such disbarment, upon the satisfaction of the labor commissioner that the contractor has purged himself of such noncompliance and will thenceforth carry out personnel and employment policies of nondiscrimination in compliance with the provision of this order.

XIII

The labor commissioner may delegate to any officer, agency or employee in the executive branch any function or duty of the labor commissioner under this Order except authority to promulgate regulations of a general nature.

XIV

This Executive Order supplements the Executive Order issued on September 28, 1967. All regulations, orders, instructions, designations and other directives issued heretofore in these premises, including those issued by the heads of various departments or agencies under or pursuant to prior order or statute, shall remain in full force and effect, unless and until revoked or superceded by appropriate authority, to the extent that they are not inconsistent with this Order.

This Order shall become effective thirty days after the date of this Order.

Dated at Hartford, Connecticut, this 16th day of June, 1971.

Thomas J. Meskill, GOVERNOR

Filed this ____ day of June, 1971.

SECRETARY OF THE STATE (DEPUTY)

GUIDELINES AND RULES

OF STATE LABOR COMMISSIONER

IMPLEMENTING GOVERNOR'S EXECUTIVE

ORDER NO. THREE

SEC. 1 PERSONS AND FIRMS SUBJECT TO EXECUTIVE ORDER NO. THREE AND GUIDELINES AND RULES.

a. Every contractor, or subcontractor as defined in Sec. 2 hereof, supplier of goods or services, vendor, bidder and prospective contractor or subcontractor, having ten or more employees as defined in Sec. 3 of these Guidelines, having or entering into or bidding to enter into any type of contractual relationship with the State of Connecticut or any of its agencies, boards, commissions, departments or officers, and if the consideration. cost, subject matter or value of the goods or services exceeds $5,000.00, shall be subject to the Governor's Executive Order No. Three and these Guidelines and Rules

b. A copy of the Governor's Executive Order No. Three and of these Guidelines and Rules shall be available to each said contractor, subcontractor, supplier, vendor, bidder and prospective contractor and subcontractor, and the said Executive Order No. Three and these Guidelines and Rules shall be incorporated by reference and made a part of the contract, purchase order, agreement or document concerned. A copy of the Executive Order and of these Guidelines and Rules shall be furnished to a contracting party or bidder on request.

c. All persons, partnerships, associations, firms, corporations and other entities having less than ten employees as defined in Sec. 3 at the time of the bid and execution of the contract and continuing through the performance of the contract are exempt from the provisions of the said Executive Order and these Guidelines and Rules. All contracts, subcontracts, purchase orders and agreements wherein the consideration is $5,000.00 or less shall be exempt from Executive Order No. Three and from these Guidelines and Rules.

SEC 2. SUBCONTRACTORS.

As used herein, subcontractors are persons, partnerships, associations, firms or corporations or other entities having contractual relationship with a contractor who in turn has a contract with the State of Connecticut or any of its agencies, boards, commissions or departments. Subcontractors below this tier are exempt from the Executive Order and from these Guidelines and Rules.

SEC. 3 EMPLOYEES

As used herein, employees are persons working full or part-time irrespective of personnel classification whose wages, salaries, or earnings are subject to the Federal Insurance Contribution Act and/or to Federal Withholding Tax as a matter of law (whether in fact or not any actual withholding occurs in a given case), in an employee-employer relationship at the time of bid, contract execution, or offer or acceptance. and/or

during any time thereafter during the existence of the performance period of the contract to the conclusion thereof.

SEC. 4 REPORTS.

a. Prior to the execution of the contract or prior to acceptance of a bid, as the case may be, the contractor, subcontractor, bidder or vendor shall file a report with the State Labor Commissioner, which report shall be complete and contain all of the information therein prescribed. The report shall be on Form E.O. .3-1, a facsimile of which is attached hereto and made a part hereof, or in lieu thereof the contractor. subcontractor, bidder or vendor shall submit a detailed report containing all of the information required in Form E.0.3-1.

b. The Labor Commissioner may require the filing of additional reports prior to final payment or prior to any renewal or extension of the contract and during the duration of the contract at such times as the Commissioner may, in his discretion, from time to time deem necessary. . The Labor Commissioner may require the filing of additional information or reports, and the contractor, subcontractor, bidder or vendor shall furnish said information or reports within the times prescribed by the Labor Commissioner.

c. The Labor Commissioner may, at his discretion, also require timely statistical reports on the number of minority employees employed or to be employed in_ the performance of the contract, and the Labor Commissioner may define such minority groups or persons.

d. Reports filed pursuant to these Guidelines and Rules in implementation of Executive Order No. Three are not public records subject to

public inspection, but may be inspected only by federal and state officials having jurisdiction and authority to investigate matters of this type. All federal and state agencies empowered by law to investigate matters relating to Executive Order No. Three shall have access to these reports for inspection or copying during regular business hours.

e. Any person who willfully, wantonly or through negligence _

destroys or permits to be destroyed, alters or allows to be altered after filing, any reports submitted in compliance herewith shall be subject to penalties as prescribed by law.

SEC.5 MANDATORY CLAUSES IN DOCUMENTS.

a. All contracts shall contain the following provisions

verbatim:

This contract is subject to the provisions of Executive Order No. Three of Governor Thomas J. Meskill promulgated June 16. 1971 and. as such, this con tract may be cancelled, terminated or suspended by the state labor commissioner for violation of or noncompliance with said Executive Order No. Three, or any state or federal law concerning nondiscrimination, notwithstanding that the labor commissioner is not a party to this contract. The parties to this contract, as part of the consideration hereof, agree that said

Executive Order No. Three is incorporated herein by reference and made a part hereof. The parties agree to abide by said Executive Order and agree that the state labor commissioner shall have continuing jurisdiction in respect to contract performance in regard to nondiscrimination, until the contract is completed or terminated prior to completion.

The (contractor), (subcontractor), (bidder), (vendor) agrees, as part consideration hereof, that this (order) (contract) is subject to the Guidelines and Rules issued by the state labor commissioner to implement Executive Order No. Three, and that he will not discriminate in his employment practices or policies, will file all reports as required, and will fully cooperate with the State of Connecticut and the state labor commissioner.

These provisions are in addition to and not in lieu of other clauses required by law.*

**N.* B. The above paragraphs contain requirements additional to those set forth in the July 16. 1971 directive to state agencies.

b. Every purchase order or like form submitted by a vendor or bidder, as applicable, shall contain the following clause verbatim:

Vendor agrees, as part of the consideration hereof, that this order is subject to the provisions of Executive Order No. Three and the Guidelines and Rules issued by the Labor Commissioner implementing said Order as to nondiscrimination. and vendor agrees to comply therewith.

c. Where preprinted contract forms have been prescribed by federal authority and the rules of the federal agency prohibit the alteration thereof, the compliance officer of the State agency concerned shall submit to the Labor Commissioner a suggested short form or addendum acceptable to the federal agency, and in such cases, after approval by the Labor Commissioner, said clause may be substituted.

SEC.6 COOPERATION OF STATE AGENCIES. BOARDS AND COMMISSIONS.

Every agency, board, commission and department of the State of Connecticut shall cooperate with the Labor Commissioner in the implementation of Executive Order No. Three and shall furnish such information and assistance as the Labor Commissioner may from time to time request.

SEC. 7 INVESTIGATIONS; COMPLAINTS.

The Labor Commissioner may initiate an investigation upon receipt of a complaint alleging discrimination. The Labor Commissioner may request that an investigation be conducted by the State agency which is the party to the contract in question. Investigations shall be conducted in accordance with acceptable legal standards, safeguarding the rights of all parties involved, and obtaining all of the relevant facts necessary for a complete determination of the issues. If the Labor Commissioner is not satisfied with the investigation or any part thereof he may order it to continue or to proceed further.

SEC. 8 HEARINGS.

The Labor Commissioner or officers designated by the heads of the State agencies, boards and commissions may conduct hearings on complaints filed. Hearings shall be held only after a report of the complaint has been filed with the Labor Commissioner and after a hearing on the complaint has been

authorized or directed by the Labor Commissioner. Hearings shall be conducted in accordance with the accepted principles of administrative law. All parties shall be afforded the opportunity to a full, fair, impartial and complete hearing, the opportunity to examine and cross examine witnesses and to be present at all sessions of the hearing. If any party is vulnerable to a charge of a violation of the law, he shall be afforded the opportunity to procure counsel who may be present at the hearing.

SEC. 9 EQUAL EMPLOYMENT OPPORTUNITIES.

All State contracting agencies, employers, and labor unions shall use their best efforts to provide equal employment opportunities to all apprentices and to provide training, employment and upgrading opportunities for disadvantaged workers in accordance with section 31-5I(d) of the General Statutes.

SEC.10 DUTIES OF CONTRACTING AGENCIES.

All State contracting agencies shall be responsible for compliance with said Executive Order and with all state and federal laws relating to equal employment opportunities. All contracting agencies conducting investigations for the Labor Commissioner pursuant to Executive Order No. Three and these Guidelines and Rules shall report to the Labor Commissioner the action taken or recommended with regard to each complaint filed. Each officer of the executive department, every commissioner, and each executive head of each State agency, board and commission in the executive branch of the State government is expected to assume the responsibility of seeing to complete compliance with the Governor's Executive Order No. Three and shall forthwith take steps to assure and guarantee that there shall be no discrimination within their departments, agencies, boards or commissions in the performance of any state contract or subcontract on the basis of race, creed,. color, sex, age, national origin or national ancestry, or in any way in violation of any state or federal law relating thereto.

BY VIRTUE OF THE AUTHORITY VESTED IN ME PURSUANT TO EXECUTIVE ORDER NO. THREE EFFECTIVE. JULY 16, 1971, AND THE GENERAL STATUES OF CONNECTICUT.

Dated at Wethersfield. Connecticut this 19th day of November, 1971

JACK A. FUSARI

LABOR COMMISSIONER

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Executive Order No. 17

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STATE OF CONNECTICUT

BY HIS EXCELLENCY

THOMAS J. MESKILL

GOVERNOR

EXECUTIVE ORDER NO. SEVENTEEN

WHEREAS, Section 31-237 of the General Statutes of Connecticut as amended requires the maintaining of the established free services of the Connecticut State Employment Service to both employers and prospective employees and

WHEREAS, Section 31-5 of the General Statutes of Connecticut requires that no compensation or fee shall be charged or received directly or indirectly for the services of the Connecticut State Employment Service and

WHEREAS, large numbers of our citizens who have served in the Armed Forces of our nation are returning to civilian life in our state and seeking employment in civilian occupations and

WHEREAS, we owe a duty as well as gratitude to these returning veterans including the duty to find suitable employment for them and

WHEREAS, many of our handicapped citizens are fully capable of employment and are entitled to be placed in suitable employment and

WHEREAS, many of the citizens of our state who are unemployed are unaware of the job openings and employment opportunities which do in fact exist in our state and

WHEREAS, notwithstanding the free services of the Connecticut State Employment Service, many of our Connecticut employers do not use its free services or do not avail themselves fully of all of the services offered,

NOW, THEREFORE, I THOMAS J. MESKILL, Governor of the State of Connecticut, acting by virtue of the authority vested in me under the fourth article of the Constitution of the State and in accordance with Section 3-1 of the General Statutes, do hereby ORDER and DIRECT, as follows, by this Executive Order:

I

The Labor Commissioner shall be responsible for the administration of this Order and shall do all acts necessary and appropriate to achieve its purpose. Upon promulgation of this Order, the Commissioner of Finance and Control shall issue a directive forthwith to all state agencies, that henceforth all state contracts and subcontracts for construction on public buildings, other public works and goods and services shall contain a provision rendering such contract or subcontract subject to this Order, and that such contract or subcontract may be cancelled, terminated or suspended by the Labor Commissioner for violation of or noncompliance with this Order, notwithstanding that the Labor Commissioner is not a party to such contract or subcontract.

II

Every contractor and subcontractor having a contract with the State or any of its agencies, boards, commissions, or departments, every individual partnership, corporation, or business entity having business with the state or who or which seeks to do business with the state, and every bidder or prospective bidder who submits a bid or replies to an invitation to bid on any state contract shall list all employment openings with the office of the Connecticut State Employment Service in the area where the work is to be performed or where the services are to be rendered.

III

All state contracts shall contain a clause which shall be a condition of the contract that the contractor and any subcontractor holding a contract directly under the contractor shall list all employment openings with the Connecticut State Employment Service. The Labor Commissioner may allow exceptions to listings of employment openings which the contractor proposes to fill from within its organizations from employees on the rolls of the contractor on the date of publication of the invitation to bid or the date on which the public announcement was published or promulgated advising of the program concerned.

IV

Each contracting agency of the state shall be primarily responsible for obtaining compliance with this Executive Order. Each contracting agency shall appoint or designate from among its personnel one or more persons who shall be responsible for compliance with the objectives of the Order.

V

The Labor Commissioner shall be and is hereby empowered to insect the books, records, payroll and personnel data of each individual or business entity subject to this Executive Order and may hold hearings or conferences, formal or informal, in pursuance of the duties and responsibilities hereunto delegated to the Labor Commissioner.

VI

The Labor Commissioner or any agency officer or employee in the executive branch designated by regulation of the Labor Commissioner may hold such hearings, public or private, as the Labor Commissioner may deem advisable for compliance, enforcement or educational purposes under this Order.

VII

a. The Labor Commissioner may hold or cause to be held hearings, prior to imposing, ordering, or recommending the imposition of penalties and sanctions under this Order. In accordance herewith, the Commissioner or the appropriate contracting agency may suspend, cancel, terminate, or cause to be suspended, cancelled, or terminated in accordance with law any contract or any portion or portions thereof for failure of the contractor or subcontractor to comply with the listing provisions of the contract. Contracts may be cancelled, terminated, suspended absolutely or their continuance conditioned upon a program for future compliance approved by the contracting agency.
b. Any contracting agency taking any action authorized by this Order, whether on its own motion or as directed by the Labor Commissioner, shall promptly notify him of such action. Whenever the Labor Commissioner makes a determination under this Order, he shall promptly notify the appropriate contracting agency of the action recommended. The agency shall report the results to the Labor Commissioner promptly.

VIII

If the Labor Commissioner shall so direct, contracting agencies shall not enter into contracts with any bidder or prospective contractor unless he has satisfactorily complied with the provisions of this Order.

This Order shall become effective sixty days after the date of this Order.

Dated at Hartford, Connecticut, this 15th day of February, 1973.

Thomas J. Meskill, GOVERNOR

Filed this 15th day of February, 1973.

SECRETARY OF THE STATE (DEPUTY)

SECTION 01080

ABBREVIATIONS AND DEFINITIONS

PART 1 - GENERAL

1.01 RELATED SECTIONS:

A. Section 01090: Reference Standards

1.02 ABBREVIATIONS:

A. Where any of the following abbreviations are used in the Contract Documents, they shall have the meaning set forth opposite each. Abbreviations for trade associations and standards organizations are listed in Section 01090 Reference Standards.

AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AFBMA	Anti-Friction Bearing Manufacturers Association
AGA	American Gas Association
AGMA	American Gear Manufacturers Association
AISC	American Institute of Steel Construction
AMCA	Air Moving and Conditioning Association
ANS	American National Standard
125-lb. ANS or 250-lb. ANS	American National Standard for Cast-Iron Pipe Flanges and Flanged Fittings, Designation B16.1-1975, for the appropriate class
ANSI	American National Standards Institute
API	American Petroleum Institute
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers

ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWG	American or Brown and Sharpe Wire Gage
AWPA	American Wood-Preservers' Association
AWWA	American Water Works Association
CS	Commercial Standard
IBR	Institute of Boiler and Radiator Manufacturers
IEEE	Institute of Electrical and Electronics Engineers, Inc.
Fed. Spec.	Federal Specifications issued by the Federal Supply Service of the General Services Administration, Washington, D.C.
IBR	Institute of Boiler and Radiator Manufacturers
IPS	Iron Pipe Size
JIC	Joint Industry Conference Standards
NBS	National Bureau of Standards
NEC	National Electrical Code; latest edition
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NPT	National Pipe Thread
OS&Y	Outside screw and yoke
SMACNA	Sheet Metal and Air Conditioning Contractors National Association, Inc.
Stl. WG	U. S. Steel Wire, Washburn and Moen, American Steel and Wire or Roebling Gage
UL	Underwriters Laboratories, Inc.
USS Gage	United States Standard Gage

WOG Water, Oil, Gas

WSP Working steam pressure

1.03 SPECIFICATION AND DRAWING CONVENTIONS:

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 1 General Requirements: Requirements of Sections in Division 1 apply to the Work of all Sections in the Specifications.

1.04 DEFINITIONS:

A. General: Basic Contract definitions are included in the General Conditions.

B. Wherever the words defined in this section or pronouns used in their stead occur in the Contract Documents, they shall have the meanings herein given.

Approved

When used to convey Engineer’s action on Contractor's submittals, applications, and requests, "approved" is limited to Engineer’s duties and responsibilities as stated in the Conditions of the Contract.

As Directed, as Required, Etc.

Wherever in the Contract Documents, or on the Drawings, the words "as directed," "as ordered," "as requested," "as required," "as permitted," “as authorized,” or words of like import are used, it shall be understood that the direction, order, request, requirement, permission, or authorization of the Engineer is intended.

Indicated

Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

Regulations

Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

Furnish

Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

Install

Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

Provide

Wherever in the Contract Documents the word "provide" is used, it shall mean to furnish (or supply) and install, complete and ready for the intended use.

Project Site

Space available for performing construction activities. The extent of Project Site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

Elevation

The figures given on the Drawings or in the other Contract Documents after the word "elevation" or abbreviation of it shall mean the distance in feet above the datum adopted by the Engineer.

Rock

The word "rock," wherever used as the name of an excavated material or material to be excavated, shall mean only boulders and pieces of concrete or masonry exceeding 1 cu. yd. in volume, or solid ledge rock which, in the opinion of the Engineer, requires, for its removal, drilling and blasting, wedging, sledging, barring, or breaking up with a power-operated tool. No soft or disintegrated rock which can be removed with a hand pick or power-operated excavator or shovel, no loose, shaken, or previously blasted rock or broken stone in rock fillings or elsewhere, and no rock exterior to the maximum limits of measurement allowed, which may fall into the excavation, will be measured or allowed as "rock."

Earth

The word "earth", wherever used as the name of an excavated material or material to be excavated, shall mean all kinds of material other than rock as above defined.

State Specifications

The term “State Specifications”, whenever indicated as a standard for materials, shall mean that it shall conform to the requirements of the “State of Connecticut Department of Transportation Standard Specification for Roads and Bridges”, latest edition as last amended.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

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SECTION 01090

REFERENCE STANDARDS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Quality assurance.

B. Schedule of references.

1.02 QUALITY ASSURANCE

A. For products or workmanship specified by association, trade, or Federal Standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current on date for receiving bids unless otherwise specified in Product Sections.

C. Should specified reference standards conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

1.03 SCHEDULE OF REFERENCES

AASHTO	American Association of State Highway and Transportation Officials 444 North Capitol Street, N.W. Washington, DC 20001
ACI	American Concrete Institute Box 19150 Reford Station Detroit, MI 48219
AI	Asphalt Institute Asphalt Institute Building College Park, MD 20740
AISC	American Institute of Steel Construction 400 North Michigan Avenue Eighth Floor Chicago, IL 60611
AISI	American Iron and Steel Institute 1000 16th Street, N.W. Washington, DC 20036
ANSI	American National Standards Institute 1430 Broadway New York, NY 10018
ASME	American Society of Mechanical Engineers 345 East 47th Street New York, NY 10017

ASTM	American Society for Testing and Materials 1916 Race Street Philadelphia, PA 19103
AWS	American Welding Society 550 LeJeune Road, N.W. Miami, FL 33135
AWWA	American Water Works Association 6666 West Quincy Avenue Denver, CO 80235
CDA	Copper Development Association 57th Floor, Chrysler Building 405 Lexington Avenue New York, NY 10174
CRSI	Concrete Reinforcing Steel Institute 933 Plum Grove Road Schaumburg, IL 60195
EJCDC	Engineers' Joint Contract Documents Committee American Consulting Engineers Council 1015 15th Street, N.W. Washington, DC 20005
EJMA	Expansion Joint Manufacturers Association 25 North Broadway Tarrytown, NY 10591
IMIAC	International Masonry Industry All-Weather Council International Masonry Institute 815 15th Street, N.W. Washington, DC 20005
NCMA	National Concrete Masonry Association P.O. Box 781 Herndon, VA 22070
PCA	Portland Cement Association 5420 Old Orchard Road Skokie, IL 60077
PS	Product Standard U. S. Department of Commerce Washington, DC 20203

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01200

PROJECT MEETINGS

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section specifies requirements for project meetings including but not limited to Pre-Construction Conference and Progress Meetings.

B. It shall be the responsibility of the Contractor to coordinate work between all subcontractors, sections, and trades required for the proper completion of the Work.

1.02 PRE-CONSTRUCTION CONFERENCE

A. After the bids have been opened but prior to the start of the construction there will be a pre-construction conference to discuss the phasing and scheduling of the Project. The specific time and place of the conference shall be arranged by the Engineer after the Contract has been awarded.

B. This pre-construction conference is intended to establish lines of communication between the parties involved, review responsibilities and personnel assignments, establish project schedules, discuss proposed performance methods, and coordinate Work to be performed by subcontractors.

C. Authorized representatives of the Owner, Engineer and their consultants, the Contractor, its Superintendent and Site Foreman, and all others invited by the Contractor, shall attend the pre-construction conference. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.

D. Discuss items of significance at the pre-construction conference that could affect progress including at least the following:

1. Tentative construction schedule
2. Critical Work sequencing
3. Designation of responsible personnel
4. Procedures for processing field decisions and Change Orders
5. Procedures for processing Applications for Payment
6. Review of Davis Bacon and other federal requirements
7. Distribution of Contract Documents
8. Submittal of Shop Drawings, Product Data and Samples

9. Preparation of record documents
10. Use of the premises
11. Office, work and storage, and laydown areas
12. Equipment deliveries
13. Construction safety procedures
14. Environmental health and safety procedures
15. First aid
16. Security
17. Housekeeping
18. Working hours
19. Emergency Vehicle Access to and around work site
20. Environmental protection measures for construction site

1.03 PROGRESS MEETINGS

A. During the course of the Project, the Contractor shall attend regular progress meetings as scheduled by the Owner. The Owner, based on work progress and activities, may adjust the progress meetings to fit the schedule. The attendance of subcontractors may be required during the progress of the Work. The Contractor's delegate to the meeting shall be prepared and authorized to discuss the following items:

1. Progress of Work/Critical Work Sequencing in relation to Contract Schedule.
2. Proposed Work activities for forthcoming period.
3. Resources committed to Contract.
4. Coordination of Work with others.
5. Status of procurement of equipment and materials.
6. Status of Submittals.
7. Outstanding actions, decisions, or approvals that affect Work activities.
8. Site access and/or security issues
9. Hazards and risks
10. Housekeeping
11. Quality issues
12. Potential Claims
13. Change Orders
14. Costs, budget, and payment requests

B. The Contractor shall revise the construction schedule after each progress meeting where revisions to the schedule have been made or recognized and the revised schedule shall be submitted to the Engineer and Owner.

PART 2 - PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 - GENERAL

1.01 DESCRIPTION:

A. This section specifies the general methods and requirements of submissions applicable to the following work-related submittals.

1. Shop Drawings, Product Data and Samples.
2. Mock-ups.
3. Construction Photographs.
4. Contractor's Responsibilities.
5. Submission Requirements.
6. Review of Shop Drawings, Product Data, Working Drawings and Samples.
7. Distribution.
8. General Procedures for Submittals.
9. Certificate of Delegated Design.
10. Certificate of Unit Responsibility
11. Certificates of Compliance.
12. Schedules.

B. Additional general submission requirements are contained in Paragraph 6.17 of the General Conditions.

C. Detailed submittal requirements will be specified in the technical specifications section.

1.02 SCHEDULE OF SUBMITTALS:

A. Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by the Engineer and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.

2. Format: Arrange the following information in a tabular format:

   a. Scheduled date for first submittal.

   b. Specification Section number and title.

   c. Submittal category: Action; informational.

   d. Name of Subcontractor.

   e. Description of the Work covered.

   f. Scheduled date for Engineer's final release or acceptance.

   g. Scheduled date of fabrication.

   h. Scheduled dates for purchasing.

   i. Scheduled dates for installation.

   j. Activity or event number.

1.03 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.

2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on accepted submittal schedule.

3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.

4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

   a. The Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

5. The Contractor shall revise and resubmit rejected submittals and those requiring corrections or verification of information in a timely manner such that the overall progress of the Work is not impeded.

6. Coordination of Submittal Times: The Contractor shall prepare and transmit each submittal sufficiently in advance of performing the related Work or other applicable activities, or within the time specified in the individual Sections of the Specifications, so that the installation will not be delayed by processing times, including rejection and resubmittal (if required), coordination with other submittals, testing, purchasing, fabrication, delivery, and similar sequenced activities. No extension of Contract Time will be authorized because of the Contractor's failure to transmit submittals sufficiently in advance of the Work.

B. All shop drawings shall be submitted using the transmittal form furnished by the Engineer.

C. All shop drawings submitted by Subcontractors for approval shall be sent directly to the Contractor for checking. The Contractor shall be responsible for their submission at the proper time so as to prevent delays in delivery of materials.

D. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Engineer's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 21 days for initial review of each submittal. Allow 30 days for major equipment that requires review by more than one discipline. Allow additional time if coordination with subsequent submittals is required. The Engineer will advise Contractor when a submittal being processed must be delayed for coordination.

2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.

3. Resubmittal Review: Allow 21 days for review of each resubmittal. Allow 30 days for major equipment that requires review by more than one discipline.

4. Sequential Review: Where sequential review of submittals by the Engineer's consultants, the Owner, or other parties is indicated, allow 30 days for initial review of each submittal.

    a. Equipment requiring sequential review may include that specified under, but not limited to, Divisions 11, 13, 14, 15, and 16.

E. Electronic Submittals: All submittals shall be provided in electronic format. Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.

2. Name file with submittal number or other unique identifier, including revision identifier.

    a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., SSWW-03100.01).

Resubmittals shall include an alphabetic suffix after another decimal point (e.g., SSWW-03100.01.A).

3. Transmittal Form for Electronic Submittals: The submittal shall contain the following information:

   a. Project name.

   b. Date.

   c. Name and address of Engineer.

   d. Name of Construction Manager.

   e. Name of Contractor.

   f. Name of firm or entity that prepared submittal.

   g. Names of Subcontractor, manufacturer, and Supplier.

   h. Category and type of submittal.

   i. Submittal purpose and description.

   j. Specification Section number and title.

   k. Specification paragraph number or drawing designation and generic name for each of multiple items.

   l. Drawing number and detail references, as appropriate.

   m. Location(s) where product is to be installed, as appropriate.

   n. Related physical samples submitted directly.

   o. Indication of full or partial submittal.

   p. Transmittal number**,** numbered consecutively.

   q. Submittal and transmittal distribution record.

   r. Other necessary identification.

   s. Remarks.

4. Metadata: Include the following information as keywords in the electronic submittal file metadata:

   a. Project name.

b. Number and title of appropriate Specification Section.

c. Manufacturer name.

d. Product name.

F. Options: Identify options requiring selection by the Engineer.

G. Deviations and Additional Information: On an attached separate sheet, prepared on the Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by the Engineer on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

H. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.

2. Note date and content of revision in label or title block and clearly indicate extent of revision.

3. Resubmit submittals until they are marked with acceptance notation from the Engineer’s action stamp.

I. Distribution: Furnish copies of final submittals to manufacturers, Subcontractors, Suppliers, fabricators, installers, and authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

J. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with acceptance notation from the Engineer’s action stamp.

PART 2 - PRODUCTS

2.01 SUBMITTAL PROCEDURES:

A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections. Paper and electronic submittals are required.

1. Submit electronic submittals via email as PDF electronic files.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.

2. Mark each copy of each submittal to show which products and options are applicable.

3. Include the following information, as applicable:

   a. American Iron and Steel certification

   b. Manufacturer's catalog cuts.

   c. Manufacturer's product specifications.

   d. Standard color charts.

   e. Statement of compliance with specified referenced standards.

   f. Testing by recognized testing agency.

   g. Application of testing agency labels and seals.

   h. Notation of coordination requirements.

   i. Availability and delivery time information.

4. For equipment specified under Divisions 11, 13, 14, 15, and 16, include the following in addition to the above, as applicable:

   a. Wiring diagrams showing factory-installed wiring.

   b. Printed performance curves.

   c. Operational range diagrams.

   d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

   e. Listing of all installations where identical or similar equipment has been installed and been in operation for a period of at least one year.

   f. Maintenance and lubrication schedules for each piece of equipment. Schedules shall be similar to the following sample schedules:

SAMPLE MAINTENANCE SCHEDULE			
ITEM	ACTION	FREQUENCY	REMARKS
Sedimentation Equipment	Check removal of scum washdown; if required, remove any debris, etc.	Daily	
	Dewater, examine structure, scrape and	6 months	Scrape and clean walls of structure. Repair any

	paint all exposed metals, examine scraping shoes.		damage to scraping shoes.
Sludge Collector Drive Unit	Remove shear pin, clean off rust, grease and replace	6 months	
Overflow Weir	Check Serviceability	Daily	

SAMPLE LUBRICATION SCHEDULE			
ITEM	ACTION	TYPE LUBRICANT	FREQUENCY
Spur and Worm Gearing	Check Oil Level	See below; same as for oil change	Weekly
	Change Oil	75-80 NSMP Gem oil (Winter) 80-90 NSMP Gem Oil (Summer)	6 months
	Flush out drives before oil change	Kendall Flushing oil	Prior to oil change
Gear Motors*	Change oil	Kenoil 053 R&O (Winter) Kenoil 072 (R&O (Summer)	2,000 hours

*See manufacturer's instructional manual for initial operation instructions. (IMPORTANT).

5. Submit Product Data before or concurrent with Samples.

6. Submit Product Data in the following format:

    a. Six paper copies of Product Data unless otherwise indicated. The Engineer will return two copies.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Drawings shall include plan views, sectional views, title block, Tag Numbers, serial numbers, Parts List (identifying each component), dimensions, connection sizes and types and all details of all related items. In cases where certain information is proprietary and is omitted, provided a statement indicating that the information is proprietary and is being omitted.

    a. Drawings shall be in conformance with all other requirements as specified in this specification.

2. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

    a. Identification of products.

    b. Schedules.

c. Compliance with specified standards.

d. Notation of coordination requirements.

e. Notation of dimensions established by field measurement.

f. Relationship and attachment to adjoining construction clearly indicated.

g. Seal and signature of professional engineer if specified.

3. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 30 by 42 inches.

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.

2. Identification: Attach label on unexposed side of Samples that includes the following:

a. Generic description of Sample.

b. Product name and name of manufacturer.

c. Sample source.

d. Number and title of applicable Specification Section.

e. Specification paragraph number and generic name of each item.

3. For electronic submittals, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.

4. Disposition: Maintain sets of accepted Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.

b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

a. Number of Samples: Submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. The Engineer will return submittal with options selected.

E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.

2. Manufacturer and product name, and model number if applicable.

3. Number and name of room or space.

4. Location within room or space.

2.02 DELEGATED DESIGN SERVICES:

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to the Engineer.

B. Delegated Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit PDF electronic file and three paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

2.03 CALCULATIONS:

A. Calculations shall not be submitted with any submittal unless expressly requested. Any calculations will be returned unreviewed.

PART 3 - EXECUTION

3.01 CONTRACTOR'S REVIEW:

A. Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents prior to submission to the Engineer. Mark with approval stamp before submitting to the Engineer.

B. Contractor review shall verify the following:

1. Field measurements

2. Field construction criteria

3. Catalog numbers and similar data

4. Conformance with the Specifications

C. Shop drawings found inaccurate or otherwise in error shall be returned to the Subcontractors for correction before submission thereof.

D. If a shop drawing shows any deviation from the requirements of the Contract Documents, the Contractor shall make specific mention of the deviations in the Transmittal Form furnished by the Engineer and provide a description of the deviations in a letter attached to the submittal.

E. The review and approval of shop drawings, samples or product data by the Engineer shall not relieve the Contractor from his responsibility with regard to the fulfillment of the terms of the Contract. All risks of error and omission are assumed by the Contractor and the Engineer will not have responsibility for any such errors and omissions.

F. No portion of the work requiring a shop drawing, sample, or product data shall be started nor shall any materials be fabricated or installed prior to the approval or qualified approval of such item by the Engineer. Any fabrication performed, materials purchased or on-site construction accomplished which does not conform to accepted shop drawings and data shall be at the Contractor's own risk. The Owner will not be liable for any expense or delay due to corrections or remedies required to accomplish conformity with the requirements of the Contract.

G. Project Closeout and Maintenance Material Submittals: See requirements in Section 01700 Closeout Procedures.

H. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

I. Project work, materials, fabrication and installation shall conform with approved shop drawings, applicable samples, and product data.

3.02 ENGINEER’S REVIEW:

A. The Engineer's review is for general conformance with the design concept and contract documents. Markings or comments shall not be construed as relieving the Contractor from compliance with the contract plans and specifications or from departures therefrom. The Contractor remains responsible for details and accuracy, for coordinating the work with all other associated work and trades, for selecting fabrication processes, for techniques of assembly, and for performing work in a safe manner.

B. Submittals will be reviewed for the Contractor's approval stamp. Submittals not stamped by the Contractor will be returned without any action.

C. The review of shop drawings, data, and samples will be general. They shall not be construed:

1. as permitting any departure from the Contract requirements;

2. as relieving the Contractor of responsibility for any errors or omissions, including details, dimensions, and materials;

3. as approving departures from details furnished by the Engineer, except as otherwise provided herein.

D. If the shop drawings, data or samples as submitted describe variations and show a departure from the Contract requirements which the Engineer finds to be in the interest of the Owner and to be so minor as not to involve a change in Contract Price or time for performance, the Engineer may return the reviewed drawings without noting an exception.

E. Two (maximum) copies of shop drawings or product data will be returned to the Contractor via First Class United States Postal Service. Samples will not be returned, unless otherwise indicated.

F. Submittals will be returned to the Contractor under one of the action codes indicated below and defined on the transmittal form furnished by the Engineer.

1. Marking: No Exception Taken.

a. When submittals are marked as "No Exception Taken," Work covered by submittal may proceed provided it complies with Contract Documents. Acceptance of Work depends on that compliance.

2. Marking: Make Corrections Noted.

a. When submittals are marked as "Make Corrections Noted," Work covered by submittal may proceed provided it complies with the Engineer's notations or corrections on submittal and with Contract Documents. Acceptance of Work depends on that compliance. Resubmittal not required.

3. Marking: Amend and Resubmit.

a. When submittals are marked as "Amend and Resubmit," do not proceed with Work covered by submittal. Do not permit Work covered by submittals to be used at Project site or elsewhere where Work is in progress.

b. Revise submittal or prepare new submittal in accordance with the Engineer's notations in accordance with resubmittal requirements of this section. Resubmit without delay. Repeat if required to obtain different action marking.

4. Marking: Rejected; See Remarks.

    a. When submittals are marked as “Rejected; See Remarks,” do not proceed with Work covered by submittal. Work covered by submittal does not comply with Contract Documents.

    b. Prepare new submittal for different material or equipment supplier or different product line or material of same supplier complying with Contract Documents.

5. Marking: For Information Only.

    a. When submittals are marked as “For Information Only,” the Engineer will review the submittal but take no action.

    b. It will be recorded as “For Information Only”. Work covered by this submittal may proceed provided it complies with the Contract Documents.

6. Marking: Not Required for Review.

    a. When submittals are marked as “Not Required for Review,” the Engineer has not reviewed the submittal and it is being returned.

    b. Work covered by this submittal may proceed provided it complies with the Contract Documents.

G. Resubmittals will be handled in the same manner as first submittals. On resubmittals the Contractor shall direct specific attention, in writing, on the letter of transmittal and on resubmitted shop drawings by use of revision triangles or other similar methods, to revisions other than the corrections requested by the Engineer, on previous submissions. Any such revisions which are not clearly identified shall be made at the risk of the Contractor. The Contractor shall make corrections to any Work done in relation to revisions which are not specifically pointed out to the Engineer which are deemed, by the Engineer, not to be in accordance with the Contract Documents.

H. Partial submittals may not be reviewed. The Engineer will be the only judge as to the completeness of a submittal. Submittals not complete will be returned to the Contractor, and will be considered "Rejected" until resubmitted. The Engineer may at his option provide a list or mark the submittal directing the Contractor to the areas that are incomplete.

I. If the Contractor considers any correction indicated on the shop drawings to constitute a change to the Contract Documents, the Contractor shall give written notice thereof to the Engineer at least seven working days prior to release for manufacture. The shop drawing and the Product data sheet reviews do not authorize changes in Contract Price or Contract Time. Changes involving Contract Price or Contract Time are authorized only by a signed Change Order, in accordance with the General Conditions.

J. When the shop drawings have been completed to the satisfaction of the Engineer, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the Engineer.

K. Material and equipment delivered to the Site will not be paid for until the pertinent shop drawings have been reviewed and accepted by the Engineer.

3.03 DISTRIBUTION:

A. Distribute reproductions of accepted shop drawings and copies of accepted product data and samples, where required, to the job site file and elsewhere as directed by the Engineer. Number of copies shall be as directed by the Engineer.

END OF SECTION

SECTION 01310

SCHEDULES AND REPORTS

PART 1 GENERAL

1.01 SCOPE

A. The work covered by this section of the specifications includes all labor, equipment, tools, and materials, necessary to complete schedules and reports, as specified herein, and/or as shown on the drawings.

1.02 MEASUREMENT AND PAYMENT

A. Measurement and payment for the work described in this section will be made in accordance with the provisions of SECTION 01025, MEASUREMENT AND PAYMENT.

1.03 LABORATORY AND FIELD TESTS

A. Any laboratory or field test of water samples, concrete or other project materials and finished articles shall be made by bureaus, laboratories or agencies approved by the Owner. Copies of all test reports shall be submitted in duplicate by the bureau, laboratory or agency, directly to the Owner and the Engineer. The cost of all testing shall be paid for by the Contractor.

B. The Contractor shall furnish all sample materials required for these tests and shall deliver them without charge to the testing laboratory or other designated agency when directed by the Engineer.

C. Any additional tests required beyond those required under this specification may be ordered by the Engineer to settle disagreements with the Contractor regarding the quality of work done. If the work is defective, the Contractor shall pay all costs of the extra tests and shall correct the work. If work is satisfactory, the Owner will pay for the additional tests.

D. Where the technical section of the specifications required that a piece of equipment be tested at the manufacturer's plant or at the site, the cost of such tests shall be included in the price of the equipment.

1.04 RECORD DRAWINGS

A. The Contractor shall submit one complete set of as-built drawings following the completion of the work. The Contractor shall make any revisions required by the Engineer in order to make the Drawings complete. After acceptance by the Engineer, the drawings shall be given to the Engineer. These record drawings shall be complete in every way and shall show the extent of the executed work. Change orders, addenda items and field changes should be noted where applicable. Additional specific requirements relative to record drawings may be called for in the individual sections of these specifications.

1.05 DRAWINGS OF EXISTING WPCF

A. Drawings of the existing water pollution control facility may be available for examination at the office of the Town Engineer. If drawings are available, the drawings are provided for reference only and the Owner assumes no responsibility for the accuracy of the drawings or for any conclusions that the Contractor might draw from review of the drawings.

PART 2 NOT APPLICABLE

PART 3 NOT APPLICABLE

END OF SECTION

SECTION 01400

QUALITY ASSURANCE

PART 1 - GENERAL

1.01 DESCRIPTION:

A. This section covers Quality Assurance and Control requirements for this contract.

B. The Contractor is responsible for controlling the quality of work, including work of its Subcontractors, and Suppliers and for assuring the quality specified in the Technical Specifications is achieved.

C. Refer to the General Conditions Article 6 - Contractor’s Responsibilities, including Supplementary Conditions.

1.02 TESTING LABORATORY SERVICES:

A. All tests which require the services of a laboratory to determine compliance with the Contract Documents, shall be performed by an independent commercial testing laboratory acceptable to the Engineer. The laboratory shall be staffed with experienced technicians, properly equipped, and fully qualified to perform the tests in accordance with the specified standards.

B. Preliminary Testing Services: The Contractor shall be responsible for all testing laboratory services in connection with concrete materials and mix designs, the design of asphalt mixtures, gradation tests for structural and embankment fills, backfill materials, and all other tests and engineering data required for the Engineer's review of materials and equipment proposed to be used in the Work. The Contractor shall obtain the Engineer's acceptance of the testing laboratory before having services performed, and shall pay all costs for services.

C. All field and laboratory testing specified in Section 02210 shall be performed by an independent testing laboratory employed by the Contractor. Comply with all testing methods and frequencies specified in Section 02210.

D. The Contractor shall not retain any testing laboratory against which the Owner or the Engineer have reasonable objection, and if at any time during the construction process the services become unacceptable to the Owner, or the Engineer, either the Owner or the Engineer may direct in writing that such services be terminated. The request must be supported with evidence of improper testing or unreasonable delay. If the Engineer determines that sufficient cause exists, the Contractor shall terminate the services and engage a different testing laboratory.

E. Transmittal of Test Reports: Written reports of testing and engineering data furnished by the Contractor for the Engineer's review of materials and equipment proposed to be used in the Work shall be submitted as specified for Shop Drawings.

F. The Contractor's testing laboratory shall furnish four copies of a written report of each test performed by laboratory personnel to the Contractor. Distribution shall be two copies of each test report to the Engineer's Representative, one copy to the Owner, and one copy for the Contractor within three days after each test is completed.

1.03 QUALITY ASSURANCE:

A. Codes and Standards: Refer to General Conditions Article 3 - Contract Documents: Intent, Amending, Reuse, Paragraph 3.02.

B. Copies of applicable referenced standards are not included in the Contract Documents. Where copies of standards are needed by the Contractor for superintendence and quality control of the work, the Contractor shall obtain a copy or copies directly from the publication source and maintain at the jobsite, available to the Contractor's personnel, Subcontractors, and Engineer.

C. Quality of Materials: Unless otherwise specified, all materials and equipment furnished for permanent installation in the Work shall conform to applicable standards and specifications and shall be new, unused, and free from defects and imperfections, when installed or otherwise incorporated in the Work. Material and equipment shall not be used by the Contractor for any purpose other than that intended or specified unless such use is authorized by the Engineer.

D. Where so specified, products or workmanship shall also conform to the additional performance requirements included within the Contract Documents to establish a higher or more stringent standard or quality than that required by the referenced standard.

1.04 OFFSITE INSPECTION:

A. When the specifications require inspection of materials or equipment during the production, manufacturing, or fabricating process, or before shipment, such services shall be performed by the Owner's independent testing laboratory, or inspection organization acceptable to Engineer in conjunction with or by the Engineer.

B. The Contractor shall give appropriate written notice to the Engineer not less than 30 days before offsite inspection services are required, and shall provide for the producer, manufacturer, or fabricator to furnish safe access and proper facilities and to cooperate with inspecting personnel in the performance of their duties.

1.05 MATERIALS AND EQUIPMENT:

A. The Contractor shall maintain control over procurement sources to ensure that materials and equipment conform to specified requirements in the Contract Documents.

B. The Contractor shall comply with manufacturer's printed instructions regarding all facets of materials and/or equipment movement, storage, installation, testing, startup, and operation. Should circumstances occur where the contract documents are more stringent than the manufacturer's printed instructions, the Contractor shall comply with the specifications. In cases where the manufacturer's printed instructions are more stringent than the contract documents, the Contractor shall advise the Engineer of the disparity and conform to the manufacturer's printed instructions. In either case, the Contractor is to apply the more stringent specification or recommendation, unless approved otherwise by the Engineer.

1.06 SHOP AND FIELD TESTING:

A. The Contractor is responsible for providing advance notice of and access for the shop and field testing specified in the technical specification sections.

B. The Contractor and its Subcontractor shall permit inspections, tests, and other services as required by the Contract Documents.

C. Contractor shall provide twenty-one days written notice to the Engineer so that the Engineer may schedule and witness off site and on site tests. The Engineer's witnessing of tests does not relieve the Contractor and/or Subcontractors of their obligation to comply with the requirements of the Contract Documents.

1.07 MANUFACTURER'S FIELD SERVICES:

A. When specified in the technical specifications sections, the Contractor shall arrange for and provide technical representation from manufacturer's of respective equipment, items or components. The manufacturer's representative shall be a factory trained service engineer/technician with the type and length of experience specified in the technical specifications.

B. Services Furnished Under This Contract: An experienced, competent, and authorized factory trained service engineer/technician representative of the manufacturer of each item of equipment for which field services are indicated in the specifications shall visit the site of the Work and inspect, operate, test, check, adjust if necessary, and approve the equipment installation. In each case, the manufacturer's service representative shall be present when the equipment is placed in operation. The manufacturer's service representative shall revisit the jobsite as often as necessary until all problems are corrected and the equipment installation and operation are satisfactory to the Engineer.

C. Refer to Section 01730 for additional requirements.

PART 2 - PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 QUALITY CONTROL:

A. Quality control is the responsibility of the Contractor, and the Contractor shall maintain control over construction and installation processes to assure compliance with specified requirements.

B. Certifications for personnel, procedures, and equipment associated with special processes (e.g., welding, cable splicing, instrument calibration, surveying) shall be maintained in the Contractor's field office, available for inspection by the Engineer. Copies shall be made available to the Engineer upon request.

C. Means and methods of construction and installation processes are the responsibility of the Contractor, and at no time is it the intent of the Engineer to supersede or void that responsibility.

END OF SECTION

SECTION 01500

TEMPORARY FACILITIES

PART 1 GENERAL

1.01 DESCRIPTION

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

PART 2 PRODUCTS

2.01 TEMPORARY WATER

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

2.02 TEMPORARY SANITARY FACILITIES

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

PART 3 EXECUTION (Not Applicable)

END OF SECTION

SECTION 01600

CONTROL OF MATERIALS

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

1. Section Includes:

a. Definitions.

b. Submittals.

c. Spare parts.

d. Quality assurance.

e. Delivery, storage and handling.

f. Warranty.

g. Products.

h. Substitution and “Or Equal” items.

i. Reuse of existing material.

j. Manufacturer’s instructions.

k. Special tools.

l. Lubrication.

m. Nameplates.

n. General material and equipment requirements.

o. Materials and Equipment.

p. Field Quality Control; Installation, Instructional, and Post Startup Services.

1.02 REFERENCES:

A. American Society of Mechanical Engineers (ASME):

1. B1.1: Unified Inch Screw Threads (UN and UNR Thread Form)

B. American Society for Testing and Materials (ASTM):

1. A123/A123M: Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

2. A325/A325M: Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength

1.03 DEFINITIONS:

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.

2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.

3. Comparable Product: Product that is demonstrated and accepted through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

1.04 SUBMITTALS:

A. Comparable Product Requests: See Section 01250 and Section 01300 for requirements.

1.05 SPARE PARTS:

A. Provide spare parts for Products as specified in the individual technical specification sections. Comply with the requirements specified in Section 01700.

B. Pack spare parts to protect them during storage. Tag spare parts and containers to clearly identify them in accordance with Contractor’s parts numbering system as reviewed by the Engineer. All parts shall be cross-referenced to their applicable the specification section.

1.06 QUALITY ASSURANCE:

A. Comply with the requirements specified in Section 01400.

B. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.

2. If a dispute arises between contractors over concurrently selectable but incompatible products, the Engineer will determine which products shall be used.

1.07 DELIVERY STORAGE AND HANDLING:

A. The Contractor shall arrange deliveries of materials and equipment in accordance with construction Progress Schedule, coordinate to avoid conflict with Work and conditions at site.

B. Provide equipment and personnel to handle materials and equipment by methods recommended by manufacturer to prevent soiling or damage to materials or equipment, or their packaging.

C. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

D. Owner assumes no responsibility for damage or loss due to storage of materials and equipment.

E. Interior Storage:

1. Store with seals and labels intact and legible.

2. Store materials and equipment subject to damage by elements in weathertight enclosures.

3. Maintain temperature and humidity within ranges required by manufacturer’s instructions.

F. Exterior Storage:

1. Store fabricated materials and equipment above ground, on blocking or skids, to prevent soiling or staining. Cover materials and equipment subject to deterioration with impervious sheet coverings. Provide ventilation to avoid condensation.

2. Store loose granular materials in well-drained area on solid surfaces to prevent mixing with foreign matter.

3. Store materials such as pipe, reinforcing steel, structural steel, and equipment on pallets or racks, off ground.

G. Inspection and Maintenance:

1. Arrange storage to provide easy access for inspection, maintenance, and inventory.

2. Make periodic inspections of stored materials and equipment to ensure materials and equipment maintained under specified conditions are free from damage or deterioration, and coverings are in-place and in condition to provide required protection.

3. Perform maintenance on stored material and equipment in accordance with manufacturer’s written instructions and in presence of Owner or the Engineer.

a. Notify the Engineer 24 hours before performance of maintenance.

b. Submit report of completed maintenance and condition of coverings to the Engineer with each Application for Payment.

c. Failure to perform maintenance, to notify the Engineer of intent to perform maintenance or to submit maintenance report may result in rejection of material or equipment.

H. The Contractor shall assume responsibility for protection of completed construction and repair and restore damage to completed Work equal to original condition.

I. Wheeling of loads over finished floors, with or without plank protection, is not permitted in anything except rubber-tired wheelbarrows, buggies, trucks or dollies. This applies to finished floors and exposed concrete floors, as well as those covered with composition tile or other applied surfacing.

J. Where structural concrete is also finished surface, avoid marking or damaging surface.

K. See Section 01610 for additional requirements.

1.08 WARRANTY:

A. Warranties specified in other sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.

2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.

2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.

3. See other sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Section 01700.

1.09 PRODUCTS:

A. Furnish products of qualified manufacturers suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise.

B. Do not use materials and equipment removed from existing premises, except as specifically permitted by Contract Documents.

C. Furnish interchangeable components from same manufacturer for components being replaced.

1.10 SUBSTITUTION AND “OR EQUAL” ITEMS:

A. Follow the procedures in Article 6.05 of the General Conditions.

1.11 ACCEPTANCE OF MATERIALS:

A. Unless otherwise specified, only new materials and equipment shall be incorporated in the work. All materials and equipment furnished by the Contractor shall be subject to the inspection and acceptance of the Engineer. No material shall be delivered to the work without prior acceptance of the Engineer.

B. As specified in Section 01300, the Contractor shall submit to the Engineer, data relating to materials and equipment he proposes to furnish for the work. Such data shall be in sufficient detail to enable the Engineer to identify the particular product and to form an opinion as to its conformity to the specifications.

C. Facilities and labor for handling and inspection of all materials and equipment shall be furnished by the Contractor. If the Engineer requires, either prior to beginning or during the progress of the work, the Contractor shall submit additional samples or materials for such special tests as may be necessary to demonstrate that they conform to the

specifications. Such samples shall be furnished, stored, packed, and shipped at the Contractor's expense. Except as otherwise noted, the Owner will make arrangements for and pay for the tests.

D. Any delay of acceptance resulting from the Contractor's failure to submit samples or data promptly shall not be used as a basis of a claim against the Owner or the Engineer.

E. In order to demonstrate the proficiency of workmen or to facilitate the choice among several textures, types, finishes, and surfaces, the Contractor shall provide such samples of workmanship or finish as may be required.

F. The materials and equipment used on the work shall correspond to the accepted samples or other data.

1.12 REUSE OF EXISTING MATERIAL:

A. Except as specifically indicated or specified, do not use materials and equipment removed from existing structure(s) in new Work.

B. For material and equipment specifically indicated or specified to be reused in Work:

1. Use special care in removal, handling, storage, and reinstallation to ensure proper function in completed Work.

2. The Contractor shall arrange and pay for transportation, storage, and handling of products which require off-site storage, restoration or renovation.

3. Off-site storage areas and buildings shall conform to requirements of this section.

1.13 MANUFACTURER’S INSTRUCTIONS:

A. Installation of equipment and materials shall comply with manufacturer’s instructions. Obtain and distribute printed copies of such instructions to parties involved in installation, including 6 copies to the Engineer.

1. Maintain one set of complete instructions at Site during installation and until completion of Work.

B. Handle, store, install, connect, clean, condition, and adjust materials and equipment in accordance with manufacturer’s written instructions and in conformance with Specifications.

1. If Site conditions or specified requirements conflict with manufacturer’s instructions, consult the Engineer for further instructions. Do not proceed with Work without written instructions.

1.14 SPECIAL TOOLS:

A. For each type of equipment furnished, the Contractor shall provide a complete set of all special tools (including grease guns or other lubricating devices) which may be necessary for the adjustment, operation, maintenance, and disassembly of such equipment. Tools shall be high-grade, smooth, forged, alloy, tool steel. Grease guns shall be lever type.

B. Special tools are considered to be those tools which because of their limited use are not normally available, but which are necessary for the particular equipment.

C. Pack items to protect them during storage. Tag items and containers to clearly identify them in accordance with Contractor's part system, as reviewed by the Engineer. Cross-reference all items to their applicable specification section.

D. Special tools shall be delivered at the same time as the equipment to which they pertain. The Contractor shall properly store and safeguard such special tools until completion of the work, at which time they shall be delivered to the Owner.

E. The Contractor shall furnish and erect one or more steel wall cases with flat key locks and clips or hooks to hold each tool in arrangement.

1.15 LUBRICATION:

A. Where lubrication is required for proper operation of equipment, incorporate necessary and proper provisions in equipment in accordance with manufacturer's requirements. Where possible, lubrication shall be automated and positive.

B. During testing and prior to acceptance, the Contractor shall furnish all lubricants necessary for proper lubrication of all equipment furnished under this contract.

1.16 NAMEPLATES:

A. With the exceptions mentioned below, each piece of equipment shall be provided with a nameplate of non-corrodible metal, securely fastened in place and clearly and permanently inscribed with the manufacturer's name, model or type designation, serial number, principal rated capacities, electrical or other power characteristics, and similar information.

B. This requirement shall not apply to standard, manually operated hydrants or to gate, globe check and plug valves.

C. Each process valve shall be provided with a substantial tag of non-corrodible metal securely fastened in place and inscribed with an identification number in conformance with the Valve Identification Schedule indicated on the drawings or furnished later by the Engineer.

1.17 GENERAL MATERIAL AND EQUIPMENT REQUIREMENTS:

A. The requirements of this Paragraph shall constitute the standards for the material and equipment specified herein. Should these requirements conflict with the Supplier's recommendations or in any way be less stringent than the Supplier's requirements, they shall be superseded by the Supplier's requirements.

B. Bolts, Anchor Rods and Nuts:

1. All necessary bolts, anchor rods, nuts, washers, plates and bolt sleeves shall be furnished by the Contractor in accordance herewith. Anchor rods shall have suitable washers and hexagonal nuts.

2. All anchor rods, nuts, washers, plates, and bolt sleeves shall be galvanized unless otherwise indicated or specified.

3. Unless otherwise specified, stud, tap, and machine bolts, and nuts shall conform to the requirements of ASTM Standard Specification for Carbon Steel Externally and Internally Threaded Standard Fasteners, Designation A325. Hexagonal nuts of the same quality of metal as the bolts shall be used. All threads shall be clean cut and shall conform to ANSI Standard B1.1 for Unified Inch Screw Threads (UN and UNR Thread Form).

4. Bolts, anchor rods, nuts, and washers, specified to be galvanized, shall be zinc coated, after being threaded, by the hot-dip process in conformity with the ASTM Standard Specification for Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip, Designation A123, or the ASTM Standard Specifications for Zinc Coating (Hot Dip) on Iron and Steel Hardware, Designation A153, as is appropriate.

5. Bolts, anchor rods, nuts, and washers specified to be stainless steel shall be Type 304 or Type 316 stainless steel, as indicated.

6. Anchor rods shall be set accurately. They shall be carefully held in suitable templates of acceptable design. Where indicated on the Drawings, specified, or required, anchor bolts shall be provided with square plates at least 4-inch by 4-inch by 3/8-inch or shall have square heads and washers and set in the concrete forms with suitable pipe sleeves, or both. If anchor are set after the concrete has been placed, all necessary drilling and grouting or caulking shall be done by the Contractor and care shall be taken not to damage the structure or finish by cracking, chipping, spalling, or otherwise during the drilling and caulking.

C. Grease Fittings:

1. Provide extension fittings and tubing on all grease fittings that are installed in an inaccessible location. The extension is to be located so that equipment can be

lubricated from the operating level without the use of ladders, staging or shutting down the equipment. Tubing: 316 L stainless steel.

D. Concrete Inserts For Hangers:

1. Concrete inserts for hangers shall be designed to support safely, in the concrete that is used, the maximum load that can be imposed by the hangers used in the inserts. Inserts for hangers shall be of a type which will permit adjustment of the hangers both horizontally (in one plane) and vertically and locking of the hanger head or nut. All inserts shall be galvanized by the hot-dip process in conformity with the ASTM Standard Specification for Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip, Designation A123, or the ASTM Standard Specifications for Zinc Coating (Hot Dip) on Iron and Steel Hardware, Designation A153, as is appropriate.

E. Equipment Foundations, Installation and Grouting:

1. The Contractor shall furnish the necessary materials and construct suitable concrete foundations for all equipment installed by him, even though such foundations may not be indicated on the Drawings. The tops of foundations shall be at such elevations as will permit grouting as specified below.

2. All such equipment shall be installed by skilled mechanics and in accordance with the instructions of the manufacturer.

3. In setting pumps, motors, and other items of equipment customarily grouted, the Contractor shall make an allowance of at least 1 in. for grout under the equipment bases. Shims used to level and adjust the bases shall be steel. Shims may be left embedded in the grout, in which case they shall be installed neatly and so as to be as inconspicuous as possible in the completed work. Unless otherwise permitted, all grout shall be a suitable non-metallic, non-shrink grout.

4. Grout shall be mixed and placed in accordance with the recommendations of the manufacturer. Where practicable, the grout shall be placed through the grout holes in the base and worked outward and under the edges of the base and across the rough top of the concrete foundation to a peripheral form so constructed as to provide a suitable chamfer around the top edge of the finished foundation.

5. Where such procedure is impracticable, the method of placing grout shall be as accepted by the Engineer. After the grout has hardened sufficiently, all forms, hoppers, and excess grout shall be removed, and all exposed grout surfaces shall be patched in an accepted manner and given a burlap-rubbed finish.

F. Equipment Drive Guards:

1. All equipment driven by open shafts, belts, chains, or gears shall be provided with acceptable all-metal guards enclosing the drive mechanism. Guards shall be constructed of galvanized sheet steel or galvanized woven wire or expanded metal set in a frame of galvanized steel members. Guards shall be secured in position by steel braces or straps which will permit easy removal for servicing the equipment. The guards shall conform in all respects to all applicable safety codes and regulations.

G. Sleeves:

1. Unless otherwise indicated on the drawings, or specified, form openings for the passage of pipes, conduits, and circular ducts through floors and walls using sleeves of standard weight, galvanized-steel pipe. Provide sleeves of ample diameter to pass the pipe and its insulation, if any, and to permit expansion as may occur. Provide sleeves that are flush at the walls and at the bottom of slabs and project 4 inches above the finished floor surface. Threaded nipples shall not be used as sleeves.

2. Sleeves in exterior walls below ground or in walls that have liquids on one or both sides, shall have a 2-inch annular fin of 1/8 in. plated welded with a continuous weld completely around the sleeve at mid-length. Galvanize sleeves after the fins are attached.

3. Sleeves shall be set accurately before the concrete is placed or shall be built in accurately as the masonry is being built.

H. Protection Against Electrolysis:

1. Where dissimilar metals are used in conjunction with each other, provide insulation between adjoining surfaces to eliminate direct contact and any resultant electrolysis. Provide bituminous insulation, heavy bituminous coatings, nonmetallic separators or washers, impregnated felt, or other means to provide insulation.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT:

A. Material and Equipment Incorporated into Work:

1. Conform to applicable specifications and standards.

2. Comply with size, make, type, and quality specified or as accepted by Submittal.

B. Manufactured and Fabricated Materials and Equipment:

1. Design, fabricate, and assemble in accordance with engineering and shop practices standard with industry.

2. Manufacture like parts of duplicate units to standard sizes and gauges, to be interchangeable.

3. Two or more items of same kind shall be identical, by same manufacturer.

4. Material and equipment shall be suitable for service conditions.

5. Equipment capabilities, sizes, and dimensions shown or specified shall be adhered to, unless variations are specifically accepted, in writing.

6. Equipment shall be adapted to best economy in power consumption and maintenance. Parts and components shall be proportioned for stresses occurring during continuous or intermittent operation, and for additional stresses occurring during fabrication or installation.

7. Design so working parts are readily accessible for inspection and repair, easily duplicated, and replaced.

C. Do not use material or equipment for purpose other than for which it is designed or specified.

PART 3 - EXECUTION

3.01 FIELD QUALITY CONTROL; INSTALLATION, INSTRUCTIONAL, AND POST STARTUP SERVICES:

A. General:

1. Provide on-site services of Supplier’s representatives for equipment provided by Contractor during construction, installation, equipment startup, and training of Owner’s personnel for equipment or plant operation as specifically required in specification section for equipment or system.

2. Include and pay costs for Supplier’s services.

3. Work day is defined as 8-hour period during Owner’s or Contractor’s typical calendar day. Work day for purposes of this section does not include travel to or from Site.

4. Specifications include minimum man-days to provide basis for bidding. If additional time is required to perform services Contractor shall include that time in Contract Price.

B. Installation Services:

1. Where installation services are called for in Specifications, provide competent and experienced technical representatives of manufacturers of material or equipment and systems to resolve assembly or installation procedures attributable to, or associated with, equipment furnished.

2. After equipment is installed, representatives shall perform initial equipment and system adjustment and calibration to conform to Specifications and manufacturer's requirements and instructions. The inspection shall include but shall not be limited to, the following points as applicable:

   a. Soundness (without cracked or otherwise damaged parts).

   b. Completeness in all details, as specified.

   c. Correctness of setting, alignment, and relative arrangement of various parts.

   d. Adequacy and correctness of packing, sealing, and lubricants.

3. The operation, testing, and adjustment shall be as required to prove that the equipment is left in proper condition for satisfactory operation under the conditions specified.

4. On completion of his work, the manufacturer's or supplier's representative shall submit to the Engineer a complete signed report of the result of his inspection, operation, adjustments, and tests. This report shall include detailed descriptions of the points inspected, tests and adjustments made, quantitative results obtained if such are specified, and suggestions for precautions to be taken to ensure proper maintenance. Provide "Certificate of Installation Services" stating proper adjustments have been made to equipment or system and equipment or system is ready for startup and system demonstration. Use Form 01600-1 and furnish two (2) copies to the Engineer.

5. After the Engineer as reviewed the reports from the manufacturers' representatives, the Contractor shall make arrangements to have the manufacturers' representatives present when field acceptance tests are made.

C. Training:

1. Comply with Section 01730 and the technical specifications.

D. Post Startup Services:

1. After equipment/system has been in operation for at least 6 months, but no longer than 11 months, each equipment manufacturer or authorized equipment representative shall make final inspection when required in Specifications. Final inspection will provide assistance to Owner's operating personnel in making

adjustments or calibrations required to ensure equipment or system is operating in conformance with design, manufacturer, and Specifications.

2. Provide “Certificate of Post Startup Services”, cosigned by Owner and equipment representative, verifying this service has been performed. Use form similar to Form 01600-2 and furnish two (2) copies to the Engineer.

3.02 CONTRACT CLOSEOUT:

A. Provide in accordance with Section 01700.

FORM 01600-1
EQUIPMENT MANUFACTURER'S CERTIFICATE OF INSTALLATION SERVICES

Owner – Town of Branford

Project – Septage Receiving Station

Contract No. 43

AECOM Project No. 60491951

EQUIPMENT SPECIFICATION SECTION_____

EQUIPMENT DESCRIPTION_____

I_____, Authorized representative of
(Print Name)

_____
(Print Manufacturer's Name)

hereby CERTIFY that _____
(Print equipment name and model with serial No.)

conforms to the requirements of the Contract and is ready for permanent operation and that nothing in the installation will render the manufacturer's warranty null and void.
on

Date:_____ Time:_____

CERTIFIED BY:_____DATE:_____
(Signature of Manufacturer's Representative)

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FORM 01600-2
EQUIPMENT MANUFACTURER'S CERTIFICATE OF POST STARTUP SERVICES

Owner – Town of Branford

Project – Septage Receiving Station

Contract No. 43

AECOM Project No. 60491951

EQUIPMENT SPECIFICATION SECTION_____

EQUIPMENT DESCRIPTION_____

I_____, Authorized representative of
(Print Name)

_____
(Print Manufacturer's Name)

hereby CERTIFY that _____
(Print equipment name and model with serial No.)

Post Startup Services for the subject project (has) (have) been performed in a satisfactory manner, and that Owner assigned operating personnel have been suitably instructed in the operation, lubrication, and care of the unit(s) on

Date:_____ Time:_____

CERTIFIED BY:_____DATE:_____
(Signature of Manufacturer's Representative)

OWNER'S ACKNOWLEDGMENT OF POST STARTUP SERVICES

(I) (We) the undersigned, authorized representatives of the Owner and/or Plant Operating Personnel have received Post Startup Services for the equipment as required by the contract on:

_____ Date: _____

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SECTION 01610

DELIVERY, STORAGE AND HANDLING

PART 1 - GENERAL

1.01 GENERAL:

A. This Section specifies the general requirements for the delivery handling, storage and protection for all items required in the construction of the work. Specific requirements, if any, are specified with the related item.

1.02 TRANSPORTATION AND DELIVERY:

A. Transport and handle items in accordance with manufacturer's instructions.

B. Schedule delivery to reduce long term on-site storage prior to installation and/or operation. Under no circumstances shall equipment be delivered to the site more than one month prior to installation without written authorization from the Engineer.

C. Ship equipment, material and spare parts complete except where partial disassembly is required by transportation regulations or for protection of components.

D. Coordinate delivery with installation to ensure minimum holding time for items that are hazardous, flammable, easily damaged or sensitive to deterioration.

E. Deliver products to the site in manufacturer's original sealed containers or other packing systems, complete with instructions for handling, storing, unpacking, protecting and installing.

F. All items delivered to the site shall be unloaded and placed in a manner which will not hamper the Contractor's normal construction operation or those of subcontractors and other contractors and will not interfere with the flow of necessary traffic.

G. Provide necessary equipment and personnel to unload all items delivered to the site.

H. Promptly inspect shipment to assure that products comply with requirements, quantities are correct, and items are undamaged. For items furnished by others (i.e. Owner, other Contractors), perform inspection in the presence of the Engineer. Notify Engineer verbally, and in writing, of any problems.

I. Pay all demurrage charges if fail to promptly unload items.

1.03 STORAGE AND PROTECTION:

A. Store and protect products in accordance with the manufacturer's instructions, with seals and labels intact and legible. Storage instruction shall be studied by the Contractor and reviewed with the Engineer by him. Instruction shall be carefully followed and a written record of this kept by the Contractor for each product and piece of equipment.

B. Arrange storage of products and equipment to permit access for inspection. Periodically inspect to make sure products and equipment are undamaged and are maintained under specified conditions.

C. Provide protective maintenance during storage consisting of manually exercising equipment, inspecting mechanical surfaces for signs or corrosion or other damage, lubricating, applying any coatings as recommended by the equipment manufacturer necessary for its protection and all other precautions to assure proper protection of all equipment stored and for compliance with manufacturers' requirements related to warranties. Log all protective maintenance for each piece of equipment in the written record noted above.

D. Store loose granular materials on solid flat surface in a well-drained area. Prevent mixing with foreign matter.

E. Cement and lime shall be stored under a roof and off the ground and shall be kept completely dry at all times. All structural, miscellaneous and reinforcing steel shall be stored off the ground or otherwise to prevent accumulation of dirt or grease, and in a position to prevent accumulations of standing water and to minimize rusting. Beams shall be stored with the webs vertical. Precast concrete shall be handled and stored in a manner to prevent accumulations of dirt, standing water, staining, chipping or cracking. Brick, block and similar masonry products shall be handled and stored in manner to reduce breakage, cracking and spalling to a minimum.

F. All mechanical and electrical equipment and instruments subject to corrosive damage by the atmosphere that is to be stored outdoors (even though covered by canvas) shall be stored in a weathertight building to prevent damage. The building may be a temporary structure on the site or elsewhere, but it must be satisfactory to the Engineer. Building shall be provided with adequate ventilation to prevent condensation. Maintain temperature and humidity within range required by manufacturer and to prevent condensation on the equipment being stored.

1. All equipment shall be stored fully lubricated with oil, grease and other lubricants unless otherwise instructed by the manufacturer.

2. Moving parts shall be rotated a minimum of once weekly to insure proper lubrication and to avoid metal-to-metal "welding." Log all rotation maintenance for each piece of equipment in the written record noted above.

3. Upon installation of the equipment, the Contractor shall start the equipment, at least half load, once weekly for an adequate period of time to ensure that the equipment does not deteriorate from lack of use. Log all startup for each piece of equipment in the written record noted above.

4. Lubricants shall be changed upon completion of installation and as frequently as required thereafter during the period between installation and acceptance. New lubricants shall be put into the equipment at the time of acceptance.

5. For electrical equipment installed in areas where temperature and humidity are not controlled for (including switchgear, switchboards, motor control center and variable frequency drives) provide temporary heaters in accordance with manufacturer's recommendation to prevent condensation prior to energization of equipment.

6. Prior to acceptance of the equipment, the Contractor shall have the manufacturer inspect the equipment and certify that its condition has not been detrimentally affected by the long storage period. Such certifications by the manufacturer shall be deemed to mean that the equipment is judged by the manufacturer to be in a condition equal to that of equipment that has been shipped, installed, tested and accepted in a minimum time period. As such, the manufacturer will guaranty the equipment equally in both instances. If such a certification is not given, the equipment shall be judged to be defective. It shall be removed and replaced at the Contractor's expense.

END OF SECTION

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SECTION 01700

CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

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

1.02 SUMMARY:

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Substantial Completion procedures.
2. Final completion procedures.
3. Warranties.
4. Final cleaning.
5. Repair of the Work.
6. Specific closeout and special cleaning requirements for the Work in those Sections.

B. Substantial Completion procedures apply to the entire project as well as any partial Substantial Completion of a portion of the Work.

1.03 REFERENCES:

A. Green Seal:

1. GS-37.

B. National Air Duct Cleaners Association (NADCA):

1. Standard 1992-01.

1.04 SUBMITTALS:

A. Submit the following shop drawings in accordance with Section 01300.

B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

C. Certified List of Incomplete Items: Final submittal at Final Completion.

D. Certificates of Release: From authorities having jurisdiction.

E. Certificate of Insurance: For continuing coverage.

F. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.05 SUBSTANTIAL COMPLETION PROCEDURES:

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 working days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.

2. Submit closeout submittals specified in other Division 1 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.

3. Submit closeout submittals specified in individual Divisions 2 through 16 Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.

4. Submit maintenance material submittals specified in individual Divisions 2 through 16 Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by the Engineer. Label with manufacturer's name and model number where applicable.

   a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain the Engineer’s signature for receipt of submittals.

5. Submit test/adjust/balance records.

6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 working days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Advise Owner of pending insurance changeover requirements.

2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.

3. Complete startup and testing of systems and equipment.

4. Perform preventive maintenance on equipment used prior to Substantial Completion.

5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified as required.

6. Advise Owner of changeover in heat and other utilities.

7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.

8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.

9. Remove labels that are not permanent labels.

10. Complete final cleaning requirements, including touchup painting.

11. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 working days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. The Engineer will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by the Engineer, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

2. Results of completed inspection will form the basis of requirements for final completion.

1.06 STARTING OF SYSTEMS:

A. Coordinate schedule for start-up of various equipment and systems.

B. Notify the Engineer seven days prior to start-up of each item.

C. Verify each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.

D. Verify tests, meter readings, and specified electrical characteristics agree with those required by equipment or system manufacturer.

E. Verify wiring and support components for equipment are complete and tested.

F. Execute start-up under supervision of applicable manufacturer's representative as specified.

G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

H. Submit a written report in accordance with Section 01300 that equipment or system has been properly installed and is functioning correctly.

1.07 DEMONSTRATION AND INSTRUCTIONS:

A. Conform to the requirements of Section 01730 and the technical specifications.

B. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

C. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.

D. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed time, at designated location.

E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

F. Required instruction time for each item of equipment and system is specified in individual sections.

1.08 TESTING, ADJUSTING AND BALANCING:

A. Adjust operating Products and equipment to ensure smooth and unhindered operation.

B. Independent firm will perform services specified in Section 15950.

C. Reports will be submitted by independent firm to the Engineer indicating observations and results of tests and indicating compliance or non-compliance with requirements of Contract Documents.

1.09 PROTECTING INSTALLED CONSTRUCTION:

A. Protect installed Work and provide special protection where specified in individual specification sections.

B. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

E. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

F. Prohibit traffic from landscaped areas.

1.10 SPARE PARTS AND MAINTENANCE PRODUCTS:

A. Furnish spare parts, maintenance, and extra products in quantities specified in individual specification sections. Comply with the requirements specified in Sections 01600 and 01700.

B. Deliver to Project site and place in location as directed by Owner; obtain receipt prior to final payment.

C. Coat parts to protect from moisture.

D. Crate in containers designed for prolonged storage suitable for handling with hoisting equipment containers.

E. Stencil on containers:

1. Manufacturer/supplier name.

2. Unit name.

3. Spare part name.

4. Manufacturer catalogue number.

5. Other identifying information.

6. Precautionary information.

1.11 FINAL COMPLETION PROCEDURES:

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment according to Section 00700 General Conditions and Section 01069 State and Federal Requirements.

2. Certified List of Incomplete Items: Submit certified copy of the Engineer's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by the Engineer. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.

3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 work days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. The Engineer will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.12 LIST OF INCOMPLETE ITEMS (PUNCH LIST):

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order According to the structure designations from the Contract Drawings.

2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.

3. Include the following information at the top of each page:

a. Project name.

b. Date.

c. Name of Engineer.

d. Name of Contractor.

e. Page number.

4. Submit list of incomplete items in the following format:

a. Six paper copies and MS Excel electronic file. Engineer will return two revised copies.

1.13 SUBMITTAL OF PROJECT WARRANTIES:

A. Time of Submittal: Submit written warranties on request of the Engineer for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.

2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.

3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

D. Provide additional copies of each warranty to include in operation and maintenance manuals.

1.14 AS-BUILT DRAWINGS:

A. Comply with the requirements specified in Section 00800.

B. The "as-built" drawings shall consist of all the Contract Drawings.

C. The Contractor shall maintain one set of "marked up" as-built drawings throughout the duration of the contract.

D. The Contractor shall maintain the drawings and identify all the work completed as the project progresses.

E. The as-built drawings shall be stored and maintained in the Contractor's field office apart from other documents used for construction. The as-built drawings shall be maintained in a clean, dry and legible condition and shall not be used for construction purposes.

F. The as-built drawings shall be made available at all times for the Engineer and/or Owner's review throughout the duration of the project. All deficiencies noted shall be promptly corrected by the Contractor.

G. On a daily basis, the Contractor shall take ties and record top of pipe elevations.

H. The Contractor shall record all changes, including the location, size, number, type, horizontal alignment, elevation, etc. of all elements of the project which deviate from those indicated on the Contract Drawings.

I. The Contractor shall submit the final as-built drawings for the Engineer's review. Inaccuracies in the as-built drawings shall be corrected.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

1. Use cleaning products that comply with Green Seal’s GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.01 FINAL CLEANING:

A. General: Perform final cleaning in accordance with Section 01710.

B. Pest Control: Comply with pest control requirements in Section 01500. Prepare written report.

C. Construction Waste Disposal: Comply with waste disposal requirements in Section 01500.

3.02 REPAIR OF THE WORK:

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.

2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.

a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.

3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.

4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

3.03 ADJUSTING:

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

END OF SECTION

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SECTION 01710

CLEANING UP

PART 1 - GENERAL

1.01 SUMMARY:

A. Execute cleaning during progress of Work and at completion of Work.

B. Refer to specification sections for specific cleaning for Products or Work.

1.02 DISPOSAL REQUIREMENTS:

A. Conduct cleaning and disposal operations to comply with local codes, ordinances, regulations, and anti-pollution laws. Do not burn or bury rubbish or waste materials on Project site. Do not dispose of volatile wastes, such as mineral spirits, oil, or paint thinner, in storm or sanitary drains. Do not dispose of wastes into streams or waterways.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Use only those cleaning materials which will not create hazards to property and persons or damage surfaces of material to be cleaned.

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

PART 3 - EXECUTION

3.01 CLEANING DURING CONSTRUCTION:

A. At all times maintain areas covered by the contract and adjacent properties and public access roads free from accumulations of waste, debris, and rubbish caused by construction operations.

B. During execution of work, clean site, adjacent properties, and public access roads and dispose of waste materials, debris, and rubbish to assure that buildings, grounds, and public properties are maintained free from accumulations of waste materials and rubbish. Unneeded construction equipment shall be removed and all damage repaired so that the public and property owners will be inconvenienced as little as possible.

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

D. Cover or wet excavated material leaving and arriving at the site to prevent blowing dust. Clean the public access roads to the site of any material falling from the haul trucks.

E. Where material or debris has washed or flowed into or been placed in existing watercourses, ditches, gutters, drains, pipes structures, work done under this contract, or elsewhere during the course of the Contractor's operations, such material or debris shall be entirely removed and satisfactorily disposed of during the progress of the work, and the ditches, channels, drains, pipes, structures, and work, etc., shall, upon completion of the work, be left in a clean and neat condition.

F. On or before the completion of the work, the Contractor shall, unless otherwise especially 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, acceptably disinfect, and cover all organic matter and material containing organic matter in, under, and around privies, houses, and other buildings used by him; shall remove all rubbish from any grounds which he has occupied; and shall leave the roads and all parts of the premises and adjacent property affected by his operations in a neat and satisfactory condition.

G. The Contractor shall restore or replace, when and as directed, any public or private property damaged by his work, equipment, or employees, to a condition at least equal to that existing immediately prior to the beginning of operations. To this end the Contractor shall do as required all necessary highway or driveway, walk, and landscaping work. Suitable materials, equipment, and methods shall be used for such restoration. The restoration of existing property or structures shall be done as promptly as practicable as work progresses and shall not be left until the end of the contract period.

H. Provide on-site containers for collection and removal of waste materials, debris, and rubbish in accordance with applicable regulations.

3.02 FINAL CLEANING:

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.

b. The Contractor shall thoroughly clean all materials and equipment installed by him and his subcontractors, and on completion of work shall deliver it undamaged and in fresh and new appearing condition. All mechanical equipment shall be left fully charged with lubricant and ready for operation.

c. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.

d. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.

e. Remove tools, construction equipment, machinery, and surplus material from Project site.

f. Remove snow and ice to provide safe access to buildings.

g. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.

h. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.

i. Sweep concrete floors broom clean in unoccupied spaces.

j. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.

k. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.

l. Remove labels that are not permanent.

m. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.

n. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.

o. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.

p. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.

q. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.

r. Leave project clean and ready for occupancy.

C. Construction Waste Disposal: Comply with waste disposal requirements in Section 01500.

D. Contractor shall touch-up paint or repaint damaged finishes on electrical items delivered to Project with finish coat of paint. Engineer will make final determination of items to be repainted or touched-up.

E. Prior to substantial completion or Owner occupancy, Contractor with Engineer shall conduct inspection of sight-exposed interior and exterior surfaces and work areas to verify Work and site is clean.

F. Upon completion of the work, the Contractor shall remove from the sites of the work all of his plant, machinery, tools, equipment, temporary work, and surplus materials; shall, unless otherwise directed or permitted in writing, remove all rubbish from any grounds which he has occupied; and shall leave the roads and all parts of the premises and adjacent property affected by his operations in a neat and satisfactory condition.

END OF SECTION

SECTION 01730

OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.01 DESCRIPTION:

A. This section includes procedural requirements for compiling and submitting operation and maintenance data required to complete the project.

1.02 RELATED WORK:

A. Section 01300: Submittals

B. Section 01400: Quality Assurance

C. Section 01740: Warranties and Bonds

1.03 OPERATING AND MAINTENANCE INSTRUCTIONS AND PARTS LISTS:

A. Where reference is made in the Detail Technical Specifications to operating and maintenance and spare parts lists, the Contractor shall furnish for each piece of equipment three complete hard copy sets and one electronic copy on a USB flash drive and providing information listed below.

1. The manual for each piece of equipment shall be a separate document with the following specific requirements:

a. Contents:

(1) Table of contents and index

(2) Brief description of each system and components

(3) Starting and stopping procedures

(4) Special operating instructions

(5) Routine maintenance procedures

(6) Clean and concise manufacturer's printed operating and maintenance instructions, adjustment, lubrication and other maintenance of equipment including: parts list, illustrations, and diagrams

(7) One copy of each wiring diagram

(8) One copy of each approved shop drawing and each Contractor's coordination and layout drawing

(9) List of spare parts, manufacturer's price, and recommended quantity

(10) Name, address, and telephone numbers of local service representatives

b. Hard Copy Material:

(1) Loose leaf on 60 pound, punched paper

(2) Holes reinforced with plastic cloth or metal

(3) Page size, 8-1/2-in. by 11-in.

(4) Diagrams, illustrations, and attached foldouts as required of original quality, reproduced by dry copy method

(5) Covers: oil, moisture, and wear resistant 9 X 12 size

B. Such instructions and parts lists shall be completely and neatly annotated so that only the specific equipment and features furnished are clearly indicated. References to other sizes and types or models of similar equipment shall be deleted or neatly lined out.

C. Such instructions and parts lists shall be delivered to the Engineer at the same time that the equipment to which they pertain is delivered to the site. Each submittal shall be accompanied by a transmittal form identifying the information included. Each submittal shall be reviewed by the Engineer for compliance with the above requirements.

D. If a submittal is acceptable, all four copies will be retained by the Engineer and three additional copies shall be provided to the Engineer by the Contractor. If deficiencies are found, one copy will be retained by the Engineer and three copies with the deficiencies, noted, will be returned to the Contractor. The copy retained by the Engineer shall not count toward the four complete acceptable sets required herein.

E. At the Engineer's discretion, he may retain all four copies and request only supplemental information from the Contractor. In this case the supplemental information shall be accompanied by a complete electronic copy of the complete revised manual on a USB flash drive.

1.04 CONTENTS, EACH VOLUME:

A. Table of Contents: Provide title of Project, names, addresses, and telephone numbers of Engineer, subconsultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

B. For Each Product or System: List names, addresses and telephone number of Subcontractors and suppliers; including local source of supplies and replacement parts.

C. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

D. A list of all parts for the equipment with each part identified by a functional name, the part manufacturer's name and a unique part number, (normally the part manufacturer's alpha-numeric desig-nation). A list of parts keyed by non-unique item numbers to a sectional drawing will not be adequate to fulfill this requirement.

E. All components of each system, e.g., pump motor, coupling, and drive, shall be combined in a single submittal with the above data provided for each component.

F. Drawings: Supplement product data to illustrate relations of component parts, and data applicable to installation. Delete inapplicable information.

G. Type Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's printed instructions specified.

H. Warranties and Bonds are as specified in Section 01740.

1.05 MANUAL FOR MATERIALS AND FINISHES:

A. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Provide information for re-ordering custom manufactured products.

B. Instructions for Care and Maintenance: Include manufacturer's printed recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

C. Moisture Protection and Weather Exposed Products: Include product data listing, applicable reference standards, chemical composition, and details of installation. Provide printed recommendations for inspections, maintenance, and repair.

D. Additional Requirements: As specified in individual product specification sections.

E. Provide a listing in Table of Contents for design data, if provided by Contractor, with tabbed fly sheet and space for insertion of data.

1.06 MANUAL FOR EQUIPMENT AND SYSTEMS:

A. For each Item of Equipment and Each System provide the following:

1. Description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include certified performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

2. Panelboard Circuit Directories including electrical service characteristics, controls and communications, and color coded wiring diagrams as installed.

3. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences; regulation, control, stopping, shut-down, and emergency instructions; and summer, winter, and any special operating instructions.

4. Completed Equipment Data Form pages 1 through 4 as appended to the end of this section.

5. Maintenance Requirements:

a. Routine procedures and guide for troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

b. Servicing and lubrication schedule, with list of lubricant type, frequency and method of lubrication. Any components which do not require lubrication or any expendable components which are not normally serviced shall be clearly noted as such.

c. Manufacturer's printed operation and maintenance instructions.

d. Sequence of operation by controls manufacturer.

e. Original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

f. Lubrication and maintenance schedules shall be similar to that specified in Section 01300.

6. Control diagrams by controls manufacturer as installed.

7. Contractor's coordination drawings, with color coded piping diagrams as installed.

8. Charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

9. List of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

10. Test and balancing reports as specified.

11. Additional Requirements: As specified in individual product specification section.

B. Provide a listing in Table of Contents for design data, if provided by Contractor, with tabbed fly sheet and space for insertion of data.

1.07 INSTRUCTION OF OWNER PERSONNEL:

A. Before final inspection, instruct Owner's designated personnel in operation, adjustment, and maintenance of products, equipment, and systems, at agreed upon times.

B. Where specified in technical specification sections for specific equipment or systems, the Contractor shall have instructions digitally recorded while they are being given to Owner's personnel. Recording shall be performed by a person or organization experienced in the production of video recordings and shall include the entire instruction session(s) and all questions and answers. Video recordings shall be provided on USB flash drive and become the property of the Owner.

C. Use operation and maintenance manuals as basis for instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.

D. Prepare and insert additional data in Operations and Maintenance Manual when need for such data becomes apparent during instruction.

E. Provide a completed and filled-out Equipment Manufacturer’s Certificate of Installation, Testing and Instruction form attached to the end of this section.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION - (NOT USED)

END OF SECTION

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EQUIPMENT MANUFACTURER'S CERTIFICATE OF INSTALLATION, TESTING AND INSTRUCTION

Owner – Town of Branford

Project – Septage Receiving Station

Contract No. 43
(fill in)

AECOM No. 60491951

EQUIPMENT SPECIFICATION SECTION_____

EQUIPMENT DESCRIPTION_____

I_____, Authorized representative of
(Print Name)

_____
(Print Manufacturer's Name)

hereby CERTIFY that _____
(Print equipment name and model with serial No.)

installed for the subject project (has) (have) been installed in a satisfactory manner, (has) (have) been satisfactorily tested, (is) (are) ready for operation, and that Owner assigned operating personnel have been suitably instructed in the operation, lubrication, and care of the unit(s) on

Date:_____ Time:_____

CERTIFIED BY:_____DATE:_____
(Signature of Manufacturer's Representative)

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OWNER'S ACKNOWLEDGMENT OF MANUFACTURER'S INSTRUCTION

(I) (We) the undersigned, authorized representatives of the _____ and/or Plant Operating Personnel have received classroom and hands-on instruction on the operation, lubrication, and maintenance of the subject equipment and (am) (are) prepared to assume normal operational responsibility for the equipment:

_____ Date: _____

_____ Date: _____

_____ Date: _____

EQUIPMENT DATA FORM Page 1 of 4

PROJECT NAME			
CONTRACT NO.			
CONTRACTOR			
EQUIPMENT NO.		ASSET NO.*	
DESCRIPTION		MAINT. NO.*	
LOCATION			
MANUFACTURER			
PURCHASED FROM			
VENDOR ORDER NO.		PURCHASE $	
DATE OF PURCHASE			
LOCAL SUPPLIER			
ADDRESS			
PHONE NO.			
MODEL NO.			
NO. OF UNITS		SERIAL NOS.	
*By Owner			

EQUIPMENT DATA FORM Page 2 of 4			
NAMEPLATE DATA			
ELECTRIC MOTOR		PUMP/HVAC UNIT	
MANUFACTURER		MANUFACTURER	
TYPE	[ ] AC [ ] DC	TYPE	
HORSEPOWER		SIZE	
RPM		CAPACITY	
VOLTAGE		PRESSURE	
AMPERAGE		ROTATION	
PHASE		IMPELLER SIZE	
FRAME		IMPELLER MATERIAL	
DRIVE/REDUCER		OTHER (I&C)	
MANUFACTURER		MANUFACTURER	
TYPE	[ ] GEAR [ ] V-BELT [ ] CHAIN [ ] VARIDRIVE	TYPE	
		SIZE	
SERVICE FACTOR		CAPACITY	
RATIO		RANGE	

EQUIPMENT DATA FORM Page 3 of 4

MAINTENANCE SUMMARY			
EQUIPMENT NO.		ASSET NO.*	
DESCRIPTION		MAINT. NO.*	
MAINTENANCE OPERATION:		FREQUENCY:	
List briefly each Maintenance Operation required and refer to specific information in Manufacturer's Manual, if applicable. Refer by symbol to "Lubricant List" for Lubrication Operation.		List required frequency of each maintenance operation.	
*By Owner			

EQUIPMENT DATA FORM Page 4 of 4

LUBRICANT/RECOMMENDED SPARE PARTS LIST			
EQUIPMENT NO.		ASSET NO.*	
DESCRIPTION		MAINT. NO.*	

LUBRICANT LIST		
REFERENCE SYMBOL	LUBRICANT TYPE (MILITARY STANDARD)	RECOMMENDED LUBRICANT AND MANUFACTURER
List symbols in "Maintenance Operation" (Page 3).	List general lubricant type.	List specific lubricant name, viscosity, and manufacturer.

RECOMMENDED SPARE PARTS LIST				
PART NO. **	DESCRIPTION	UNIT	QUANTITY	UNIT COST

ADDITIONAL DATA AND REMARKS

* By Owner

** Identify parts provided by this contract with two asterisks.

Note: Attach additional sheets if necessary; identify each sheet at top with equipment number and description.

END OF SECTION

SECTION 01740

WARRANTIES AND BONDS

PART 1 - GENERAL

1.01 SCOPE OF WORK:

A. This section specifies general administrative and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturers' standard warranties on products and special warranties.

1.02 DEFINITIONS:

A. Standard Product Warranties are pre-printed written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.

B. Special Warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

C. Standard Product Warranties and Special Warranties shall start on the date established as the date of Substantial Completion.

1.03 RELATED WORK:

A. Refer to Conditions of Contract for the general requirements relating to warranties and bonds.

B. General closeout requirements are included in Section 01700.

C. Specific requirements for warranties for the Work and products and installations that are specified to be warranted, are included in the individual sections of Divisions 2 through 16.

D. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.

1.04 SUBMITTALS:

A. Submit written warranties to the Owner prior to the date fixed by the Engineer for Substantial Completion. If the Certificate of Substantial Completion designates a commencement data for warranties other than the date of Substantial Completion for the

Work, or a designated portion of the Work, submit written warranties upon request of the Owner.

B. When a designated portion of the Work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Owner within fifteen days of completion of that designated portion of the Work.

C. When a special warranty is required to be executed by the Contractor, or the Contractor and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Engineer for approval prior to final execution.

D. Refer to individual sections of Divisions 2 through 16 for specific content requirements, and particular requirements for submittal of special warranties.

E. At Final Completion, compile two copies of each required warranty and bond properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.

F. Bind warranties and bonds in heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8 1/2 x 11-inch paper.

G. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of the product or work item.

H. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address and telephone number of the installer, supplier, and manufacturer.

I. Identify each binder on the front and the spine with the typed or printed title "WARRANTIES AND BONDS," the Project title or name, and the name, address, and telephone numbers of the Contractor and equipment supplier.

J. When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

1.05 WARRANTY REQUIREMENT:

A. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.

B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.

D. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights or remedies.

E. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.

F. The Owner reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

G. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION - (NOT USED)

END OF SECTION

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SECTION 02100

SITE PREPARATION

PART 1 GENERAL

1.01 SCOPE

A. The work of this section includes all labor, equipment, tools, and materials necessary for the performance of all operations in connection with clearing and all incidental and appurtenant work pertaining thereto, as specified herein, and as shown on the drawings.

1.02 SUBMITTALS

A. Submittals required under this section include, but are not limited to the following:

1. Sediment and erosion control devices including silt fence and silt sacks.

1.03 PRODUCT HANDLING - Not Used

1.04 SPECIAL REQUIREMENTS

A. Prior to the performance of any work of this section or any related work required by other sections of the specifications, the Limit of Work Line shall be laid out and staked in the field by the Contractor, according to the drawings. The Contractor shall be responsible for maintaining the Limit of Work Line during the construction operation.

B. At all times throughout the duration of this contract, the Contractor shall be responsible for the appearance and condition of the area within and surrounding the project site. The Contractor shall repair or replace, at no additional expense to the Owner, any structures, either natural or man-made such, as but not limited to, utilities, trees, plants, water bodies, and pavements that are damaged or destroyed by any actions or sequences of events related to the Contractor's operations.

C. Disposal of waste/surplus materials may involve securing permits, licenses, or approvals, which may vary according to the type of material to be disposed of prior to the start of construction. The Contractor shall apply for these, as they may be required by the various governing agencies and pay all required fees. The Contractor shall have sole responsibility for the legal disposal of all waste surplus material of this project. The Contractor shall be responsible for any and all fines due to any illegal activity with regards to the disposal of waste/surplus materials.

PART 2 PRODUCTS

A. All materials shall conform to the requirements of "State of Connecticut Department of Transportation Standard Specification for Roads and Bridges", latest edition as last amended (hereinafter referred to as the "State Specifications") and as specified herein.

B. Sediment erosion control devices shall conform to Articles 2.10.02 and 2.19.02 of the State Specifications.

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

A. All graded areas, and all areas within the Limit of Work Line on which proposed work is to be installed, shall be cleared as may be needed and as indicated on the drawings.

B. The Contractor shall be careful to note any areas that may be designated on the drawings to receive only selective clearing.

3.02 CLEARING

A. Clearing operations shall be performed in a manner which will prevent damage and which will provide for the safety of employees and other persons.

3.03 DISPOSAL OF WASTE MATERIALS

A. Disposal of Cleared and Grubbed Materials

1. Disposal of cleared materials by burning is not permitted, they shall be legally disposed of off-site by the Contractor.

B. All waste materials shall be satisfactorily legally disposed of off-site by the Contractor.

3.04 SEDIMENT AND EROSION CONTROL

A. Sediment and soil erosion control devices shall be installed prior to any clearing operations.

B. Construction methods shall conform to the requirements of Articles 2.10.03 and 2.19.03 of the State Specifications.

C. The Contractor shall take such actions as may be required to ensure that his construction activities do not interfere with or adversely impact the hydraulic characteristics or aesthetic qualities of any natural or manmade watercourse or drain.

D. The Contractor shall provide acceptable siltation control devices such as haybale sediment control devices or permanent or portable control basins for the settling or filtering of fine sands, silts and clay resulting from rainfall runoff or dewatering operations. Any natural areas or manmade structures which have been affected by siltation or erosion due to construction activities shall be restored to their pre-construction condition by the Contractor at no additional cost to the Owner.

END OF SECTION

SECTION 02220

EARTHWORK

PART 1 GENERAL

1.01 SCOPE

A. The Work of this section includes the furnishing of all labor, materials, tools, equipment, accessories and appurtenances necessary to satisfactorily complete all stripping of topsoil, excavation of earth and rock, stockpiling, removal of unsatisfactory materials, backfilling, filling, compaction, and grading not specified elsewhere, and all incidental Work pertaining thereto within the limits of the Work indicated or required as specified herein.

1.02 SUBMITTALS

A. Shop drawings and brochures shall be submitted for all items to be furnished in accordance with the provisions of the DOCUMENT 00700, GENERAL CONDITIONS.

B. Submittals required under this section includes, but are not limited to, the following:

1. Materials Testing Results
2. Materials Brochures
3. Temporary Earth Support Certification Letter
4. Control of Water Certification Letter
5. Soil Testing Reports

1.03 PRODUCT HANDLING - NOT USED

1.04 PROTECTION OF WORK

A. Prosecute the Work so that no damage occurs to adjacent utilities, structures, property, or any other installation located in or adjacent to Work areas. Damaged utilities shall be repaired with similar or better materials of the same size and to the requirements of the utility owner. Have on site the necessary manpower, materials and equipment such as pumps, piping, and the like as required to protect and maintain uninterrupted flows in existing utilities during construction.

B. Excavations shall be kept free from water, snow and ice during construction. Bedding and backfill material shall not be placed in water. Water shall not be allowed to rise upon or flow over bedding and backfill material.

C. Maintain all benchmarks, monuments and other reference points and, if disturbed, shall replace them at no additional cost to the Owner.

D. Excavating equipment shall be of such size and type, and used in a manner, that will not damage existing items such as but not limited to paved surfaces, utilities, structures and/or trees.

E. The finished subgrade shall not be disturbed by traffic or other operations and shall be maintained in a satisfactory condition until the finished surfaces are placed. No pavement materials shall be installed thereon until the Engineer has observed the subgrade is in compliance with this requirement.

F. Take whatever steps necessary to prevent catch basins and drain lines from receiving silt and sediment washed from Project Work areas. Clean out catch basins and drain lines that have not been properly protected.

PART 2 PRODUCTS

2.01 MATERIALS

A. Fill materials, meeting the following requirements, shall be used in the areas shown on the Contract Drawings and/or where specified herein. Fill materials may be obtained from either on-site excavations or from off-site sources as appropriate.

2.02 COMMON FILL

A. Common fill shall be granular material, consisting of hard, sand and gravel with less than thirty-five (35) percent passing the No. 200 sieve, when tested in accordance with ASTM C136 and ASTM C117 and shall be free of organic matter, trash, roots or other deleterious material.

B. Common fill material shall contain no stone measuring greater in any dimension than two-thirds of the loose lift thickness or twelve (12) inches whichever is smaller. Common fill material shall be capable of forming a firm, stable base when spread and compacted. In addition, the common fill shall be non-plastic (plasticity index zero, defined as liquid limit minus plastic limit). Any materials, excavated from the site, not conforming to this common fill specification, shall be legally disposed of and replaced with approved material, as required, at no additional cost to the Owner.

2.03 GRAVEL FILL

A. Gravel fill shall consist of hard, durable gravel and sand, free from trash, organic matter and clay, surface coatings, and other deleterious materials.

B. Gravel fill shall have a maximum stone size of five inches. Gravel fill used for pipe bedding or pavement subbase shall have a maximum stone size of 1.5 inches. Gradation, plasticity, and resistance to abrasion requirements shall be as per State Specifications, Section M.02.06, Gradation C.

2.04 SELECT FILL

A. Select fill shall consist of hard durable sand or sand and gravel, free from trash, organic matter, clay, surface coatings and other deleterious materials.

B. Select fill placed between the mid-height of a pipe and twelve (12) inches above a pipe shall have a maximum stone size of four (4) inches. Select fill used for other purposes shall have a maximum stone size of two thirds of the loose lift thickness and that portion passing the four (4) inch sieve shall meet the following gradation requirements, as determined by ASTM C136 and ASTM C117:

U.S. Sieve Size	Percent Passing
4 inch	100
No. 10	30-100
No. 40	0-70
No. 200	0-15

2.05 CRUSHED STONE

A. Crushed stone shall consist of clean, crushed, non-porous rock, or crushed gravel, uniformly blended.

B. Crushed stone shall meet the gradation requirements of the State Specifications, Section M.01.01, No.6."

2.06 FILTER CLOTH AND STABILIZATION FABRIC

A. Filter cloth shall be Mirafi 140N, Carthage Mills FX-40HS, Amoco 4545 or equal.

B. Stabilization fabric shall be Polyfelt TS700, SUPAC 9NP or equal.

2.07 PROCESSED AGGREGATE BASE

A. Processed aggregate base shall consist of a foundation for bituminous concrete pavement constructed on a compacted gravel subbase in conformity with the lines, grades, compacted thickness and typical details or cross sections indicated on the Contract Documents.

B. All materials for this work shall conform to the requirements of Article M 05.01 of the State Specifications.

PART 3 EXECUTION

3.01 PREPARATION

A. Stripping

1. Prior to any excavation, filling, or grading operations, all topsoil and subsoil or similar organic soils found within the Limit of Work line shall be stripped to their full depth in the area of all structures and in all areas required to be filled, excavated or graded.

2. Stripped materials suitable for re-use as loam shall be stockpiled. Stockpiles shall be kept separate and not mixed with other materials. Excess stripped materials and unsuitable materials shall be legally disposed of off-site unless otherwise specified.

B. Pavement Removal

1. All pavements to be removed shall be cut uniformly along straight lines as shown on the Contract Drawings or as directed.

2. Where excavations are to be made in paved or surface treated areas, the pavement shall be cut with a pavement saw or wheel cutter prior to excavation unless otherwise noted.

3. In areas where the trench width is greater than the original cut, the pavement shall be re-cut prior to paving operations.

4. Care should be exercised during removal of the pavement in order that adjacent areas outside the cut lines will not be damaged.

5. All pavement removed shall be disposed of legally off the project by the Contractor, unless otherwise directed.

3.02 EXCAVATION

A. General

1. Excavation shall consist of the removal of soil, rock, and other materials to the limits shown on the Contract Drawings, specified herein, and as required to provide firm bearing. No structures, pavements, utilities or fill materials of any kind shall be placed in, or upon excavated areas until such areas have been observed by the Engineer.

2. Rippable rock shall be considered earth excavation. Rippable rock is defined as rock which can be excavated using a single tooth hydraulic ripper pulled by a D8 Dozer or equivalent equipment.

3. Excavated materials meeting the requirements for the various fill materials specified herein shall be stockpiled for reuse. Unsuitable or excess suitable materials shall be legally disposed of off-site unless otherwise specified.

4. Excavation shall be to the limits as necessary to install foundations, utilities, pavement or other facilities unless otherwise specified. Excavation of unsuitable material beyond the limits necessary shall only be performed as authorized by the Engineer.

5. The proposed contour lines and spot grades shown on the Contract Drawings are finish elevations. Excavation to subgrade shall be the distance below these elevations as may be required by the size and thickness of pavements, structures, utilities and surface treatments as shown on the Contract Drawings, details and sections, and/or as specified herein.

6. Over-excavation beyond the specified or detailed limits shall be backfilled and properly compacted and at no additional cost to the Owner.

7. No spread foundations shall be founded partially on rock and partially on soil. In this event the rock shall be excavated to a minimum depth of twelve (12) inches below the bottom of foundation and compacted gravel fill placed to the bottom of foundation unless otherwise shown on the Contract Drawings.

8. Excavating equipment shall be of such size and type, and operated in a manner, that will not damage items such as, but not limited to, existing paved surfaces, utilities, structures and trees.

9. Excavate under guy wires, along side of poles, buildings, and other objects as necessary to complete the Work at no additional cost to the Owner. This may require hand excavation. There shall be no special compensation for this Work unless otherwise noted herein. The relocation of utility poles, and the like, shall be done at no additional cost to the Owner.

B. Trench Excavation

1. Trench excavation shall consist of the removal of all materials encountered. Excavations shall be made to accommodate the elevation, depth of cover, or detail shown on the Contract Drawings and/or as specified. Trench widths shall be kept to the minimum practicable but shall be at least three (3) feet wide or two (2) feet plus the diameter of the pipe, whichever is greater. The bottom of the trenches shall be firm and free of water and shall be accurately graded and shaped to allow

placement of required bedding beneath the bottom of all barrels, bells or couplings of all pipes installed.

2. Design criteria require that pipe be laid in trench conditions; therefore trenches for utilities in fill areas shall be excavated after all fill materials have been placed, spread and compacted to an elevation at least twelve (12) inches above the top of the proposed utility. This requirement is necessary to fulfill design criteria and should not be construed as a dictation of means and methods of construction.

3. If, through error, the excavations are carried beyond the specified limits, or if inadequate dewatering causes softening of the subgrade that necessitates removal, backfill shall be with gravel fill, placed and compacted as specified hereinafter under Trench Backfilling. Backfill shall be performed at no additional cost to the Owner.

4. When trenching occurs around trees to remain, the tree roots shall not be cut but rather, the trench shall be tunneled under or around the roots by careful hand digging and without injury to the roots.

C. Foundation Excavation

1. Excavations shall be carried to the grade lines as indicated or as may be required to permit the finished floors or surfaces to be constructed at the proper elevations and on firm bearing materials. This includes excavation for all pipe channels, sumps, or other features which extend below the bottom of foundations or slabs.

D. Excavation in Graded Areas

1. Excavation in graded areas shall be performed as necessary to bring such areas to proper subgrade or finish grade. Subgrade for grass areas shall be a minimum of six (6) inches below finish grade unless otherwise specified.

E. Rock and Boulder Excavation

1. Rock and boulder excavation shall include the excavation, removal and disposal of solid rock and all boulders one (1) cubic yard or more in volume that require blasting or drilling and splitting. Boulders of less than one (1) cubic yard in volume or other materials found in the excavations, however stiff, heavy and compact, including rippable rock, which, in the opinion of the Engineer, can be removed without blasting or drilling and wedging, shall not be considered as rock excavation.

2. Blasts shall be covered to prevent scattering of material and all adjacent property shall be suitably protected. Explosives shall be transported, handled and stored in a safe manner and in compliance with all state and local regulations. Charges shall not be so large as to shake, loosen or endanger adjacent structures or their contents or to do harm to their occupants. Responsibility for damage to persons or property shall rest solely with the Contractor. Only personnel qualified in the use of explosives shall be employed for blasting. Obtain all necessary permits at no additional cost to the Owner.

3. Design blast pattern(s) and use blast control methods to prevent detrimental effects to the rock outside of the excavation limits. All loose, unsound or semidetached rock fragments, as determined by the Engineer, which may be detrimental to the proposed structure or installation shall be removed from the excavation. Excavation beyond the necessary limits, made to remove damaged rock shall be backfilled with compacted gravel fill at no additional cost to the Owner.

4. After blasting, the rock surface at subgrade shall be thoroughly cleaned of all vegetation, soil, excessively broken rock, excessively weathered or decomposed rock, loose fragments, ice, snow, and other objectionable substances. Picking, barring, wedging, streams of water, hammers, and other effective means shall be used as required to accomplish this cleaning. All free water left on the surface of the rock shall be removed. The Engineer shall be notified and provided the opportunity to observe the cleaned rock surface before any masonry, concrete, bedding, or fill is placed on or against the rock.

5. Where boulders are on the sides of or in the bottom of excavations, they shall be wholly or partially removed at a minimum to the limits as specified and/or as determined by the Engineer. In removing boulders lodged in the sides of the excavations, do not disturb or undermine adjacent pavement or structures. Pavement surfaces damaged beyond reasonable limits as determined by the Engineer, shall be repaired at no additional cost to the Owner. In general, boulders or rock fragments that extend under paved surfaces shall be removed by blasting or mechanical splitting.

6. Unauthorized excavations in rock, or excavations made beyond or below the indicated limits shall be refilled and compacted with approved gravel fill at no additional cost to the Owner.

7. Depressions below the required grade resulting from the removal of boulders and rock fragments shall be refilled with compacted gravel fill at no additional cost to the Owner.

8. Pre-drilling through overburden is an acceptable method, however, blasting rock through overburden will not be allowed unless otherwise authorized by the Engineer. Remove the overburden from the rock surface to determine the true configuration of the formation. Blasting operations will not be allowed to commence until the Engineer has verified measurement of the rock surface.

9. Whenever provisions for a future connection are placed in pipelines in rock areas, the rock shall be removed for a distance of at least three feet, horizontally from the end or face of the pipe and in the direction of the future connection and full vertical height.

F. Excavation of Unsuitable Foundation Materials Below Trench Grade and/or Subgrade

1. Existing soils, which are considered unsuitable foundation materials by the Engineer, shall be removed to the limits directed by the Engineer. The lateral limit for the excavation of unsuitable material beneath structures shall be defined as the intersection point, with suitable subgrade material, of an imaginary line drawn downward at a 45 degree angle from the outside edge of the foundation. For pipelines, the horizontal limits are defined as two (2) feet plus the diameter of the pipe or a minimum total width of three (3) feet whichever is larger unless otherwise directed by the Engineer. The horizontal limits are defined as two feet outside the outside face of the manholes or catch basin bases.

2. The exposed subgrade shall be compacted and the area backfilled with gravel fill. The Engineer shall be present during the excavation of all unsuitable soils in order to permit verification of the limits of and volume of material removed.

G. Experimental Excavation

1. Make excavations at locations authorized by the Engineer, for the purpose of confirming the location and depth of existing utilities or structures.

2. Additional experimental excavations may be requested to precisely locate utilities and underground structures that may be affected by the Work. Backfill the experimental excavations with materials meeting the specification for common fill, unless directed otherwise by the Engineer. Backfill of experimental excavation shall be compacted in accordance with the requirements for Trench Backfilling.

3.03 TEMPORARY EARTH SUPPORT

A. Design, furnish, install and maintain temporary earth support systems, as required, to prevent injury to persons, collapse of the sides of the excavation, and damage, disturbance and settlement of adjacent property. Sheeting and bracing shall be of adequate type; size and strength for the conditions encountered and shall be driven to true alignment in a workmanlike manner.

B. Timber sheeting shall be straight and sound and shall be tongue and grooved where groundwater is encountered. Minimum thickness of timber sheeting shall be a nominal three inches.

C. Steel sheeting shall have a minimum thickness of 3/8 inch. Steel sheeting shall be designed for the conditions encountered and shall be driven tight.

D. Sheeting may be either left in place or removed. Sheeting left in place shall be cut off at least one (1) foot above the crown of the pipe. In no case shall the top of sheeting be left in place within five (5) feet of the finished grade.

E. Excavated slopes in rock shall be appropriately laid back or be stabilized by rock bolts or other appropriate means. Loose or semi-detached rock shall be scaled from the rock surface. When necessary, wire mesh or other appropriate means shall be installed to prevent injury to workers from falling rock.

F. If sheeting is utilized, engage an independent Registered Professional Engineer (in the state where the project is located) with experience in the design of temporary earth support to evaluate his methods of excavation and provide guidance regarding proper slopes and to design or provide guidance of temporary earth support during construction. Submit a notarized letter to the Engineer certifying conformance to the above requirements, before the start of any construction (Refer to attached sample form).

3.04 CONTROL OF WATER

A. Evaluate the impact of the anticipated subsurface soil and groundwater conditions on proposed method of excavation and dewatering and other operations. If subsurface conditions so dictate, provide wells, wellpoints, pumps, or any other facilities to control groundwater and surface water in order to permit Work to be performed under dry and stable conditions. Provide any facilities required to remove subsurface water from the construction area in advance of excavation. Dewatering shall continue until all Work below groundwater level has been completed or otherwise stabilized against uplift or other disturbance. Pumping shall be continuous where required to protect the Work and to maintain satisfactory progress. All dewatering wells shall be backfilled upon completion of the Work.

B. Control all surface water within the Work area. Excavations shall be protected from flooding by surface water by use of berms, ditches or other appropriate means.

C. Pay special attention to areas where difficult soil and groundwater conditions are anticipated and evaluate the subsurface conditions in these areas from the geotechnical data provided in the Contract Document or by other means.

D. All pipeline(s) and structures not stable against uplift during construction or prior to completion of installation shall be thoroughly braced or otherwise protected.

E. Dewater in a manner that does not cause loss of ground or disturbance to the bearing soil or soil supporting adjacent structures.

3.05 STRUCTURAL AND EMBANKMENT FILLS

A. General

1. Unless otherwise specified or shown, all fill placed beneath structures shall meet the material, placement, and compaction specifications for Gravel Fill. In fill areas, the "limits of a structure" are defined by the same criteria used for the excavation of unsuitable foundation material below subgrade included under the excavation paragraphs of these specifications.

2. Unless otherwise specified or shown, all embankment fill material obtained from on-site sources shall meet the material, placement, and compaction requirements for Common Fill. When embankment fill material is obtained from off-site borrow sources, it shall meet the material, placement, and compaction requirements for Select Fill.

B. Subgrade Preparation

1. After completion of the necessary excavation and/or stripping operations, the surface shall be smoothed to present a surface free of ruts, holes, sharp ridges, or other uneven features. The surface shall be graded to prevent ponding of surface waters within the subgrade area, and shall include the installation of suitable ditches and sumps where necessary.

2. The entire subgrade shall be compacted to reconsolidate to its original density all soil material loosened during the excavation, stripping, and smoothing operations.

3. Should any area of the subgrade become disturbed the disturbed soil shall be removed and replaced with gravel fill and compacted as specified herein.

4. No fill or concrete shall be placed until the Engineer has observed the surface against which it is to be placed.

C. Fill Placement

1. Fill shall be placed to the lines and grades for each class of material shown on the Contract Drawings and/or as specified herein. In general, the deepest fills shall be made first.

2. Fill materials shall be spread in approximately flat layers (horizontal or sloped as required) in such a manner as to obtain layers of relatively uniform thickness without spaces between successively deposited loads. Placing and spreading shall be done in such a manner as to prevent segregation.

3. Fill shall be placed in lifts and in a systematic manner that will provide uniformity throughout the full fill thickness. The maximum loose lift thickness shall be consistent with the size and type of compaction equipment being used.

4. If the surface becomes rutted or uneven subsequent to compaction, it shall be flattened and leveled before placing the next layer of material. Hauling equipment shall be routed across the fill in such a way as to prevent the formation of ruts or lanes in the compacted fill.

5. No fill shall be placed on a frozen subgrade, nor shall any frozen fill material be used.

D. Compaction

1. Each lift shall be compacted to achieve a minimum of ninety-nine (99) percent of the maximum density as defined by ASTM D1557 for Gravel Fill and ninety (90) percent for Select Fill and Common Fill.

2. Common fill shall be placed at a water content between three (3) percentage points below and two (2) percentage points above the optimum water content determined by ASTM D1557.

E. Maintenance of Fill Surface

1. The surface of the fill shall at all times be kept reasonably smooth and free from humps or hollows. The fill surface shall be pitched in order to ensure drainage during periods of wet weather.

2. Upon suspension of filling operations for any period in excess of twenty-four (24) hours or in wet weather, the surface of the fill shall be rolled smooth to seal it against excessive absorption of moisture and to facilitate runoff. During the suspension of fill operations, every effort shall be made to protect the compacted fill surface to minimize erosion.

3. If placement of fill material is suspended in a freezing weather conditions or anticipated frost conditions, the compacted fill surface shall receive, before suspending operation, at least four (4) inches of fill material (loose measure). The four (4) inches of loose material shall be removed prior to placing a new lift and compaction.

4. Fill operations shall be suspended during periods of extended wet weather if the material is too wet to be compacted properly. Upon resuming operations, all fill materials that are excessively wet or soft shall be removed from the fill and either stockpiled for reprocessing or disposed of off site. The removal of wet or soft material shall be carried to such depth as is necessary to expose firm materials.

5. Under no circumstances shall ice, snow, or frozen material be incorporated in the fill. In the event that the fill surface becomes frozen during construction, all frozen materials shall be excavated from the fill and wasted before additional material is placed.

3.06 PIPE BEDDING AND TRENCH BACKFILLING

A. General

1. The requirements for pipe bedding and trench backfilling shall be as specified and/or as shown on the Contract Drawings.

2. Pipe and/or structures shall be placed on specified bedding materials, to provide uniform support and a stable foundation for the pipeline(s) or structure(s) and backfill material. No bedding shall be placed on unstable subgrade soils. An unstable subgrade is defined as a condition of running sand, running silt, quick bottom, or otherwise soft, soupy or spongy bottom. If an unstable condition exists, or develops during the excavation, excavate, dewater and stabilize the subgrade to the extent necessary to provide a firm stable foundation prior to placing bedding, pipe and/or structures.

3. The height of fill adjacent to structures and pipelines shall be increased at approximately the same rate on all sides to prevent displacement.

B. Trench Bedding

1. Pipeline(s) and appurtenant items of Work shall be laid in the bedding material, from the bottom of the excavation to the mid-diameter of the pipe, for the full width of trench. Bedding material shall be compacted to a minimum density of ninety-five (95) percent of the maximum density as determined by ASTM D1557 (Modified Proctor) and shall meet the requirements for gravel fill or crushed stone.

2. The type and thickness of bedding material shall be adjusted based on field conditions, as follows:

   a. Gravel fill or crushed stone bedding material shall be placed to a depth of 6 inches below the pipe as shown on the Contract Drawings and compacted to the mid-diameter of the pipe as specified hereinbefore."

   b. The excavation shall be made to a depth of six (6) inches below the bottom of pipe for placement of bedding material.

   c. Where the bottom of the trench excavation is below the groundwater level and pumping of water is done from within the excavation, utilize a bedding system which provides a stable working surface which limits the disturbance of the subgrade and prevents migration or washing of fine soils from the subgrade due to the flow of water into the trench.

3. Excavation beyond the required limits shall be backfilled with compacted gravel fill at no additional cost to the Owner. Gravel Fill used to replace unsuitable material or unauthorized excavation shall be compacted to a minimum density of ninety-two (92) percent of the maximum density determined by ASTM D1557, (Modified Proctor).

4. If crushed stone is used as bedding material, a twelve (12) inch wide impermeable clay cutoff barrier ("Control Dam") shall be constructed, as specified and/or as shown on the Contract Drawings, across the trench from the bottom of the excavation to the mid-diameter of the pipe every three hundred (300) feet, or as otherwise directed by the Engineer, to prevent groundwater from flowing unimpeded along the pipe trench, through the crushed stone. No more than six (6) inches of crushed stone bedding shall be placed beneath the bottom of any pipe and/or structure.

C. Trench Backfilling

1. Backfill materials, meeting the requirements for Select Fill, shall be placed above the mid diameter of the pipe to twelve (12) inches above the pipe. The Select Fill backfill shall be compacted to a density of at least ninety-two (92) percent of the maximum density as determined by ASTM D1557 (Modified Proctor).

2. Backfill materials placed from twelve (12) inches above the pipe to the bottom of the roadway base course in paved areas or to the bottom of loam shall meet the requirements for Common backfill. Fill shall be placed and compacted so that a density of at least ninety (90) percent of the maximum density is achieved as determined by ASTM D1557 (Modified Proctor). Select equipment and establish procedures consistent with the backfill materials being used to achieve the required density. Backfill materials with more than fifteen (15) percent passing the No. 200 sieve shall be placed at a moisture content between two (2) percent dry and three (3) percent wet of the optimum moisture content as determined by ASTM D1557.

3. Puddling or jetting of the backfill materials may be utilized, however, any water used for puddling or jetting shall be secured in sufficient quantity and pressure to obtain the required result and shall be provided at no additional cost to the Owner.

4. All settlement of trench backfill shall be repaired at no additional cost to the Owner. All repairs shall be made with materials meeting the requirements of the specifications compacted as specified.

5. After trenches have been backfilled as specified, all surplus material shall be removed and legally disposed of at no additional cost to the Owner. The removal of surplus material and clean up of trench surfaces shall closely follow the pipe laying Work.

6. Where hardened surfaces or roadways, driveways, or walls are disturbed, special attention shall be given to backfilling and compaction prior to resurfacing.

3.07 SOIL TESTING

A. General

1. Three (3) types of soil tests shall be performed by a soil testing laboratory furnished by the Contractor. The type of test, timing and frequency are described below.

2. The performance of these tests does not relieve the responsibility to control operations and perform tests as necessary to assure that the Work performed meets the requirements of the specifications.

3. Sieve analysis tests for initial approval of fill materials from borrow sources shall be performed by an independent testing laboratory at no additional cost to the Owner. Such testing is considered incidental to the Work and will not be measured and paid for separately by the Owner.

B. Sieve Analysis Tests

1. Sieve analysis tests shall be performed on a minimum of one (1) random sample for each type of fill being placed on site. Additional tests shall be performed on samples obtained from the fill when it is suspected that the material does not meet specifications. Tests shall also be performed when it is noted that the gradation of material actually being placed differs significantly from the documented gradation from a particular source.

2. Sieve analysis will be performed in accordance with ASTM C136 and ASTM C117.

C. In-Place Density Tests

1. The Engineer will determine the location, number and timing of In Place Density tests. The Engineer will coordinate the testing with the Work schedule.

2. In general, at least one (1) test shall be performed for each three hundred (300) feet of pipeline installed. Structural and embankment fills shall be tested at least once for each five hundred (500) cubic yards of fill placed. For structures and embankments, a minimum of four (4) tests shall be performed during each of two (2) separate visits by the testing laboratory.

3. Tests shall be performed in accordance with ASTM D1556, ASTM D2167, or ASTM D2922.

D. Moisture Density Relationship Test

1. Moisture Density Relationship Tests (Proctor Tests) shall be performed in conjunction with In-Place Density Tests for each different fill material tested.

2. Tests shall be performed in accordance with ASTM D1557.

3.08 GRADING

A. General

1. The areas to be graded shall be raked or machine-graded to remove stones and other unsatisfactory material and then shall be compacted as specified. Any depressions which occur during the compaction operation shall be filled with additional suitable material and the surface then regraded and compacted until true to line and grade as required.

2. The Work includes all grading required including shaping, trimming, compacting and finishing of the surfaces. The grading of shoulders and sloped areas may be done by machine methods. Up to two (2) inches in ten (10) foot tolerance will be permitted on slopes over two (2) percent, and one (1) inch in ten (10) foot on slopes under two (2) percent provided the slopes are uniform in appearance and without abrupt changes. All ruts shall be eliminated. The maximum deviation from finished grade shall be plus or minus one (1) inch.

3. Grading of subgrades for paved areas shall be finished at the required depth below and parallel to the proposed surface with one-half (1/2) inch in ten (10) foot tolerance.

4. Stones larger than four (4) inches in largest dimension shall not be present in the upper six (6) inches of fill. Grading operations shall be completed after the buildings have been finished, the utilities installed, the site improvements constructed, and all materials, rubbish and debris removed from the site.

B. Finish Grades

1. Finish grades shall be as shown on the Contract Drawings, unless otherwise specified. Excavations and fills shall be carried to proper subgrade levels below finish grades and contours shown, to allow for finish Work.

2. The subgrade for areas on which pavement is to be placed shall be finished to the required depth below and parallel to the proposed pavement surface, after all pipeline(s) located in paved areas are in place and have been successfully tested.

3. The grading of the slopes and other areas to be loamed may be done by machine methods and a tolerance will be permitted in slopes as specified above, provided the slopes are uniform in appearance and without abrupt changes.

3.10 CLEAN-UP

A. Where hardened surfaces or roadways, driveways, or walls are disturbed, special attention shall be given to backfilling and compaction prior to resurfacing. This shall be done and redone as many times as necessary to ensure that the Project is safe at all times and to give the required result.

B. Provide street sweeping as necessary to reduce dust, siltation, nuisance problems, and to provide safe passage for vehicular and pedestrian traffic.

END OF TEXT

SEE ATTACHED FORMS

1. Temporary Earth Support Certification

Date: _____

To: _____
_____
_____
_____
_____

Subject: Owner Name: _____
Project Name: _____
Contract No.: _____
Temporary Earth Support Certification

Dear _____:

I hereby certify that I have reviewed the methods for Temporary Earth Support proposed by the following contractor for the above referenced project:

Name: _____
Address: _____
_____
_____

I have experience in the design of temporary earth support and have evaluated the proposed methods of excavation and have provided guidance regarding proper slopes. The following is a description of the proposed methods to be used during construction:

_____
_____
_____
_____

If you have any questions or comments concerning the information provided, please contact our office.

Very truly yours,

_____
SIGNATURE of REGISTERED PROFESSIONAL ENGINEER

_____ _____
NAME of REGISTERED PROFESSIONAL ENGINEER ENGINEER's STAMP
(Signed and Dated)

SECTION 02485

LOAMING AND SEEDING

PART 1 GENERAL

1.01 SCOPE

A. The work of this section includes the furnishing of all labor, materials, tools and equipment required to furnish and install loam and seeding and/or sod in the unpaved areas disturbed by the Contractor's operations and work, or any cross-country or lawn areas disturbed by the Contractor's operations during the course of construction.

1.02 SUBMITTALS

A. Shop Drawings and/or brochures shall be submitted for all items to be furnished in accordance with the provisions of the DOCUMENT 00700, GENERAL CONDITIONS.

B. Submittals required under this section include, but are not limited to the following:

1. Soil test results and recommendations for liming and fertilizing shall be submitted to the Engineer at least 45 days prior to loaming operations.

2. Certification of variety, proportions and percent germination of species in the seed mixture and percentage of crop seeds, weed seeds, noxious weeds and inert matter shall be submitted to the Engineer at least 45 days prior to loaming and seeding operations.

3. Brochures and samples for woven jute mesh netting and erosion control blanket.

4. The source and location of the sod shall be submitted to the Engineer at least 45 days prior to sodding.

1.03 SEASONS FOR PLANTING

A. Seeding shall take place as soon as possible after each loam area has been prepared, in accordance with the recommendations of the seed supplier relating to the site conditions and region where seeding is to be done. Seeding shall be prohibited during windy or inclement weather, or in frozen or muddy ground; in general, conditions for seeding shall meet with the approval of the Engineer. This does not relieve the Contractor of the responsibility of providing a growth that is full and healthy, in the opinion of the Engineer.

PART 2 MATERIALS

2.01 LOAM

A. Testing

1. All loam used in the work of this section of the specifications will be tested and approved for use by the Engineer prior to being spread. Stripped material may be used if approved in accordance with the following requirements. Approved material shall be stockpiled so as not to interfere with the other work and other subgrade or fill materials.

2. All testing shall be done by an independent test laboratory approved by the Engineer. The Contractor shall provide the laboratory with representative soil samples for testing and send test reports directly to the Engineer.

3. Loam shall be tested for the following: pH, buffer pH, soluble salts (expressed in millimhos), available Nitrogen, Phosphorous, exchangeable Potassium, Magnesium,

Calcium and Sodium, Cation Exchange Capacity, percent H base saturation, percent Ca base saturation, percent M base saturation, and available Zinc, Manganese, Copper, Iron, humus content and soil type. All nutrient results shall be expressed in parts per million (ppm).

4. Test reports shall also contain specific recommendations as to the exact types and times and rates of application of soil additives and fertilizers based upon the soil test results. These recommendations shall be followed during lawn construction. All Contractors shall note that any and all materials and procedures, with respect to soil additives and fertilizers, contained herein are approximate and are given to assist bidding and that they will be adjusted to comply with test reports.

B. Loam shall be a "fine sandy loam", or a "sandy loam" determined by mechanical analysis and based on the "U.S.D.A. Classification System". It shall be of uniform composition, without mixture of subsoil. It shall be free of stones, lumps, plants and their roots, debris and other extraneous matter over 1 1/2 inches in diameter or excess quantities of smaller pieces of the same materials as determined by the Engineer. It shall not contain toxic substances harmful to plant growth. It shall be obtained from naturally well drained areas which have never been stripped before.

C. No more than 10 percent of loam shall be clay, with organic matter comprising not less than 4 percent, nor more than 20 percent of the total weight per load.

D. Loam shall not be delivered or worked in a frozen or muddy condition.

E. Soluble salts shall not be higher than 75 parts per million.

2.02 LIME

A. Limestone shall be standard commercial ground limestone and shall be applied at a rate to be determined by the Engineer subsequent to the testing of loam; however, the rate shall not exceed 4,000 pounds per acre. Limestone shall not be installed during windy or inclement weather. Limestone in hydro-seeding operations shall be restricted in building areas. Any buildings or structures discolored or damaged from limestone spray shall be the Contractor's responsibility.

B. The Contractor shall take whatever precautions are deemed necessary to prevent damage by distribution of limestone. Any damage incurred by the Contractor's negligence shall be repaired at no additional cost to the project.

2.03 COMMERCIAL FERTILIZER

A. Commercial fertilizer shall be a standard dry granular mixture, delivered in the manufacturer's containers and containing a guaranteed analysis by weight of Nitrogen, Phosphorous and Potash, applied at the rate to be determined by testing.

2.04 SEED

A. Seed shall be fresh, clean, new crop seed. Seed shall be delivered to the work site with each container bearing the dealer's guaranteed analysis. Seed mixes shall be composed substantially as follows with less than 1.5 percent inert matter, not more than one percent crop seed content, and no noxious weed seeds. Seed shall be spread at rates indicated after each mixture.

B. Mowable Grass Seed Mixture (4 pounds/1,000 square feet)

1. Mowable grass seed mixture shall conform to seed mixture of State of Connecticut Department of Transportation Standard Specifications Section M13.04.

C. Wildflower Seed Mixture (34 pounds/acre)

1. Wildflower seed mixture shall be eight pounds of Loft's "Pinto" Wildflower Mix, mixed with 26 pounds sheep or hard fescue per acre of seeding.

2. Northeast Mixture by Applewood Seed Co., Arvada, Co., or Northeastern U.S. Wild Flowers by Environmental Seed Producers, Inc., El Monte, CA will be considered at double the manufacturer's recommended rate of application, mixed with sheep or hard fescue as specified above.

D. All topsoil stockpiles shall be stabilized by seeding with annual ryegrass at the rate specified for mowable grass seed mixture. Stockpiles shall be reseeded as necessary to maintain good cover for enrichment and to prevent erosion.

2.05 WOVEN JUTE MESH NETTING

A. Woven jute mesh netting shall be "Ludlow Soil Saver", as manufactured by the Ludlow Corp., Needham Heights, Massachusetts, or an equal manufactured by Advance Netting Company, Lodi, New Jersey, or "Jute - Net" by Bemis, Inc., St. Louis, Missouri, and shall be placed on all slopes greater than 3 to 1, and all slopes 3 to 1 which are higher than 10 feet. Woven Jute Mesh Netting will only be required for the protection of mowable grassed areas or in any other areas where erosion is a problem.

2.06 STRAW OR HAY

A. Straw or hay for erosion control and moisture retention shall consist of stems or stalks after threshing. Hay shall consist of a mowed, properly cured grass, clover or other acceptable plant. Straw or hay shall be kept in place by stakes, netting, pins or liquid coatings as may be required and as approved by the Engineer.

PART 3 EXECUTION

3.01 SEEDING OPERATIONS

A. Personnel for lawn work shall be familiar with lawn construction and shall be under the constant supervision of a qualified foreman.

B. Preparation for Seeding

1. Preparation of Subgrade. After the Engineer has accepted the subgrade, the Contractor shall do whatever additional grading is necessary to bring the subgrade to a true smooth slope, parallel to finish grade or to the level of adjacent existing loam areas. Subgrade depth for Lawn Areas shall be 6 inches while Subgrade depth for Cross Country Areas shall be 4 inches.

2. The top 3 inches of the subgrade immediately prior to being covered with loam shall be raked or otherwise loosened and shall be free from stones, rock and other foreign materials 3 inches or greater in dimension.

3. Sufficient grade stakes as determined by the Engineer shall be provided to insure correct line and grade of subgrade and of finished grade.

4. Subgrade shall be inspected and approved by Engineer before placing of loam.

5. Loam shall be as specified above, and shall be placed and spread over approved areas to a sufficient depth so that after natural settlement and light rolling for lawn areas, the completed work will conform to the lines, grades and elevations indicated.

6. Finish grading. After loam has been spread, it shall be prepared by scarifying or harrowing and hand raking. All large stiff clods, lumps, brush, roots, stumps, litter and other foreign matter, and stones over 1 inch in diameter shall be removed from the loam which shall also be free of smaller stones in excessive quantities.

7. The surface for lawn areas shall then be rolled with a hand roller weighing not more than 100 pounds per foot of width.

8. During the rolling, all depressions caused by settlement of rolling shall be filled with additional loam and the surface shall be regraded and rolled until presenting a smooth and even finish to the required grade.

9. Subsequent to or during raking of the loam and at least 4 days prior to seeding, lime shall be applied and raked into the soil over all loam areas.

10. After the lime has been applied and worked into the loam, the entire area shall receive an application of commercial fertilizer. Fertilizer shall be spread in advance of seeding by approved mechanical spreading devices and lightly taken into the top of the soil.

C. Placement of Seed

1. Seed shall be spread at least 4 days after fertilization of the soil by an approved mechanical method and at the rate of 5 pounds per thousand square feet or as noted with seed mix. Seed shall be lightly raked into the soil to a depth of approximately 1/8 inch and no greater than 1/4 inch and the entire seeded area shall be rolled with a lightweight roller.

2. Seeding shall not be done during windy weather.

3. For lawn areas, seeding shall be done in 3 directions, 2 at right angles to each other, and one diagonally.

4. Culti-packer or approved similar equipment may be used to cover the seed and to form the seed bed in one operation. Due to the small size of the seed in the cross-country mix, the Contractor shall increase the bulk prior to seeding by the addition and thorough mixing of sand, Milorganite or other approved materials.

5. Immediately after seeding, all seeded areas shall be watered to a depth of approximately 4 inches and shall be covered with a loose, uniform layer of straw or hay.

3.02 INSTALLATION OF MESH NETTING

A. Mesh netting shall be installed in accordance with accepted practices and the manufacturer's instructions and recommendations by personnel experienced with similar installations. All products and/or fastenings shall be as supplied by or recommended by the manufacturer, subject to approval by the Engineer.

B. Netting shall lay loose on the grade and shall not be stretched or tightened in any direction. The netting shall conform naturally to the contour and grade of the proposed topography.

C. Anchor slots, butts with structures, walls, curbs, etc., side and junction overlaps and terminal folds shall be made and fastened in accordance with the manufacturer's recommendations or as directed by the Engineer.

3.03 MAINTENANCE AND PROTECTION

A. Maintenance shall begin immediately after each portion of the lawn is installed.

B. Lawns shall be maintained for at least 60 days or as much longer as necessary to establish a uniform stand of the specified grasses.

C. Maintenance and protection of seeded areas shall consist of temporary protective fences, barriers, signs, watering, weeding, cutting, and reseeding as necessary, as well as maintaining the straw or mesh cover in a uniform layer.

D. The surface layer of soil shall be kept damp at all times during the germination period. In the absence of adequate rainfall, watering shall be performed two or three times daily or as often as necessary during the germination period and in sufficient quantities to maintain moist soil to a depth of at least 4 inches. Watering shall be done during the heat of the day to prevent the soil from drying out.

E. After first cutting, watering shall be once per week as necessary to supplement natural rain, to the equivalent of 1 inch per week, or to 4 inches in depth. Weekly inspection shall be made to determine the moisture content of the soil and the approved schedule shall be adjusted to fit conditions.

F. At the time of the first cutting, when grass is 4 inches high, mower blades shall be set at 2-l/2 inches high. In subsequent mowings, lawn areas shall be cut to a 2-l/2 inches height with not more than 40 percent of the grass leaf being removed. Naturalized seed mixture shall be cut only once per year during dormant periods as recommended by the manufacturer.

G. All clippings shall be removed after each mowing. Mowing shall be done only in dry weather.

H. The Contractor shall be responsible for providing a second application of commercial fertilizer should lawn work not be accepted within a 90-day period following the first application of fertilizer.

I. Excessive weeds shall be removed by methods approved by the Engineer.

J. The Contractor shall, at his own expense, repair bare spots and/or damage resulting from erosion, gulleys, washouts, or other causes by filling with topsoil and reseeding.

K. In the event that lawn operations are completed too late in the fall for adequate germination and/or growth of grass, maintenance shall continue into the following spring.

3.04 INSPECTION AND ACCEPTANCE

A. The Engineer will inspect the seeded areas upon written request by the Contractor. The request shall be received at least 10 days before the anticipated date of inspection.

B. Inspection and acceptance of seeded areas may be requested and granted in part, provided the area for which acceptance is requested is relatively substantial in size and reasonably regular in shape with clearly definable boundaries.

C. An acceptable seeded area shall be one that has a dense, uniform stand of the specified species. It shall be free of ruts, gullies, bare spots, and the grass areas shall be healthy and free of weeds.

D. Upon acceptance of the work, the Contractor shall be relieved of further responsibility for care or maintenance of accepted lawns.

3.05 DAMAGE AFTER ACCEPTANCE

A. Any lawns damaged after final acceptance of seeded areas and before project acceptance shall be repaired, reseeded, and maintained as specified above with an inspection and formal acceptance required.

3.06 CLEANING UP

A. When any of this work is done while buildings are occupied, pavements shall be kept clear at all times, and broomed clean to prevent tracking dirt into buildings.

B. After completion of all landscaping work, all debris and excess material shall be disposed of to the satisfaction of the Engineer. All pavements shall be broomed and hosed clean.

END OF SECTION

SECTION 02503

BITUMINOUS CONCRETE PAVEMENT

PART 1 GENERAL

1.01 SCOPE

A. The work covered by this section of the specifications includes furnishing all labor, equipment, tools, and materials, and in performing all operations in connection with roadway pavement overlay, and the replacement of existing paved surfaces, tack coat, and all incidental work pertaining thereto as indicated on the drawings and as specified herein.

1.02 SUBMITTALS

A. Shop drawings and material reports shall be submitted for all items to be furnished in accordance with the provisions of DOCUMENT 00700, GENERAL CONDITIONS.

B. Submittals required under this section include, but are not limited to the following:

1. Material reports for bituminous concrete pavement job mix formula and tack coat.

1.03 PRODUCT HANDLING - NOT USED

1.04 ENVIRONMENTAL CONDITIONS

A. Permanent paving shall be placed only when the underlying surface is dry, when the atmospheric temperature in the shade is above 40 degrees F, and when the weather is not foggy or rainy, provided, however, that the Engineer may permit, in case of sudden rain, the placing of mixture then in transit from the plant, if laid at proper temperature and if the roadbed is free from pools of water. Such permission shall in no way relax the requirements for quality of the pavement and smoothness of surface.

B. No material shall be laid upon a frozen base course or when wind conditions are such that rapid cooling will prevent satisfactory compaction. No load shall be sent out so late in the day that spreading and compaction cannot be completed during daylight.

PART 2 PRODUCTS

2.01 GENERAL

A. All materials shall conform to the requirements of "State of Connecticut Department of Transportation Standard Specification for Roads and Bridges", latest edition as last amended (hereinafter referred to as the "State Specifications") and as specified herein.

2.02 CALCIUM CHLORIDE

A. Calcium Chloride shall conform to the requirements of Section 9.42 of the State Specifications.

2.03 BASE COURSE

A. Gravel base course shall conform to the requirements of Section M.02.06, Grading "B" of the State Specifications. The maximum size of stone in the gravel shall be 3 inches.

B. Processed aggregate base course shall conform to the requirements of Section M.05.01 with no reclaimed materials, Item No. 67 of the State Specifications.

2.04 BITUMINOUS CONCRETE PAVEMENT

A. The binder and top courses for bituminous concrete pavement shall conform to the requirements of Section M.04 of the State Specifications.

B. The general composition limits of materials, which makes up the Job Mix Formula, shall conform to columns entitled "SO.375 and S1" as listed in Section M.04.03 of the State Specifications. No bituminous concrete pavement shall be placed until the Engineer approves the job mix formula.

2.05 BITUMINOUS CONCRETE FOR TEMPORARY SURFACING

A. Hot mixed bituminous concrete shall be as specified hereinbefore for binder course or top course unless otherwise authorized by the Engineer.

B. Cold mixed bituminous concrete shall be a suitable type as approved by the Engineer. Cold mix may only be used when hot mixed bituminous concrete is not available and when authorized by the Engineer.

2.06 TACK COAT

A. Tack Coat shall conform to the requirements of Section M.05.02 of the State Specifications.

PART 3 EXECUTION

3.01 DUST CONTROL

A. Calcium chloride shall be applied to control dust. No calcium chloride will be allowed where runoff will enter water bodies or wetlands.

B. Calcium chloride shall be uniformly applied at the rate of 1-1/2 pounds per square yard.

3.02 PREPARATIONS FOR BITUMINOUS CONCRETE PAVING

A. Subgrade Preparation

1. All trenches shall be backfilled and compacted as required under the SECTION 02220, EARTHWORK. The edges of all pavements along the line of the trench shall be cut back from exposed edges thereof, a sufficient distance to form a clean, sharp straight edge essentially parallel to the centerline of the trench. The minimum lateral cut back to be allowed will be 12 inches. Cut back pavement shall be carefully removed to minimize any disturbance to foundation materials. The exposed surface of the foundation material shall then be rolled, wetting the surface as necessary to obtain a firm, even surface. Any depressions or uneven areas shall be regraded and re-rolled until the surface is smooth and satisfactorily compacted.

2. All surfaces to receive pavements shall be examined by the paving subcontractor to see that they are in proper condition to receive paving. Starting work in any area shall constitute acceptance of that surface. Sub-grade shall be maintained in satisfactory condition and properly drained until surface improvement is placed. All defects resulting from use of unaccepted surfaces shall be corrected by the Contractor at no additional expense to the Owner.

B. The Contractor shall raise all Owner drain and sewer manhole frames and covers, catch basin frames and grates and gate boxes to the established grades before paving is applied.

C. Prior to submitting his bid, the Contractor shall contact the other utilities so as to gain their requirements concerning any possible adjustment of gate boxes and other such structures.

If the utility wishes the Contractor to raise these boxes it shall be in accordance with the utilities requirements. If the utility wishes to adjust their own gate boxes the Contractor shall give the utility adequate notice of his paving schedule.

3.03 GRAVEL BASE COURSE

A. Construction requirements for gravel base course shall conform to the requirements for gravel fill in SECTION 02220, EARTHWORK.

B. Material as previously specified shall be placed and compacted to the required thickness for the particular application. The moisture content of material may have to be adjusted to obtain the specified compaction. Refer to the SECTION 02220, EARTHWORK for specific compaction requirements. After compaction, all base course for pavements shall be as indicated on the drawings.

3.04 BITUMINOUS CONCRETE PAVEMENT

A. Construction requirements for bituminous concrete pavement shall conform to Section 4.06 of the State Specifications.

B. Material for proposed bituminous concrete roadway shall be spread on the prepared gravel base course in 2 courses in the compacted thickness indicated on the drawings. If there has been an appreciable lag in time between installing bituminous concrete courses, or if the binder course has been used extensively during construction, the Engineer shall determine whether tack coat and/or cleaning will be required.

C. In areas indicated for proposed bituminous concrete resurfacing, the Contractor shall thoroughly clean and repair the existing pavement to the satisfaction of the Engineer. Upon securing approval, the Contractor shall apply a tack coat as specified and shall place a bituminous concrete mix to a minimum depth as shown on the Contract Drawings in an approved manner.

END OF SECTION

SECTION 02615

DUCTILE IRON PIPE AND FITTINGS

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Provide and test ductile iron pipe, fittings and appurtenances as indicated and in compliance with Contract Documents.

B. Options:

1. For buried exterior pipelines provide push-on joint pipe.

a. Provide push-on pipe as specified unless indicated otherwise

b. Provide either restrained push-on joint fittings as specified and where indicated or provide mechanical joint fittings with restraint system as specified herein

2. For piping exposed, provide flanged or rigid-joint, grooved-coupled pipe and fittings.

3. Cast iron pipe and fittings are not acceptable.

1.02 REFERENCES”

A. American Society of Mechanical Engineers (AMSE):

1. B16.1: Cast-Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250, and 800.

2. B16.21: Nonmetallic Flat Gaskets for Pipe Flanges.

3. B16.42: Ductile Iron Pipe Flanges and Flanged Fittings.

4. B31.1: Power Piping.

B. ASTM International (ASTM):

1. A240: Specification for Heat Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet and Strip for Pressure Vessels.

2. A307: Carbon Steel Bolts and Studs, 60,000 psi Tensile.

3. A380: Standard Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment and Systems.

4. A530: Specification for General Requirements for Specialized Carbon and Alloy Steel Pipe.

5. A774: Specification for As-Welded Wrought Austenitic Stainless Steel Fittings for General Corrosive Service at Low and Moderate Temperatures.

6. A778: Specification for Welded, Unannealed Austenitic Stainless Steel Tubular Products.

C. American Water Works Association (AWWA):

1. A21.4: Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.

2. A21.10: Ductile-Iron and Gray-Iron Fittings, 3 in. through 48 in., for Water and Other Liquids.

3. A21.11: Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe Fittings.

4. A21.15: Flanged Ductile-Iron Pipe with Threaded Flanges.

5. A21.50: Thickness Design of Ductile-Iron Pipe.

6. A21.51: Ductile-Iron Pipe, Centrifugally Cast in Metal Molds, or Sand-Lined Molds, for Water or Other Liquids.

7. A21.53: Ductile-Iron Compact Fittings, 3-in through 16-in. for Water and Other Liquids.

8. C105/A21.5: Polyethylene Encasement for Ductile Iron Pipe Systems.

D. ISO:

1. 8179-1: Ductile Iron Pipes – External Zinc-Based Coating – Part 1: Metallic zinc with finishing layer. Second edition 2004-06-01.

E. Fluid Sealing Association: Technical Handbook.

1.03 SUBMITTALS:

A. Submit the following in accordance with Section 01300:

1. Pipe manufacturer’s technical specification and product data.

2. Certified shop and erection drawings. Contractor shall submit electronic files of the piping layout including the following.

a. Pipe layouts in full detail.

b. Location of hangers and supports.

c. Location and type of anchors.

d. Location of couplings and expansion joints.

e. 1/2-inch = 1 foot-0 inch (1 mm = 25 mm) scale details of all wall penetrations and special fittings.

f. Schedules of pipe, fittings, special castings, couplings, expansion joints and other appurtenances.

3. Certificates: Sworn certificates in duplicate showing compliance with material used and shop tests performed.

4. Catalog cuts and technical data for expansion joints, couplings, gaskets, pipe supports and other accessories.

5. Brochures and technical data on coatings and linings and proposed method of application.

6. Manufacturer's descriptive literature and technical data on insulation and proposed method of installation.

B. Material Certification:

1. Provide certification from the pipe and fittings manufacturer that the materials of construction specified are recommended and designed for the service conditions specified and indicated. If materials other than those specified are proposed based on incompatibility with the service conditions, provide technical data and certification that the proposed materials are recommended and designed for the service conditions specified and indicated including an installation list of a minimum of five (5) installations in operation for a minimum of five (5) years. Provide proposed materials at no additional cost to the Owner.

2. Where materials are not specified, provide technical data and certification that the proposed materials are recommended and designed for the service conditions specified and indicated.

C. A copy of the contract mechanical process, civil and structural drawings, with addenda that are applicable to the equipment specified in this section, marked to show all changes necessary for the equipment proposed for this specification section. If no changes are required, mark all drawings with “No changes required” or provide a statement that no changes are required.

1. Failure to include all drawings or a statement applicable to the equipment specified in this section will result in submittal return without review until a complete package is submitted.

2. A copy of this specification section with addenda and all referenced specification sections with addenda, with each paragraph check-marked to indicate specification compliance or marked and indexed to indicate requested deviations and clarifications from the specified requirements.

   a. If deviations and clarifications from the specifications are indicated, therefore requested by the Contractor, provide a detailed written justification for each deviation and clarification.

   b. Failure to include a copy of the marked-up specification sections and or the detailed justifications for any requested deviation or clarification will result in submittal return without review until marked up specifications and justifications are submitted in a complete package.

1.04 QUALITY ASSURANCE:

A. Provide in accordance with Section 01400 and as specified.

B. Provide manufacturer's certification in writing, that materials meet or exceed minimum requirements as specified.

C. Inspect and test at foundry according to applicable standard specifications.

D. Owner reserves right to inspect and test by independent service at manufacturer’s plant or elsewhere at his own expense.

E. Visually inspect before installation.

F. Job Conditions:

1. Coordinate dimensions and drillings of flanges with flanges for valves, pumps and equipment to be installed in the piping systems.

1.05 DELIVERY, STORAGE AND HANDLING:

A. Comply with the requirements specified in Section 01610.

B. During loading, transportation and unloading, prevent damage to pipes and fittings. Load and unload each pipe under control at all times. Under no circumstances will a dropped pipe be used unless inspected and accepted by CM. Place skids or blocks under each pipe in the shop and securely wedge pipe during transportation.

PART 2 - PRODUCTS

2.01 PIPE:

A. Ductile Iron:

1. Design conforming to AWWA A21.50.

2. Manufacture conforming to AWWA A21.15 or AWWA A21.51.

3. Thickness class, unless otherwise indicated or specified:

   a. Minimum Thickness Class 52.

   b. Minimum thickness Class 53 for use with threaded flanges.

   c. Minimum thickness Class 53 for use with flanged pipe.

   d. Minimum thickness for use with grooved couplings conforming to AWWA C606.

2.02 PIPE FOR USE WITH COUPLINGS:

A. As specified above except ends shall be plain.

B. With bolted split sleeve couplings, ends cast or machined at right angles to axis.

C. With grooved type coupling:

1. Ductile-Iron of thickness class specified above.

2. Grooved End dimensions conforming to AWWA C606 for flexible or rigid joints to suit joint requirements.

2.03 FLEXIBLE JOINT PIPE:

A. Provide joints with maximum deflection 15 degrees in any direction from pipe axis. Joint design to prevent pulling apart, and to remain watertight at any deflection angle within specified range.

B. Provide boltless type with rubber gaskets.

C. Pipe barrel thickness: According to manufacturer's standard but not less than AN Standard for pipe of corresponding class.

D. Machine joint contact surfaces spherical, without depressions or chatter marks, or rough tool cuts.

1. Smooth by grinding, and buffing.

2. Machining accuracy: Finished pipes interchangeable without loss of watertightness or flexibility.

3. Protect spherical spigot and plain ends of cut lengths by fastened wood lagging.

2.04 FITTINGS:

A. Provide fittings conforming to AWWA A21.10 or AWWA A21.53, at least Class 150 and match piping class.

B. Provide all bell push-on or mechanical-joint fittings unless otherwise indicated or specified.

C. Face and drill flanged fittings conforming to AWWA A21.10 except special drilling or tapping for correct alignment and bolting.

D. If flanged fittings are not available under AWWA A21.10 provide fittings conforming to ASME B16.1 in 125 lb. pressure class.

E. Provide standard base fittings where indicated.

F. Provide grooved-end fittings ductile-iron conforming to AWWA A21.10 for center-to-face dimensions.

1. End preparation for grooved-ends conforming to AWWA C606 for flexible or rigid joints as required by type of joint.

2.05 NONSTANDARD FITTINGS:

A. Acceptable design.

B. Same diameter and thickness as standard fittings.

C. Manufactured to meet requirements of same specifications as standard fittings except for laying length and types of ends.

2.06 WALL CASTINGS:

A. Provide size and type indicated and specified.

1. Piping 24-inches (600 mm) and Smaller: Mechanical Joint with specified restraint or Restrained Push-On.

2. Piping 30-inches (750 mm) and Larger: Restrained Push-On.

B. Wall Castings: Conform to requirements of AWWA A21.10 or fabricate of Class 53 ductile iron pipe with screwed on flanges and welded on waterstop. Screwed on mechanical or push-on joints are not acceptable.

C. Provide water stop centered in wall. Weld water stops on in factory under controlled conditions to ensure adequate strength to permit waterstop to absorb thrust up to the pressure rating of the pipe.

Wall Castings with annealed ductile iron water stops

Pipe Size	Waterstop thickness, inches
4 inch-12 inch (100-300 mm)	0.50 (13 mm)
14 inch-24 inch (350 -600 mm)	0.75 (19 mm)
30 inch-36 inch (750-900 mm)	1.00 (25 mm)
42 inch-48 inch (1050-1200 mm)	1.25 (32 mm)

Wall Castings with fabricated steel water stops	
Pipe Size	**Waterstop thickness, in**
4 inch-16 inch (100-400 mm)	0.25 (6 mm)
18 inch-24 inch (450 -600 mm)	0.38 (10 mm)
30 inch-36 inch (750-900 mm)	0.50 (13 mm)
42 inch-48 inch (1050-1200 mm)	0.75 (19 mm)
54 inch-64 inch (1050-1200 mm)	1.00 (25 mm)

D. On flanged wall castings, provide space between the wall and flange to permit mounting the nuts on the flange bolts.

E. Flanged wall castings located with the flange flush with the wall are not acceptable.

F. Locate push-on joint wall castings with space between the bell and the wall to insert the follower bolts.

G. As an option, fabricated wall pipe of Schedule 40 Type 316L stainless steel may be substituted for wall castings specified above. Provide with waterstops of above dimensions and welded continuously on both sides of stop. Flanges of Type 316 stainless steel. Bolts for connection to buried pipe Type 316 stainless steel. Provide flange insulation gaskets, sleeves and washers for all flanges.

H. Testing: Factory pressure test all wall castings to pipe and joint pressure rating for a minimum of 5 minutes. No visible leakage is acceptable.

2.07 ADAPTERS:

A. Furnish and install for joining pipe of different types, unless solid sleeves indicated.

1. Provide ends conforming to above specifications for the correct type of joint, to receive adjoining pipe.

2. Joining two classes of pipe may be of lighter class provided annular space in bell-and-spigot type joints sufficient for jointing.

2.08 JOINTS:

A. Provide push-on joint and mechanical joint pipe with necessary accessories, conforming to AWWA A21.11.

1. Provide gasket composition designed for exposure to liquid within pipe.

2. Provide mechanical joint gaskets with copper tips to provide electrical continuity.

3. Provide serrated brass wedges for push-on joints to provide electrical continuity; two per joint for pipe 12-inch (300 mm) and smaller and four per joint for larger pipe.

B. Provide pipe flanges and accessories conforming to AWWA A21.15.

1. Provide flat faced flanges.

2. Provide 1/8-inch (3 mm) thick, full faced gaskets designed for exposure to liquid within pipe.

C. Provide restrained joint on pipe and fittings where indicated. Provide restrained joint which is:

1. Boltless

2. Capable of being deflected after assembly

3. Designs using set screws or requiring field welding are not acceptable.

4. Manufacturers:

a. American Cast Iron Pipe Co. Flex-Ring.

b. U.S. Pipe TR FLEX.

c. Clow Super-Lock.

2.09 MECHANICAL JOINT FITTINGS – RESTRAINT SYSTEM:

A. Provide restraint devices for pipe consisting of multiple gripping wedges incorporated into a follower gland meeting requirements of AWWA A21.10.

1. Mechanical joint restraint shall require conventional tools and installation procedures per AWWA C600, retaining full mechanical joint deflection during assembly and allowing joint deflection after assembly.

2. Provide actuation of the gripping wedges ensured with torque limiting twist off nuts.

3. Provide restraint devices Listed by Underwriters Laboratories (3 inch (75 mm) through 24 inch (600 mm) size) and Designed by Factory Mutual (3 inch (75 mm) through 12 inch (300 mm) size).

4. Gland body, wedges and wedge actuating components must be domestic manufactured in the USA.

B. Working Pressure Rating:

1. 16-inch (400 mm) and Smaller: 350 psi (2413 kPa).

2. 18-inch (450 mm) thru 48-inch (1200 mm): 250 psi (1724 kPa).

3. 54-inch (1400 mm): 200 psi (1379 kPa).

4. Minimum safety factor: 2 to 1.

C. Materials:

1. Gland body, wedges and wedge actuating components: Grade 65-45-12 ductile iron in accordance with ASTM A536.

2. Ductile iron gripping wedges: Heat treated, 370 to 470 BHN.

3. Provide three (3) test bars incrementally poured per production shift as per Underwriter's Laboratory (U.L.) specifications and ASTM A536. Testing for tensile, yield and elongation in accordance with ASTM E8.

4. Provide chemical and nodularity tests performed as recommended by the Ductile Iron Society, on a per ladle basis.

5. Provide an identification number consisting of year, day, plant and shift (YYDDD)(plant designation)(Shift number) cast into each gland body.

6. Record all physical and chemical test results such that they can be accessed via the identification number on the casting. Provide the Material Traceability Records (MTRs) available, in hard copy.

7. Provide coating for restraint devices consisting of the following:

a. Process all wedge assemblies and related parts through a phosphate wash, rinse and drying operation prior to coating application.

b. Coating: A minimum of two coats of liquid thermoset epoxy coating with heat cure to follow each coat.

c. Surface pretreat all casting bodies with a phosphate wash, rinse and sealer before drying. The coating shall be electrostatically applied and heat cured. Coating: Polyester based powder to provide corrosion, impact and UV resistance.

d. Coating system: MEGA-BOND by EBAA Iron, Inc.

D. Manufacturer:

1. EBAA Iron MEGALUG Series 1100

2.10 FLANGE ADAPTORS:

A. Provide restrained flange adaptors for pipe consisting of multiple individual gripping wedges incorporated into a follower gland meeting requirements of AWWA A21.10.

1. Provide actuation of the gripping wedges ensured with torque limiting twist off nuts.

2. Provide restraint devices Listed by Underwriters Laboratories (3-inch (75 mm) through 12 inch (300 mm) size) and Designed by Factory Mutual (4-inch (100 mm) through 12-inch (300 mm) size).

3. Gland body, wedges and wedge actuating components must be domestic manufactured in the USA.

B. Joint Deflection capability:

1. 3-inch through 8-inch (30 mm through 200 mm): 5 degrees

2. 10-inch and 12-inch (250 mm and 300 mm): 3 degrees

3. 14-inch and 16-inch (350 mm and 400 mm): 2 degrees

4. 18-inch and 20-inch (450 mm and 500 mm): 1.5 degrees

5. 20-inch, 42-inch and 48-inch (500 mm, 1050 mm and 1200 mm): 1 degrees

6. 30-inch and 36-inch (750 mm and 900 mm): 3 degrees

C. Provide flange adaptor to maintain seal with and 0.6 inch (15 mm) gap between end of pipe and mating flange

D. Working Pressure Rating:

1. 16-inch (400 mm) and Smaller: 350 psi (2413 kPa)

2. 18-inch (450 mm): 300 psi (2068 kPa)

3. 20-inch (500 mm): 250 psi (1724 kPa)

4. 24-inch (600 mm): 200 psi (1379 kPa)

5. 30-inch through 48-inch (750 mm through 1200 mm): 150 psi (1034 kPa)

6. Minimum safety factor: 2 to 1.

E. Materials:

1. Gland body, wedges and wedge actuating components: Grade 65-45-12 ductile iron in accordance with ASTM A536.

2. Ductile iron gripping wedges: Heat treated, 370 to 470 BHN.

3. Provide three (3) test bars incrementally poured per production shift as per Underwriter's Laboratory (U.L.) specifications and ASTM A536. Testing for tensile, yield and elongation in accordance with ASTM E8.

4. Provide chemical and nodularity tests performed as recommended by the Ductile Iron Society, on a per ladle basis.

5. Provide an identification number consisting of year, day, plant and shift (YYDDD)(plant designation)(Shift number) cast into each gland body.

6. Record all physical and chemical test results such that they can be accessed via the identification number on the casting. Provide the Material Traceability Records (MTRs) available, in hard copy.

7. Provide coating for restraint devices consisting of the following:

   a. Process all wedge assemblies and related parts through a phosphate wash, rinse and drying operation prior to coating application.

   b. Coating: A minimum of two coats of liquid thermoset epoxy coating with heat cure to follow each coat.

   c. Surface pretreat all casting bodies with a phosphate wash, rinse and sealer before drying. The coating shall be electrostatically applied and heat cured. Coating: Polyester based powder to provide corrosion, impact and UV resistance.

   d. Coating system: MEGA-BOND by EBAA Iron, Inc.

F. Manufacturer:

1. EBAA Iron MEGAFLANGE Series 2100

2.11 FLEXIBLE CONNECTIONS:

A. Use as specified or indicated:

1. Bolted split sleeve couplings

2. Grooved couplings

3. Expansion joints

2.12 BOLTED SPLIT SLEEVE COUPLINGS:

A. Pressure rating at least equal to that of related pipeline.

B. Provide with gaskets of composition designed for exposure to liquid within pipe.

C. Provide gaskets with copper tips for electrical continuity through joints.

2.13 GROOVED COUPLINGS:

A. Conform to AWWA C606.

B. Minimum pipe wall thickness specified under "Pipe For Use With Couplings."

C. Where grooved couplings are indicated to provide for expansion or flexibility, cut pipe grooves to provide necessary expansion or flexibility.

D. Where grooved couplings are used instead of flanged joints, joint to be of rigid type with pipe grooves cut to bring pipe ends together. Beam strength of joint shall be equal to or greater than that of flanged joint.

2.14 EXPANSION JOINTS:

A. Pressure rating at least equal to that of related pipeline.

2.15 FILLING RINGS:

A. Provide where necessary.

B. Materials, workmanship, facing, and drilling, conforming to 125-lb. ANSI (Class 125).

C. Suitable length with nonparallel faces and corresponding drilling, if necessary, for correct assembly of adjoining piping or equipment.

2.16 CONNECTIONS – TAPPED:

A. Provide service saddles for all taps for lines 24-inch (600 mm) and smaller.

1. Body: Ductile iron ASTM A395 or Bronze.

2. Straps and Hardware: Type 316 stainless steel.

B. For 30-inch (750 mm) and larger provide watertight joint with adequate strength against pullout. Use only tapered thread taps.

1. Maximum size of taps in pipe or fittings without bosses not to exceed that listed in table of Appendix to AWWA A21.51 based on: 2 full threads.

2. Where size of connection exceeds that given above for pipe, provide boss on pipe barrel or use tapping saddle. Make tap in flat part of intersection of run and branch of tee or cross, or connect by means of tapped tee, branch fitting and tapped plug or reducing flange, or tapping tee and tapping valve, or permitted.

3. Provide taps and piping for gauges and pressure sensing instruments in accordance with ANSI/HI standards so that there are no erroneous readings.

2.17 PIPE COATING:

A. Outside of pipe and fittings exposed: Provide coating in accordance with Section 09940 Shop Painting.

B. Outside surfaces of castings to be encased in concrete: No coating.

C. Machined surfaces cleaned and coated with rust-preventative compound at shop.

D. Outside of buried pipe and fittings:

1. All buried pipe and fittings shall be coated outside with an approved bituminous material in accordance with Section 4.12 of ANSI/AWWA C 104/A21.4 and Section 51-8.1 of ANSI/AWWA C 151/A21.51.

2.18 CEMENT LINING:

A. Inside of pipe and fittings: Provide double thickness cement lining and bituminous seal coat conforming to AWWA A21.4.

2.19 GASKETS, BOLTS, AND NUTS:

A. Provide ring or full face synthetic rubber gaskets for flanged joints and neoprene faced phenolic for insulating gaskets in accordance with AWWA A21.11 and ASME B16.21.

1. 1/8 inch (3 mm) thick.

B. Make flanged joints with:

1. Bolts.

2. Bolt studs with nut on each end.

3. Studs with nuts where flange is tapped.

4. Plastic bolt sleeves and washers for insulating joints.

C. Number and size of bolts conform to same ANS as flanges.

D. Provide Type 316 stainless steel bolts, washers and nuts for all services:

2.20 ELECTRICAL CONDUCTORS:

A. Provide 1/16-inch by 3/4-inch (1.5 mm by 19 mm) copper strip conductors for joints indicated to have electrical continuity.

B. Weld terminal strips to bell-ends and spigot ends of pipe in the foundry. Provide jumper strips and silicon bronze bolts and nuts to complete the connections.

C. If field cutting of pipe is necessary, weld terminal strip to cut spigot end using thermit weld or other designed process.

2.21 GATE VALVES

A. Resilient seated, ductile iron body, bronze mounted resilient wedge, double "O" ring seal, mechanical joint with retainer glands. Conform to the requirements of ANSI/AWWA C509 as modified herein. Provide catalog data, assembly drawings, and manufacturer's affidavit as required by Section 6.3 of ANSI/AWWA C509.

B. Acceptable manufacturers:

1. American Flow Control
2. Clow Valve Company
3. Mueller Company
4. Engineer approved equal

C. Operator: Non rising bronze stem with wrench nut operator. Valve opening direction to be counterclockwise (open left).

D. All cast ferrous components shall be ductile-iron.

E. Valve bolts, studs and nuts shall be Type 304L stainless steel conforming to ASTM F593 or ASTM F594 as applicable with anti-galling coating.

F. Valve stem seal shall be O-ring type, replaceable under pressure.

G. Valve Ends: Mechanical joint conforming to ANSI/AWWA C111 with Nitrile (NBR) (Acrylonitrile Butadiene) gaskets and ductile-iron retainer glands.

H. Bolting: Valve bolts, studs and nuts shall be Type 316L stainless steel conforming to ASTM F593 or ASTM F594 as applicable with an anti-galling coating.

I. Interior and Exterior Coatings: Fusion bonded epoxy coating conforming to ANSI/AWWA C550. Holiday testing shall be performed.

2.22 VALVE BOXES

A. Valve Boxes to be manufactured from cast iron conforming to ASTM A48 and coated with a water-based bituminous coating.

B. Valve boxes to be two piece adjustable sliding type with 8-inch minimum diameter base section, minimum 5-1/4 inch minimum shaft diameter and cast iron cover. Minimum wall thickness to be 3/16-inch.

C. Valve box to be marked with the letters “PW” cast into the cover.

D. Acceptable Manufacturers:

1. Bingham & Taylor
2. Bibby Ste. Croix
3. East Jordan Iron Works
4. Engineer approved equal

PART 3 - EXECUTION

3.01 HANDLING AND CUTTING:

A. Mark pipe and fittings "Rejected" and remove from site when cracked or has received a severe blow.

B. If permitted, cut on sound barrel at a point at least 12 inch (300 mm) from visible limit of crack, at Contractor's expense.

C. Machine cut with milling type cutters, knives, or saws. Snap cutters, torch, or hammer and chisel NOT ALLOWED. Examine for possible cracks.

D. Chamfer cut ends if used for push-on joints.

E. Do not cut glass lined pipes.

3.02 INSTALLATION:

A. Visually inspect before installation.

B. Ensure pipelines parallel to building walls wherever possible. Install piping to accurate lines and grades. Where temporary supports are used, ensure rigidity to prevent shifting or distortion of pipe. Provide for expansion where necessary.

C. Pitch piping toward low points. Provide for draining low points.

D. Before assembly, remove dirt and chips from inside pipe and fittings.

E. Piping Support: Provide in accordance with Section 15056.

F. Pipe and Fittings:

1. Remove and replace defective pieces.

2. Clear of all debris and dirt before installing and keep clean until accepted.

3. Lay accurately to lines and grades indicated or required. Provide accurate alignment, both horizontally and vertically.

4. Provide firm bearing along entire length of buried pipelines.

5. Do not allow deflection of alignment at joints to exceed permissible deflection as specified below:

PIPE DEFLECTION ALLOWANCES

Maximum permissible deflection, inches* (mm)		
Size of pipe, inches (mm)	Push-on joint	Mechanical joint
4 (100)	19 (482)	31 (787)
6 (150	19 (482	27 (685)
8 (200)	19 (482)	20 (508)
10 (250)	19 (482)	20 (508)
12 (300)	19 (482)	20 (508)
14 (350)	11 (279)	13-1/2 (343)
16 (400)	11 (279)	13-1/2 (343)
18 (450)	11 (279)	11 (279)
20 (500)	11 (279)	11 (279)
24 (600)	11 (279)	9 (228)
30 (750	11 (279)	9 (228)
36 (900)	11 (279)	8 (203)
42 (1050)	7-1/2 (190)	7-1/2 (190)
48 (1200)	7-1/2 (190)	7-1/2 (190)
54 (1350)	7-1/2 (190)	0 (0)
* Maximum permissible deflection for 20-feet (6.1 metres) lengths; for other lengths in proportion of such lengths to 20-feet (6.1 metres).		

a. For push-on joint or similar pipe, clean bell of excess tar or other obstruction and wipe out before inserting next pipe spigot. Shove new pipe into place until properly seated and hold securely until joint completed.

b. Set castings to be encased in concrete accurately with bolt holes, if any, carefully aligned. Clean off rust and scale before setting.

G. Temporary Plugs: When pipe laying not in progress, close open ends of pipe with temporary watertight plugs. If water in trench, do not remove plug until danger of water entering pipe passed.

H. Appurtenances: Set valves, fittings and appurtenances as indicated.

3.03 JOINTS AND COUPLINGS:

A. Push-on Joints:

1. Insert gasket into groove bell. Apply thin film of nontoxic gasket lubricant over inner surface of gasket in contact with spigot end.

2. Insert chamfered end into gasket. Force pipe past it until it seats against socket bottom.

B. Bolted Joints:

1. Remove rust-preventive coatings from machined surfaces.

2. Clean pipe ends, sockets, sleeves, housings, and gaskets and smooth all burrs and other defects.

3. Use torque wrench to tighten to correct range of torque not to exceed values specified below:

TORQUE RANGE VALUES		
Nominal pipe size, in	**Bolt diameter, in**	**Range of torque, ft-lb**
3	5/8	40-60
4-24, incl.	3/4	75-90
30, 36	1	100-120
42, 48	1-1/4	120-150

TORQUE RANGE VALUES		
Nominal pipe size, mm	**Bolt diameter, mm**	**Range of torque, Nm**
75	16	55-80
100-600, incl.	19	100-120
750, 900	25	135-160
1050, 1700	32	160-200

C. Flanged Joint:

1. Make up tight.

2. Do not put strain on nozzles, valves, and other equipment.

3. Bolt threads must fully engage the nuts. At a minimum the bolt must be flush with the nut and no more than 1/2-inch (13 mm) excess thread protruding from the nut.

D. Mechanical Joints:

1. Wire brush surfaces in contact with gasket and clean gasket.

2. Lubricate gasket, bell, and spigot with soapy water.

3. Slip gland and gasket over spigot, and insert spigot into bell until seated.

4. Seat gasket and press gland firmly against gasket.

5. After bolts inserted and nuts made finger-tight, tighten diametrically opposite nuts progressively and uniformly around joint by torque wrench. Torque bolts to values specified above.

E. Flexible Joints:

1. Clean and dry before assembly.

2. Place gaskets, rings, glands and followers in position in back of spigot ball.

3. Coat ball and socket with thin film of lubricant conforming to joint manufacturer's standards.

4. Insert ball and seat in socket. Seat gasket against ball.

5. Boltless joints:

a. Assemble retainer rings and glands conforming to manufacturer's standard.

b. Lock in place with lead strips.

F. Grooved Couplings:

1. Clean grooves and other parts.

2. Coat ends of pipe and outside of gasket with soft soap or silicone and slip gasket over one pipe end.

3. Bring pipes to correct position and center gasket over pipe ends with lips against pipe.

4. Place housing sections, insert bolts and tighten nuts until housing sections in metal-to-metal contact.

5. After assembly and inspection and before backfilling, coat exterior surfaces of buried couplings, including bolts and nuts, with heavy-bodied bituminous mastic.

G. Tapped Connection:

1. Drill and tap normal to longitudinal axis.

2. Drilled by skilled mechanics using proper tools.

3. Use only tapered threads.

H. Electrical Conductors:

1. Install pipes so terminal strips are aligned.

2. Install jumper strips and tighten bolts.

3.04 POLYETHYLENE ENCASEMENT

A. Provide polyethylene encasement for use with ductile iron pipe in accordance with ANSI/AWWA C105/ A21.5, Polyethylene Encasement for Ductile Iron Pipe Systems.

B. Provide the polyethylene encasement for use with ductile iron pipe systems consisting of three layers of co-extruded linear low density polyethylene (LLDPE), fused into a single thickness of not less than eight mils.

C. Provide the inside surface of the polyethylene wrap in contact with the pipe exterior infused with a blend of antimicrobial compound to mitigate microbiologically influenced corrosion and a volatile corrosion inhibitor to control galvanic corrosion.

D. Install ductile iron pipe and the polyethylene encasement in accordance with AWWA C600 and ANSI/AWWA C105/A21.5 and also in accordance with all recommendations and practices of the AWWA M41, Manual of Water Supply Practices – Ductile Iron Pipe and Fittings.

E. Overlap the wrap one foot (300 mm) in each direction at joints and secure in place around the pipe. Provide any wrap at tap locations taped tightly prior to tapping and inspected for any repairs following the tap and repair as required.

3.05 FIELD TESTING:

A. Clean of all dirt, dust, oil, grease and other foreign material, before conducting pressure and leakage tests.

B. Pressure and Leakage Tests:

1. Conduct combined pressure and leakage test:

a. Initially on pipeline between first two valves, maximum length 1/4 mile (0.4 km), and within three days of completion.

b. Afterwards on completed sections of maximum length 1/2 mile (0.8 km).

c. Isolated sections upon completion.

2. Conduct combined pressure and leakage test in pipelines.

3. Furnish and install temporary testing plugs or caps; pressure pumps, pipe connections, meters, gages, equipment, and labor.

4. Test when desired and comply with specifications.

5. Test pipelines in excavation or embedded in concrete before backfill or placing of concrete and test exposed piping before field painting.

6. Fill section of pipe with water and expel air. If hydrants or blowoffs are not available at high points for releasing air, make necessary taps and plug after test completion.

7. Maintain section full of water for 24 hours before conducting combined pressure and leakage test.

8. Conduct pressure and leakage test consisting of first raising water pressure (based on elevation of lowest point of section under test and corrected to gage location) to pressure in psi numerically equal to pipe pressure rating, but not more than 150 psi (1050 kPa).

9. Maintain pressure and make leakage test by metering water flow into pipe. Acceptable results:

   a. Average leakage during test: less than 10 gallons (1 liter) per inch (mm) of diameter per 24 hours per mile (km).

   b. No visible leakage in joints.

10. If unable to achieve and maintain specified pressure for one hour with no additional pumping, section fails test.

11. If section fails pressure and leakage test, locate, uncover, and repair or replace defective pipe, fitting, or joint, at no additional expense and without time extension. Conduct additional tests and repairs until section passes test.

12. Modify test procedure only if permitted by Engineer.

3.06 DISINFECTING AND FLUSHING:

A. Disinfect potable water lines using procedures and materials conforming to AWWA C651.

B. Dosage to produce minimum 10 ppm after minimum of 24 hour contact period.

C. After treatment, flush with clean water until residual chlorine content less than 0.2 ppm.

D. Prevent contamination of water in existing water mains. Neutralize chlorine content of water used in disinfecting and flushing accordance with AWWA C651.

3.07 CONTRACT CLOSEOUT:

A. Provide in accordance with Section 01700.

END OF SECTION

SECTION 03302

MISCELLANEOUS CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Furnishing and placing concrete of 4,000 psi, 28-day strength not included under any other sections for equipment pads, bulkheads, piers, pipe and duct and utility or structure supports, anchors, thrust blocks, etc. as shown on the Contract Drawings or directed by the Engineer.

B. Furnishing and placing Controlled Low Strength Material (CSLM) as shown on the Contract Drawings or as directed by the Engineer.

1.02 RELATED WORK

A. SECTION 01140 - ENVIRONMENTAL PROTECTION

B. SECTION 02220 - EARTHWORK

1.03 REFERENCES

A. The following standards based on the latest edition form a part of this specification as referenced:

1. SECTION M.03, STATE SPECIFICATIONS - PORTLAND CEMENT CONCRETE
2. ARTICLE M.06.01, STATE SPECIFICATIONS - REINFORCING STEEL
3. ACI 305R HOT WEATHER CONCRETING
4. ACI 306R COLD WEATHER CONCRETING

1.04 SUBMITTALS

A. In accordance with the General Conditions, and Section 01300.

PART 2 PRODUCT

2.01 CONCRETE

A. Concrete shall conform to the requirements of the State Specifications Section M.03. The concrete 28-day compressive strength shall be 4,000 pounds per square inch.

2.02 REINFORCING STEEL

A. Reinforcing steel bars shall be new and conform to State Specifications Article M.06.01, Grade 60.

2.03 CONTROLLED LOW STRENGTH MATERIAL

A. Controlled Low Strength Material (CLSM) or flowable fill shall have a 28-day compressive strength of 100 psi.

B. The aggregate shall be sand.

C. The water/cement ratio shall be 2.05.

D. Use one Grace Construction Products DaraFill 3 ounce egg per cubic yard.

E. Controlled Low Strength Material shall not contain fly ash.

PART 3 - EXECUTION

3.01 PREPARATION

A. Before placing concrete, all excavation for concrete, forms, access, etc., shall be complete, 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. All excavation shall be properly shared and dewatered.

B. 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.

C. 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. Concrete thrust and anchor blocks, pipe supports, etc. shall conform to the details shown on the Contract Drawings or as directed by the Engineer and be placed against undisturbed earth. Wooden side forms shall be used to provide satisfactory lines and dimensions for thrust and anchor blocks. Felt roofing paper shall be placed to protect joints. No concrete will be placed so as to cover joints, bolts or nuts, or to interfere with the removal of the joints. Tar paper or strips of 1-inch thick flexible plastic foam shall be placed and tied around the water pipe prior to pouring the concrete for supporting other existing underground pipes as shown. Construction joints shall be formed in concrete cradles if so shown or ordered.

3.02 CONCRETE PLACING DURING COLD WEATHER

A. Concrete shall not be placed on frozen ground and no frozen material or material containing ice shall be used. Materials for concrete shall be heated when temperature is below 40ºF, or is expected to be below 40ºF within 72 hours, and the concrete after placing shall be protected by covering, heat, or both.

B. All details of Contractor's handling and protecting of concrete during freezing weather shall be subject to the approval and direction of the Engineer. All procedures shall be in accordance with provisions of ACI 306.

3.03 CONCRETE PLACING DURING HOT WEATHER

A. 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. Every effort to minimize delays which will result in excessive mixing of the concrete after arrival on the job shall be taken.

B. During periods of excessively hot weather (90ºF 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 accord with the provisions of ACI 305. Any concrete with a temperature above 90ºF, when ready for placement, will not be acceptable, and will be rejected.

3.04 FIELD QUALITY CONTROL

A. Concrete inspection and testing may be performed by the Engineer or by an inspection laboratory, designated by the Engineer, engaged and paid for by the District. Testing equipment will be supplied by the laboratory, and the preparation of samples and all testing will be performed by the laboratory personnel. Full assistance and cooperation, concrete for samples, and such auxiliary personnel and equipment as needed shall be provided.

B. At least 4 standard compression test cylinders may be made and tested. One (1) slump test from each day's placement of concrete may also be made. A minimum of four compression test cylinders may be made and tested for each 100 cubic yards of each type and design strength of concrete placed. Two cylinders will be tested at 7 days, and two at 28 days. If job experience indicates additional cylinder tests or other tests are required for proper control or determination of concrete quality, such tests will be made.

C. The Engineer shall have the right to reject concrete represented by low strength tests. Rejected concrete shall be promptly removed and replaced with concrete conforming to the specifications. The decision of the Engineer as to whether substandard concrete is to be accepted or rejected shall be final.

3.05 CONTROLLED LOW STRENGTH MATERIAL PLACEMENT

A. Consolidate the controlled low strength material by hand-spreading, rodding or tamping.

B. Bring the controlled low strength material to the correct level within the excavations.

C. Cure material as necessary.

D. Placement of materials over the controlled low strength material shall not be done until the material has reached a compression strength of 100 psi.

E. Test cylinders shall be taken weekly or as directed by the engineer to verify that the maximum design strength has not been exceeded.

END OF SECTION

SECTION 09940

SHOP PAINTING

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Provide shop painting as specified and in compliance with Contract Documents.

1.02 REFERENCES:

A. ASTM International (ASTM):

1. B117: Standard Practice for Operating Salt Spray (Fog) Apparatus.

2. D870: Standard Practice for Testing Water Resistance of Coatings Using Water Immersion

3. D4541: Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers

4. D4544: Standard Practice for Estimating Peat Deposit Thickness

5. D4585: Standard Practice for Testing Water Resistance of Coatings Using Controlled Condensation

6. G8: Standard Test Methods for Cathodic Disbonding of Pipeline Coatings

B. The Society for Protective Coatings (SSPC):

1. SP6: Commercial Blast Cleaning

2. SP10: Near-White Blast Cleaning

1.03 SUBMITTALS:

A. Submit the following shop drawings in accordance with Section 01300 .

B. Manufacturer's specifications and data on the proposed primers and detailed surface preparation, application procedures and dry mil thicknesses, including list of items and surfaces to receive shop painting.

1.04 QUALITY ASSURANCE:

A. Comply with the requirements specified in Section 01400.

1.05 DELIVERY STORAGE AND HANDLING:

A. Comply with the requirements specified in Section 01610.

B. Deliver materials to application area in original, unbroken containers, plainly marked with name and analysis of product, manufacturer's name, and shelf lift date. Do not store or use contaminated, outdated, prematurely opened, or diluted materials.

C. Store coated items to prevent damage or dirtying of coatings. Avoid need for special cleaning, and store coated items out of contact with ground or pavement. Place suitable blocking under coated items during storage.

D. Do not expose surfaces to weather for more than six months before being topcoated, or less time if recommended by coating manufacturer.

E. Protect surfaces not to receive paint coatings during surface preparation, cleaning, and painting.

F. Protect coatings from damage during shipment and handling by padding, blocking, use canvas or nylon slings, and use care when handling.

G. At time of delivery of shop painted items to job site, ensure coatings are undamaged and in good condition.

1.06 PROJECT/SITE CONDITIONS:

A. Environmental Requirements:

1. Comply with manufacturer's recommendations as to environmental conditions under which coatings and coating systems can be applied.

2. Do not apply coatings when dust is being generated.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Ductile Iron Pipe And Fittings Exposed:

1. Ferrous metals submerged or which are subject to splash action in contact with potable water, provide one coat with a dry mil thickness of 3.0 to 3.5 mils of a certified NSF Standard 61 product.

2. Manufacturers:

(1) 94 H20 Urethane Zinc Rich Primer made by Tnemec Co.

(2) Carboguard 561 made by Carboline Co.

(3) Aquapon High Build Potable Water Epoxy 95-132 Series made by PPG Protective & Marine Coatings (4.0 – 6.0 DFT).

3. Performance Data:

(1) ASTM –D4541 Adhesion no less than 1700 psi

(2) ASTM-G8 Method A Cathodic Disbondment- No affect after 30 days

(3) ASTM D870 Immersion – No affect after 22 months

(4) ASTM B117 Salt Spray- no affect of coating film, < $1/16^{th}$ creep after 9900 hours

B. Shop prime with primers guaranteed by the manufacturer to be compatible with their corresponding primers and finish coats.

PART 3 - EXECUTION

3.01 APPLICATION:

A. Surface Preparation and Priming:

1. Sandblast clean in accordance with SSPC-SP-6, Commercial Grade, immediately prior to priming non-submerged components scheduled for priming, as defined above.

2. Sandblast clean in accordance with SSPC-SP-10, Near White, immediately prior to priming submerged components scheduled for priming, as defined above.

3. Before priming, provide surfaces dry and free of dust, oil, grease and other foreign material.

4. Shop prime in accordance with accepted manufacturer's printed recommendations.

B. Non-primed Surfaces: Apply accepted coating in accordance with manufacturer's printed recommendation.

3.02 TOUCH-UP:

A. Repair or replace damaged or defective coated areas. Resultant shop painting: Paint items as specified.

B. Remove damaged or defective coatings by specified blast cleaning to meet surface cleaning requirements, just before recoating. When small areas of coating need touch up,

surface preparation may be done with suitable power needle gun to match specified blast cleaning.

3.03 CONTRACT CLOSEOUT:

A. Provide in accordance with Section 01700.

END OF SECTION

SECTION 11322

SEPTAGE RECEIVING EQUIPMENT

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide and test the septage receiving equipment, controls and appurtenances as indicated and specified herein.

1.02 REFERENCES

A. American National Standards Institute (ANSI)

B. American Society for Testing and Materials International (ASTM):

C. National Electrical Manufacturers Association (NEMA):

D. AISI (American Iron and Steel Institute)

E. ABMA (American Bearing Manufacturers Association)

F. AGMA (American Gear Manufacturers Association)NEMA (National Electrical Manufacturer's)

G. NFPA (National Fire Protection Association)

H. ASTM (American Society for Testing and Materials)

I. AWS (American Welding Society Code)

J. ASME (American Society of Mechanical Engineers)

K. NEC (National Electrical Code)

L. UL (Underwriters Laboratory Standards)

1.03 SUBMITTALS:

A. Submit the following shop drawings in accordance with Section 01300:

1. Certified shop and erection drawings. Contractor shall submit electronic files of the proposed equipment in the capacity, size, and arrangement as indicated and specified.

a. Electronic files shall conform to the following minimum requirements:

(1) Submit electronic files as part of the Shop Drawing submittal.

(2) Submit electronic files via email.

(3) Drawings shall include plan views, sectional views, title block, Tag Numbers, serial numbers, Parts List (identifying each component), dimensions, connection sizes and types and all details of all related items. In cases where certain information is proprietary and is omitted, provided a statement indicating that the information is proprietary and is being omitted.

(4) Drawings shall be in conformance with all other requirements as specified in this specification.

2. Data regarding motor characteristics and performance:

a. Results of shop motor performance tests as specified.

b. Submit curves for guaranteed performance on 8-1/2-inch by 11-inch sheets, one curve per sheet.

3. Drawings showing materials of construction, thicknesses, operating and maintenance envelope and assembly weight.

4. Shop drawing data for accessory items.

5. Certified setting plans, with tolerances, for anchor bolts.

6. Manufacturer's literature as needed to supplement certified data.

7. Operating and maintenance instructions and parts lists.

8. Listing of reference installations as specified with contact names and telephone numbers.

9. List of recommended spare parts other than those specified.

10. Shop and field inspection reports.

11. Equipment shop test results.

12. Motor shop test results.

13. Qualifications of field service engineer.

14. Recommendations for short and long-term storage.

15. Shop and field testing procedures, set up and equipment to be used.

16. Special tools.

17. Gear reducer data including service factor, efficiency, torque rating and materials

18. Schematic control and power wiring diagrams including interconnecting and internal wiring diagrams

19. Control panel drawings

20. Number of service person-days provided and per diem field service rate.

21. Manufacturer's product data, specifications and color charts for shop painting.

22. List of recommended spare parts other than those specified.

23. Equipment weight and lifting points for installation and removal purposes.

24. Provide a listing of the materials recommended for each service specified and indicated. Provide documentation showing compatibility with process fluid and service specified and indicated.

25. Provide a scaled drawing showing the equipment, motors, hoists and bridge cranes including equipment weights, lifting attachments, slings and clearances for equipment removal and maintenance.

26. Number, size and weight of pieces shipped.

27. Material Certification:

    a. Provide certification from the equipment manufacturer that the materials of construction specified are recommended and suitable for the service conditions specified and indicated. If materials other than those specified are proposed based on incompatibility with the service conditions, provide technical data and certification that the proposed materials are recommended and suitable for the service conditions specified and indicated including an installation list of a minimum of five (5) installations in operation for a minimum of five (5) years. Provide proposed materials at no additional cost to the Owner.

    b. Where materials are not specified, provide technical data and certification that the proposed materials are recommended and suitable for the service conditions specified and indicated.

B. A copy of the contract mechanical process, electrical and instrumentation drawings, with addenda that are applicable to the equipment specified in this section, marked to show all changes necessary for the equipment proposed for this specification section. If no changes are required, mark all drawings with "No changes required" or provide a statement that no changes are required.

1. Failure to include all drawings or a statement applicable to the equipment specified in this section will result in submittal return without review until a complete package is submitted.

C. A copy of this specification section with addenda and all referenced specification sections with addenda, with each paragraph check-marked to indicate specification compliance or marked and indexed to indicate requested deviations and clarifications from the specified requirements.

1. If deviations and clarifications from the specifications are indicated, therefore requested by the Contractor, provide a detailed written justification for each deviation and clarification.

2. Failure to include a copy of the marked-up specification sections and or the detailed justifications for any requested deviation or clarification will result in submittal return without review until marked up specifications and justifications are submitted in a complete package.

1.04 SPARE PARTS:

A. Comply with the requirements specified in Section 01610.

B. Provide spare parts that are identical to and interchangeable with similar parts installed.

1. Furnish following spare parts for the septage receiving equipment:

a. Five (5) spare spray nozzles.
b. One (1) solenoid valve rebuild kit.
c. One (1) drum inner/HDPE seal.

2. One set of all special tools required.

1.05 QUALITY ASSURANCE:

A. Comply with the requirements specified in Section 01400.

B. Equipment specified shall be the product of one manufacturer.

C. The Contractor shall obtain the septage receiving equipment and appurtenances from the septage receiving equipment manufacturer, as a complete and integrated package to insure proper coordination and compatibility and operation of the system.

D. Equipment specified shall be manufacturer's standard cataloged product and modified to provide compliance with the drawings, specifications and the service conditions specified and indicated.

E. Welding: In accordance with latest applicable American Welding Society Code or equivalent.

F. Shop tests as specified.

G. Services of Manufacturer's Representative as stated in Section 01400 and as specified herein.

H. Provide services of factory-trained Service Technician, specifically trained on type of equipment specified:

1. Service Technician must have a minimum of five (5) years of experience, all within the last seven (7) years, on the type and size of equipment.

2. Service Technician must be present on site for all items listed below. Person-day requirements listed are exclusive of travel time, and do not relieve Contractor of the obligation to place equipment in operation as specified.

3. Installation: Inspect grouting, location of anchor bolts; setting, leveling, alignment, field erection; coordination of electrical and miscellaneous utility connection:

   a. 1 person-days.

4. Functional Testing: Calibrate, check alignment and perform a functional test. Tests to include all items specified.

   a. 1 person-days.

5. Field Performance Testing: Field performance test equipment specified.

   a. Included in item 4a

6. Vendor Training: Provide classroom and field operation and maintenance instruction including all materials, slides, videos, handouts and preparation to lead and teach classroom sessions.

   a. Included in item 4a

7. Credit to the Owner, all unused service person-days specified above, at the manufacturer's published field service rate.

8. Any additional time required of the factory trained service technician to assist in placing the equipment in operation, or testing or to correct deficiencies in installation, equipment or material shall be provided at no additional cost to the Owner.

I. Manufacturer of specified equipment shall have a minimum of five (5) operating installations with equipment of the size specified and in the same service as specified operating for not less than five (5) years.

J. If equipment proposed is heavier or taller, different width, or discharge arrangement than specified and indicated; provide all structural, architectural, mechanical, electrical and plumbing revisions at no additional cost to the Owner.

1. If equipment is heavier than specified, the Contractor shall provide all hoisting equipment sized to maintain the minimum safety factor between the specified maximum equipment weight and the lifting capacity of the hoisting equipment indicated and specified.

K. Electrical Equipment Labeling Requirements:

1. Provide equipment labeled by a nationally recognized testing company where standards have been established. Where equipment is not available with label, provide service of a nationally recognized testing company to examine the equipment and certify in writing that it complies with its safety standards. Tests and inspections of equipment shall be at no additional cost to Owner.

L. Cleaning, descaling, and passivation of all stainless steel parts to be performed per ASTM A380.

M. Provide fabrication in compliance with all applicable ASTM standards or equivalent international standards.

N. Factory welding to use shielded arc, inert gas, MIG or TIG method.

1. Filler wire: Add to all welds to provide for a cross section equal to or greater than the parent metal.

2. Butt welds: Fully penetrate to the interior surface and gas shielding to interior and exterior of the joint.

1.06 DELIVERY, STORAGE AND HANDLING:

A. Comply with the requirements specified in Section 01610.

1.07 WARRANTY

A. The septage receiving equipment shall be covered against manufacturing defects in materials and workmanship during normal use and service for a period of one (1) year from date of start up.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURER:

A. The septage receiving equipment shall be SAVI Beast Septage Station, Model VFA-800-DM as supplied by Enviro-Care Company. This is a sole source item. No substitutions will be allowed. The Contractor shall include the price of $348,581.00 for the equipment specified herein in his lump sum bid for Item #1 on the bid form. This price shall include the purchase of the equipment and accessories as described in this section, transportation to the site from the factory, lubricants, spare parts, manufacturers start up and training, instruments, shop drawings, Operation and Maintenance Manuals, painting and all other items described in this section but shall exclude installation, piping and related work, electrical and instrumentation mounting and wiring, and other construction related activities that are considered installation of the system.

2.02 SEISMIC DESIGN REQUIREMENTS:

A. The Contractor shall conform to the seismic design requirements based on the local building code.

B. Provide all equipment bases, anchorage, supports and foundations designed in accordance with the seismic requirements indicated and specified.

C. Additionally, provide with the Certificate of Unit Responsibility, certification for all equipment signed by a registered structural engineer stating that computations were performed and that all components have been sized for the seismic forces specified and indicated.

2.03 QUALITY ASSURANCE

A. The septage receiving equipment will be fully assembled and shop tested to confirm fit and function of the unit. A certificate of the shop test shall be supplied with the shipping documents.

B. The septage receiving equipment will be shipped to the site fully assembled, some ancillary components may be removed to prevent damage during shipment.

2.04 PERFORMANCE REQUIREMENTS

Conditions	Unit
Number of units	One (1)
Influent Type	Municipal Septage
Influent Solids Concentration (mg/l)	3-4%
Peak flow per unit (gpm)	450
Perforation Size (mm)	6
Drum Basket Nominal Diameter (inches)	30
Inlet Connection	4-inch flanged
Outlet Connection	8-inch flanged
Beast discharge height from operating level (feet)	4.9
Drum Installation Angle	25°
Drum Motor HP	1.5
Screw Motor HP	2.0

2.05 UTILITY REQUIREMENTS/ENVIRONMENTAL CONDITIONS

Conditions	Unit
High Pressure Spray Wash Water (gpm/psi)	40 @ 40-60
Power Supply (V/P/Hz)	480/3/60
Beast Installation Location (indoor/outdoor)	Outdoor
NFPA Classification Requirement	Non-hazardous
Control Panel Location	Outdoors
Control Panel NFPA Classification Requirement	Non-hazardous

2.06 DESIGN REQUIREMENTS

A. General

1. Equipment provided shall be a fully automatic, dual drive, self-cleaning, septage receiving unit incorporating a perforated plate rotating drum screen and an integral screenings washing, conveying and dewatering/compacting system contained within a stainless steel tank. The tank mounted rotating drum screen unit will be provided with an angle-of-inclination of 25˚ from horizontal.

2. Each rotating drum screen unit shall be provided with a rotating screen basket, exterior basket cleaning spray bar(s), exterior basket cleaning brush, concentric transport screw with integral screenings washing, dewatering and screenings compaction zone.

3. Fabricate all parts and assemblies from type 316 stainless steel unless otherwise noted.

B. Rotating Drum Screen Basket

1. The Drum Screen Basket shall be designed and built to withstand the maximum possible static hydraulic forces exerted on the screen by the liquid flow. Structural and functional parts shall be sized to prevent deflections or vibrations that may impair the screening, conveying, washing and compacting operations.

2. The drum screen basket shall be mounted at the drive end using a large diameter, single row, heavy duty industrial bearing assembly with integral ring gear comprising part of the drive system. The bearing assembly shall have a built in grease fitting.

3. The drum screen basket shall be of a cylindrical shape with perforations around the entire basket.

4. The drum screen basket shall be perforated plate with maximum openings of 6 mm. Bar screens, wire mesh or wedge wire, or stationary screens of any type will not be acceptable screen media.

5. The drum screen basket shall have angled lifting vanes to retain loose solids during rotation and lift them up and into the screw auger trough. Helical shaped vanes which can tumble screenings rather than lift screenings shall not be accepted.

6. The screenings collection trough shall extend beyond the screen opening at the influent end to maximize solids capture and reduce screenings recycle.

7. The drum screen shall have no support arms on the influent side of the screen basket to snag and accumulate long stringy solids. Screens with influent side support arms will not be accepted.

8. The drum screen basket shall be provided with a seal system incorporating an HDPE seal. Any unit which does not incorporate this design will not be accepted.

C. Drum Screen Basket Cleaning Brush and Spray Bar(s)

1. The exterior of the rotating drum screen basket assembly shall be cleaned by a high pressure stainless steel spray bar and a stainless steel backed polypropylene brush. The drum screen basket shall continuously rotate in one direction during the cleaning cycle and pass through the topmost portion where it is cleaned by the spray bar and brush.

2. The exterior cleaning brush shall be mounted on a holding device which keeps the brush in constant contact with the screen basket and can be adjusted to compensate for brush wear.

D. Screenings Transport Screw and Dewatering Zone

1. The screenings transport screw shall be constructed of 316 stainless steel.

2. The screenings collection trough shall be attached to the screenings transport tube by a drum support flange. The screw drive assembly shall be attached via a drive support flange welded to the upper end of the screenings transport tube.

3. The concentric transport/dewatering screw shall be designed to transport and dewater the screened material. The unit shall be provided with screw flights of constant pitch approaching the compaction zone to prevent clogging in the compaction zone. Designs incorporating a decreasing pitch screw will not be accepted.

4. The screenings transport screw shall be supported by a sealed, self-lubricating lower bronze bushing. The lower bushing shall be designed such that it does not take any thrust load from the transport screw. Designs requiring bearings of any type or externally lubricated bushing(s) or water injection into the housing shall not be accepted.

5. The compaction zone shall be integral to the transport screw and compaction tube. The compaction zone shall be designed to form a screenings plug and return water released from the screened material back to the tank through circular holes that are machined into the screenings compaction tube.

6. The compaction zone housing shall be fabricated entirely of stainless steel. The lower body shall be a welded construction with a minimum of 10 mm end plates for maximum torsion resistance. The bottom of the compaction zone shall be curved to promote maximum cleaning and minimum depositing of materials. Units utilizing a fiberglass reinforced compaction zone housing will not be accepted.

7. The compaction zone shall be furnished with a latched, hinged access cover with a gasket. The access cover shall incorporate a safety interlock switch to prevent operation of the unit with the access cover open. Units which require the use of any tools to gain access to the compaction zone will not be accepted.

E. Spray Wash Systems

1. Drum and flush spray systems shall each be furnished with an automatically controlled electrically actuated full port stainless steel ball valve, stainless steel piping and fittings, flexible reinforced hoses and spray nozzles.

2. Compaction zone spray system shall be furnished with a control solenoid valve, stainless steel piping and fittings, flexible reinforced hoses and spray system.

3. A drum wash system shall be located over the rotating perforated drum which utilizes a spray bar(s) with adequate spray nozzles to ensure a consistent spray pattern over the entire length of the drum.

4. A screenings spray wash system shall be located in the lower section of the transport tube to break up and return organic materials to the flow stream and to ensure maximum screenings washing.

5. A compaction zone wash system shall be provided which periodically cleans the compaction and dewatering zone via a stainless steel wash system located in the uppermost end of the compaction/dewatering chamber. The header shall be designed to completely wash the full surface of the transport tube drainage area.

F. Screen Tank

1. The septage receiving equipment shall be supplied with a two-stage stainless steel tank. The bottom of the influent section of the tank shall be sloped toward the screen to eliminate sedimentation. The inlet section shall be sized to match the inlet shape of the drum to prevent a wall for solids to dam and collect. Units with rectangular tanks which encourage sedimentation shall not be accepted.

2. The second stage tank shall house the rotating drum screen unit.

3. The inlet stage of the tank shall be provided with a flush wash system.

G. Drive Units

1. The Septage receiving unit shall be a dual drive system which allows the drum and screw to be driven independently to optimize solids removal.

2. Gear reducers shall be a helical gear type as manufactured by NORD or approved equal. Provide a cast iron frame; design in accordance with AGMA recommendations for wastewater service.

3. Transport screw shall be directly driven by a flange mounted gear reducer.

4. The transport screw gear reducer shall be bolted to a machined flange welded to the upper end of the transport tube.

5. The rotating screen drum basket shall be driven by a flange mounted gear reducer using a spur gear and bull gear assembly.

6. Gear reducers shall be driven by 240/480v, 3ph, 60hz motors rated for the installation environment location. Motor horsepower shall be as noted in Paragraph 2.04.

7. Chain drives, belt drives, friction drives, or hydraulic drives will not be accepted.

8. Designs incorporating a separate upper bearing for the transport screw will not be accepted.

H. DRUM RETRACTION

1. The complete screen assembly must be able to be retracted away from the front seal plate to allow for replacement of the seal without pivoting the screen or requiring lifting devices such as cranes or come along hoists.

2. Units that require pivoting of the screen for seal replacement shall be required to provide a complete workable lifting system.

I. PIVOT ASSEMBLY

1. The complete screen assembly must be able to pivot out of the tank without requiring the removal of the drive unit, screw or drum. Units that require disassembly of the unit shall not be allowed.

J. MOTORS

1. All motors shall be NEMA Design B and premium efficient per NEMA MG1.

2.07 HEAT TRACING/FREEZE PROTECTION

A. The wash water lines shall be fitted with 120V, single phase, 60 Hz flexible self-regulating heat tracing wire and covered with a transport tube custom fitted insulation blanket.

B. Compaction zone with heat trace cable and with custom 316 stainless steel cover.

C. Transition between influent tank and main tank shall be heated with heat trace cable, insulation and protective 316 stainless covers.

D. Wiring from the wash water heat trace cables shall terminate in a factory mounted junction box for field connection by others.

2.08 ELECTRICAL CONTROLS AND DEVICES

A. Control Panel: 480 volt primary control panel shall be provided with a type 316, stainless steel, NEMA 4X enclosure. Panel shall be suitable for pedestal mounting with the following electrical components to provide proper operation of the equipment:

1. Main disconnect with through door interlock handle
2. Main disconnecting circuit breaker
3. Step down control transformer
4. Branch circuit protection
5. Motor starter, soft start w/ overload (drum motor)
6. Motor starter, reversing w/ overload (screw motor)
7. Emergency stop pushbutton
8. Hand-Off-Auto selector switches for drum and screw drive
9. Open – Close – Auto switches for screen drum and tank flush wash water electrically actuated ball valves
10. Open – Close – Auto switch for compaction zone wash water solenoid valve
11. Load monitors shall provide overload protection for drum and screw by sensing motor power factor
12. Hour meter for each motor
13. Control power on, run and fault indicating lights
14. Alarm reset pushbutton
15. Allen-Bradley Micro850 PLC with Ethernet and required I/O
16. Operator Interface Unit, Allen Bradley PanelView 800 with 4 inch screen
17. Run and alarm auxiliary contacts for use by the customer
18. Intrinsically safe conductivity liquid level control relay
19. Integrated heat trace circuits for Beast freeze protection
20. GFCI circuit breaker for heat tracing circuit(s)
21. Panel Heater, with Thermostat
22. UL508A

B. Safety Microswitch: One (1) NEMA 4X safety interlock switch shall be factory mounted to the compaction/discharge zone access door. Interlock switch shall prevent operation of the screen while the door is open.

C. Electrically Actuated Ball Valves: Provide two (2) electrically actuated full port 316 stainless steel ball valve to control flow to the drum spray wash and tank

flush assemblies. The full port ball valve shall be 2-piece body, threaded ends, cast body from CF8M, 316 stainless steel, ball and stem from 316 stainless steel, and RTFE seats. Each valve shall be controlled by a NEMA 4X electric actuator with a housing from cast aluminum with thermally bonded polyester power coating, stainless steel output shaft, stainless steel fasteners, 120 volt, single phase, 60 Hz, two SPDT limit switches, and visual indication on valve position.

D. Solenoid Valve: Provide one (1) NEMA 4X brass body solenoid valve to control flow to the compaction zone spray wash assembly. Valve shall have a brass body. Valve shall be 120 volt, single phase, 60 Hz.

E. Level Control: Provide one (1) non-contacting radar transmitter for operation of the unit by screen start level and high level. Unit shall not be affected by FOG, debris or foam. The radar unit shall provide a 4-20mA level signal. The sensor shall be supplied with 33 feet of integral cable.

E. Thermostat: Provide one (1) ambient temperature thermostat shall be provided to control power to the heat trace cable. The thermostat shall be 120 Volt, single phase, 60 Hz with a NEMA 4X housing. The temperature set point shall be selectable by an adjustable dial.

2.09 HAULER ACCESS STATION:

A. Panel shall include the following components:

1. Enclosure, NEMA 4X 316, stainless steel Unistrut mount.
2. Internal Swing-out Door (stainless steel)
3. Lockable Full-Grip Handle with 3-Point Latch
4. Drip Shield
5. Access Keypad
6. Printer Interface
7. Compact Thermal Printer with Integral Auto-cutter Backlit Receipt Dispenser
8. Communication Controller, Ethernet based
9. Circuit breakers, Lot
10. Panel heater with thermostat
11. Power Supply, 24 VDC
12. Surge Protection
13. Pilot Devices
14. UL Certification
15. Full Flo-Logic Hauler Management Software including the following features:
    a. The data from each hauler transaction shall be collected and stored in a secure SQL database. The following data shall be collected:
        i. Site ID
        ii. Station ID
        iii. Ticket Number (On Hauler Receipt)

iv. Hauler ID
v. Date and Time of Transaction
vi. Volume Unloaded
vii. Waste ID
viii. Alarm ID

B. The manufacturer shall provide a secured Hauler Access Station that shall identify waste haulers and be configurable to interface with associated equipment such as doors, gates, valves, samplers, and screens & washers.

C. Hauler access shall be established using a keypad, magnetic-stripe card, non-insertion proximity card, or long-range proximity card.

D. The Hauler Access Station shall be constructed with an outer door that can be closed to enable a wash down of the area without damaging the internal mounted devices.

E. The hauler can access the station by opening the door to the enclosure and entering a truck ID number using the keypad or by using an assigned card. The card type shall be magnetic-striped or non-insertion proximity card.

F. If additional security measures are required by the facility, haulers shall use an additional card or pin number to access the front gate or door of the facility.

G. The Hauler Access Station shall include a daylight visible display and outdoor-rated robust keypad with integral 2-track card reader. The display shall provide log-on instructions for the hauler and prompt the hauler for additional information such as waste type.

H. The Hauler Access Station shall include a receipt printer and integral light. The printer shall quickly print and cut each receipt and the integral light shall inform the hauler that a receipt has been printed.

I. Each printed receipt shall include the following:

1. Date and Time of Transaction
2. Station ID and Ticket Number
3. Hauler ID number
4. Volume Unloaded
5. Elapsed Time
6. Alarm ID
7. Waste Type

J. The Hauler Access Station shall continue to function normally even without a network connection to the office. All hauler transaction data shall be stored in

non- volatile memory. If a network connection is established, all transaction data shall be automatically synchronized and stored securely in an IT managed SQL database.

K. The Hauler Access Station enclosure shall be mounted on top of the Base Station Enclosure.

2.10 BASE STATION ENCLOSURE

A. Base Station Enclosure shall be a NEMA 4X 316 stainless steel enclosure with locking access doors containing electric ball valve, flow meter and necessary piping.

B. Base Station Enclosure shall include the following components:

1. Enclosure: 24” x 60” x 42” (minimum), 316 Stainless Steel, with lockable access panels
2. Base pedestal, 42” high, for mounting Hauler Access Station
3. Encloses 6-inch 304 stainless steel inlet piping, electrically operated knife gate inlet valve and Magnetic Flow Meter
4. External to Base is 6” stainless steel piping with grooved inlet connection and 4” Camlock fitting for connection to septage truck hose.
5. Heat tracing and insulated blanket wrapping for valve, Magnetic Flow Meter and piping.
6. One (1) Electric actuated (24 vdc) brass knife gate valve. Operation controlled by Hauler Access Station (open/close with 2 second travel time)
7. One (1) 4-inch Flow meter, polyurethane liner, 316L stainless steel electrode, carbon steel flanges, NEMA 4X rated with integral mount transmitter.

2.11 CAM LOCK FITTING FOR HAULER CONNECTION

A. Provide one (1) 4-inch male NPT cam lock fitting for septage hauler connection.

2.12 MANAGEMENT SOFTWARE

A. The necessary management software shall be installed on one site owned PC. The PC must have a network card to communicate with Hauler Access Stations via WiFi connection. The PC must have Windows 7 (with latest security updates) or newer operating system or the Windows Server 2008 r2 or newer.

B. The software shall interface with one or more Hauler Access Stations at one or more receiving sites using an WiFi Connection. WiFi connection shall comply with the requirements specified under Section 2.13.

C. The software shall monitor the Hauler Access Station(s) and automatically upload hauler transaction data to the networked office PC.

D. The data from each hauler transaction shall be collected and stored in a secure SQL database. The following data shall be collected:

1. Site ID
2. Station ID
3. Ticket Number (On Hauler Receipt)
4. Hauler ID
5. Date and Time of Transaction
6. Volume Unloaded
7. pH (if configured)
8. Waste ID
9. Alarm ID
10. Sample Information (if configured)

E. The software shall be used to configure the hauler's pin number, magnetic-striped card, and/or proximity card used at the Hauler Access Station(s).

F. The software shall be used to configure any devices that will measure the volume. The software may also be used to configure the frequency of automatic sampling.

G. A user-friendly interface shall be provided to allow the facility to view hauler transaction data and enter/edit information when necessary. The software shall provide multiple tabs to display all necessary information

1. Station Connection Status
2. Volume Statistics
3. Activity Reports
4. Truck List
5. Alarms and Waste Types List
6. Station and Instrument Configuration
7. Station Schedule

H. The software shall allow the facility to define the Hauler Access Station's operating time schedule. If the station is closed, a message will alert the hauler that the station is closed.

I. Customer (Hauler) and Truck Features:

1. The software shall provide a table of 100 pre entered truck numbers for facility assignment to customers.

2. Each customer shall receive a Hauler ID number and 4-digit PIN number for each truck. PIN number assignment can be unique per truck or common to multiple trucks, depending on the facility and customer preference. The software shall allow the administrator to manually assign pin numbers to customers.

3. The software shall allow the facility to enable or disable a truck's access privilege. Once disable, a hauler's access will immediately be denied at all sites. A message shall be displayed at log-in at the hauler station informing the hauler to contact the office.

J. Waste Type Features:

1. The software shall allow the facility to define a list of permitted waste types.

2. When accessing the station, the customer shall be prompted at log-in to identify the waste type that shall be unloaded.

K. Status and Alarm Features:

1. The software shall allow the facility to monitor the Hauler Access Station in real-time. The facility shall be able to monitor the current customers/trucks total flow, waste types, equipment faults, and additional information.

2. The software shall allow the facility to monitor alarms at the Hauler Access Station. Alarms make the station unusable or may prevent a hauler from unloading. These alarms include:

a. E-Stop pressed
b. Equipment Fault
c. Storage Tank at High Level
d. Optional User-Defined Alarms

L. Reporting Features:

1. The software shall have a pre-formatted reporting feature that will, at a minimum, show activity with daily totals and truck usage. The reports shall be easily exported into an Adobe PDF, Microsoft Excel spreadsheet, or Word document.

2.13 WIRELESS BRIDGE

A. Provide point to point wireless bridge rated in accordance with Area Classification Schedule for wireless communication between Jauler Access Station and site owned PC.

PART 3 - EXECUTION

3.01 INSTALLATION:

A. Install items in accordance with shop drawings with no exceptions noted, manufacturer's printed instructions and as indicated.

3.02 START UP AND FIELD TESTING:

A. The initial start-up of the septage receiving equipment shall be performed by the Manufacturer. The manufacturer's authorized representative will verify the proper operation and installation and provide training to the equipment operators.

B. Comply with the requirements as specified herein.

C. Field testing will not be conducted without a procedure with no exceptions noted, calibration certificates for all testing equipment, and a completed and signed pretesting check list.

D. After installation of equipment, and after inspection, operation, testing and adjustment have been completed by the manufacturer's field service technician, conduct a dry running test and a performance test for each unit in presence of the Engineer to determine its ability to deliver its rated capacity under specified conditions.

1. Dry Testing:

a. Make all necessary adjustments and settings to the drive mechanism and tripping device at the time of the test to ensure that the mechanical bar screen rakes will stop at the appropriate trip setting.

b. Perform a dry test on the septage receiving equipment to demonstrate the correct alignment, smooth operation, freedom from vibration, excessive noise and overheating of the moving parts and bearings.

c. Perform a dry test on to demonstrate the ability of the equipment to successfully handle large objects of the size and weight occasionally encountered in unscreened raw septage.

d. All defects recorded during the above field tests and all defects and failures occurring within the first year of operation shall be corrected at no additional cost to the Owner.

e. Dry tests on each screen shall be witnessed by the Engineer.

2. Performance Tests:

   a. During tests, observe and record flow rates and motor inputs.

   b. Test Duration: Determined by the Engineer, but not less than ten cycles.

   c. The septage equipment must demonstrate ten (10) days of continuous, defect-free operation prior to final acceptance.

   d. Immediately correct or replace all defects or defective equipment revealed by or noted during tests at no additional cost to the Owner.

3. Repeat tests until specified results are obtained.

E. Make all adjustments necessary to place equipment in specified working order at time of tests.

F. Remove all replace equipment at no additional cost to the Owner with equipment that will meet all requirements specified and indicated if unable to demonstrate to the satisfaction of the Engineer that equipment will perform the service specified, indicated and as submitted.

3.03 FIELD TOUCH-UP PAINTING:

A. After installation and acceptance testing, apply touch-up paint to all scratched, abraded and damaged shop painted surfaces. Coating type and color shall match shop painting.

3.04 CONTRACT CLOSEOUT:

A. Provide in accordance with Section 01700.

END OF TEXT

Scope of Supply

Project:
Contract No. 43 – Septage Receiving Station
Branford, Connecticut

Specification:
11322 - Septage Receiving Unit

Addenda:
None

Equipment:
SAVI Beast Septage Receiving Station Model VFA-800-DM

Engineer:
AECOM Technical Services, Inc. - Rocky Hill, CT

Represented By:
Wescor Associates, Inc.
Stephen Roach
Phone: 617-816-8737
Email: sroachct@aol.com

Regional Sales Manager:
SAVÉCO North America, Inc.
Formerly Enviro-Care
Brian Serio
Phone: 224-302-0315
Email: Brian.Serio@savecowaterna.com

Project No.: WEC216168
June 28, 2022

ITEM: "A" - One (1) SAVI Beast Septage Receiving Station Model VFA-800-DM

BASIS OF DESIGN

Number of Units:	One (1)
Application:	Municipal Septage Receiving
Influent Solids Concentration:	3-4 %
Peak Nominal Flow:	450 gpm
Screen Perforated Opening:	6 mm
Nominal Screen Basket dia.:	30 inches
Nominal Screw Conveyor dia.:	10 inches
Screenings Discharge Height:	4.9 feet above operating floor
Drum Drive motor HP:	1.5 HP
Screw Drive motor HP:	2.0 HP
Spray wash water requirement:	40 gpm @ 40-60 psi
Inlet pipe size:	4 inch flanged
Outlet pipe size:	8 inch flanged

DESCRIPTION OF EQUIPMENT:

- Fully automatic, self-cleaning, dual drive, septage receiving system incorporating a perforated plate rotating drum screen and an integral screenings washing, conveying and dewatering/compacting contained within a tank from type 316 stainless steel.
- The septage receiving unit shall be a dual drive system which allows the drum and screw to be driven independently.
- A cylindrical drum screen shall be constructed of perforated plate media in type 316 stainless steel with 6 mm perforations around the entire basket.
- The drum screen shall be mounted on the drive end using a large diameter, single row, heavy duty industrial slewing ring bearing assembly with integral ring gear comprising part of the screen drive system.
- Drum gear reducer drive unit with 1.5 HP TEFC motor suitable for 460/3/60 electrical supply.

- The tank mounted rotating drum screen, conveying and dewatering system shall be positioned at a 25° angle of inclination from horizontal and includes a pivoting/retraction assembly to allow the drum to be retracted for seal replacement or rotated out of the tank for full maintenance.
- A cleaning brush and spray bar shall be located on the outside of the screen drum to prevent small solids from passing through the screen.
- Angled lifting vanes shall be positioned inside the drum screen to retain and lift solids into the screw trough.
- The screw trough shall extend beyond the drum screen opening at the influent end to maximize solids capture and reduce screenings recycle.
- The drive assembly for the screw shall be attached via a drive support flange welded to the upper end of the screenings transport tube.
- Screw drive unit with 2.0 HP TEFC motor suitable for 460/3/60 electrical supply.
- The shafted screenings screw conveyor to be constructed from type 316 stainless steel.
- Compaction zone integral to the screw conveyor and with perforated drainage section, latched & hinged cover from type 316 stainless steel and safety interlock switch.
- Dewatering zone drain flush spray system from type 316 stainless steel with manual ball valve.
- Transport tube spray system from type 316 stainless steel and rubber hose with manual ball valves.
- The septage receiving unit shall be supplied with a two-stage tank. The inlet section of the tank shall slope toward the screen to prevent sedimentation. The second stage of the tank shall house the rotating drum screen.
- Tank flush wash system from type 316 stainless steel with manual ball valve.
- All covers will be gasketed and either hinged, bolted or latched.

OUTDOOR FREEZE PROTECTION - WEATHER PROTECTION SYSTEM (EACH)

- Wash water piping and compaction/discharge zone wrapped with self-regulating heat trace cable supplied with insulation and protective jacket.
- Electrical wiring routed to two (2) factory mounted conduit boxes for field connection.

HARDWARE (EACH)

- Assembly fasteners from type 316 stainless steel.
- Anchor rods from type 316 stainless steel.

CONTROL PANEL AND INSTRUMENTATION (EACH)

- One (1) NEMA 4X type 316 stainless steel wall mount main control panel suitable for 480/3/60 electrical supply. Control panel shall contain the following control devices for operation of the Beast unit.
    1. Main circuit breaker disconnect with door interlocked handle.
    2. Control Power Transformer, 480/120VAC w/branch circuit protection.

3. Surge Protection, 120 VAC.
4. Motor starter w/ overload and branch circuit protection (drum motor).
5. Motor starter, reversing w/ overload and branch circuit protection (screw motor).
6. Load monitors (drum and screw motors).
7. Pilot lights, (Motor Run & Fault, Control Power, High Water Level).
8. Push buttons (E-Stop, System Reset).
9. Selector Switches (Motor HOA, Wash Solenoid and Electrically Actuated Ball Valves HOA).
10. Programmable Logic Controller, Allen-Bradley Micro850, with Required I/O.
11. Operator Interface Unit, Allen Bradley PanelView 800 with 4-inch screen.
12. Ethernet Unmanaged, 5-Port.
13. Power Supply, 24VDC.
14. Power and monitoring of the Radar Level sensor.
15. Panel Heater, with Thermostat.
16. Control Relays.
17. Terminal Blocks.
18. Intrinsically safe barrier relay for Radar Level sensor.
19. Heat trace power circuit [1000W max].
20. GFCI circuit breaker for heat trace circuit.
21. Sun shield, shroud type – top, back and sides.
22. Power circuit to hauler station.
23. UL Label.

- One (1) Safety Microswitch: 120 volt safety interlock switch suitable for the area classification shall be factory mounted to the compaction/discharge zone. Interlock switch shall prevent operation of the screen while the door is open.
- One (1) NEMA 4X brass body solenoid valve, 120 volt, single phase, 60 Hz, to control flow to the dewatering zone spray wash assembly.
- Two (2) NEMA 4X full port 316 stainless steel electric actuated ball valves to control flow to the drum spray wash and tank flush assemblies. Ball valve electric actuator shall be NEMA 4X 120 volt, single phase, 60 Hz.
- One (1) non-contacting radar transmitter to detect start and high level.
- One (1) NEMA 4X ambient temperature thermostat to control heat tracing.

HAULER STATION, BASE STATION, AND FLO-LOGIC SOFTWARE PACKAGE (EACH)

- The manufacturer shall provide a secured Hauler Access Station that shall identify waste haulers and be configurable to interface with associated equipment such as doors, gates, valves, samplers, and screens & washers.
    1. Enclosure, NEMA 4X 316 stainless steel w/interior door and sub-panel.
    2. Power Required: 120VAC, 5A.
    3. Heavy Duty Key Lockable enclosure handle, with 3 Point door mechanism.
    4. Panel Heater Kit, Heavy Duty with Thermostat.

5. Keypad, Stainless Steel, USB Type, for PIN number hauler identification.
6. User Display, Stainless Steel Bezel, Full Color, 1000 NIT Brightness.
7. Thermal Printer, Large Capacity paper roll and feeder, with illuminated print done chute.
8. Power Supply, 24 VDC.
9. Surge Protection.
10. Communication Controller, Solid State Storage, Dual LAN.
11. Circuit Breakers.
12. Local I/O Control as required.
13. Sun shield, shroud type – top, back and sides.
14. UL Label, Industrial Control Assembly.
15. Full Flo-Logic Hauler Management Software including the following features -
16. The data from each hauler transaction shall be collected and stored in a secure SQL database. The following data shall be collected:

    a. Site ID
    b. Station ID
    c. Ticket Number (On Hauler Receipt)
    d. Hauler ID
    e. Date and Time of Transaction
    f. Volume Unloaded
    g. Additional Process Analyzer Data
    h. Product Type ID
    i. Alarm ID

- Wireless Bridge
    1. Provide point to point wireless bridge rated in accordance with Area Classification Schedule for wireless communication between Hauler Access Station and site owned PC.

- One (1) Base station, type 316 Stainless steel enclosure with locking access doors, contains gate valve, flow meter and necessary piping.
    1. One (1) 6-inch flanged electrically actuated Gate Valve.
    2. One (1) 4-inch Flow meter, NEMA 4X rated with integral mount transmitter.
    3. 4-inch cam lock fitting for septage hauler connection.
    4. 4-inch flange for connection to BEAST.

- The Flo-Logic™ software shall allow the facility to manage each customer, who shall receive a Hauler ID number and 4-digit PIN number for each truck. PIN number assignment can be unique per truck or common to multiple trucks, depending on the facility and customer preference. The software shall allow the administrator to manually assign PIN numbers to trucks.

- The Flo-Logic™ software shall allow the facility to enable or disable a truck's access privilege. Once disable, a hauler's access will immediately be denied at all sites. A message shall be displayed at log-in at the hauler station informing the hauler to contact the office.
- The Flo-Logic™ software shall allow the facility to define the Hauler Access Station's operating time schedule. If the station is closed, a message will alert the hauler that the station is closed.
- The Flo-Logic™ software shall have a pre-formatted reporting feature that will, at a minimum, show activity with daily totals and truck usage. The reports shall be easily exported into an Adobe PDF, Microsoft Excel spreadsheet, or Word document.
- Remote (phone) support for orientation and installation assistance for the software system.

SPARE PARTS (TOTAL)

- Five (5) spare spray nozzles.
- One (1) solenoid valve rebuild kit.
- One (1) drum HDPE seal.
- ~~One (1) Set of special tools.~~ *(Not required)*

FIELD SERVICE (TOTAL)

- Site service of one (1) trip for a total of two (2) days for installation inspection, startup and operator training.

CLARIFICATIONS/COMMENTS

- 11322.3.02.D.2 - Per clarification from AECOM, a SAVÉCO technician is not required to be onsite during the ten (10) day performance testing.

OPTIONAL ITEMS

- None.

NOTE: ANY ITEM NOT LISTED ABOVE TO BE FURNISHED BY OTHERS.

EXCLUSIONS

Taxes, electrical wiring, conduit or electrical equipment, piping, valves, or fittings, shimming material, lubricating oil or grease, shop or field painting, field welding, erection, hoist or lifting apparatus, detail shop fabrication drawings, performance testing, unloading, storage, concrete work, civil design, grating, platforms, stairs, hand railing, dumpster (except as specifically noted).

This proposal section has been reviewed for accuracy and is approved for issue:

By: Beth Emmelot Date: June 28, 2022

PRICING

Item	Equipment	Price
A	One (1) SAVI Beast Septage Receiving Station Model VFA-800-DM	$ **348,581.00**

Validity:

Prices are valid until November 1st 2022. After November 1st, 2022, prices may exceed quotations due to the current supply chain issues, volatility of the stainless steel market and sharp rise in fuel costs and may be adjusted accordingly. Purchase Orders received will commence the order schedule as stated in the Submittals paragraph below.

Warranty Statement and Term:

SAVÉCO North America, Inc. warrants the supplied equipment to the original end user against defects in workmanship or material under normal use and service in compliance with the original design specifications and the maintenance requirements and instructions as found in the Operations & Maintenance Manual. All SAVÉCO North America supplied equipment is warranted for 12 months from date of start-up or 18 months from date of shipment, whichever occurs first.

Warranty Exclusions:

This warranty does not cover costs for standard and/or scheduled maintenance performed, nor does it cover consumables and SAVÉCO North America parts that, by virtue of their operation, require replacement through normal wear (aka: Wear Parts), unless a defect in material or workmanship can be determined by SAVÉCO North America. Wear parts are defined as brushes, rollers, spray nozzles, drum seals and other items specifically identified in the Operations & Maintenance Manual.

Warranty Coverage:

SAVÉCO North America's liability is limited to the supply or repair of defective parts returned, freight prepaid by buyer to a location specified by SAVÉCO North America. Repaired or replacement parts will be shipped to buyer prepaid via standard ground freight. Express or expedited shipments will be at the expense of the buyer.

Exclusions and Exceptions:

This Warranty excludes damage or wear to equipment caused by misapplication of product, improper maintenance, accident, abuse, unauthorized alteration or repair, Acts of God, or installation or operation that is non-compliant with SAVÉCO North America installation and operations instructions.

Limited Liability:

SAVÉCO North America shall not under any circumstances be liable for any incidental or consequential damages arising from loss, damage to property, personal injury or other damage or losses owing to the failure of SAVÉCO North America's equipment. The liability of SAVÉCO North America, Inc. is limited as set forth above within the time period set forth above.

Term: 15% with Submittal Approval
80% Net 30 Days after Shipment
5% Net 30 days after Startup. Startup not to exceed 180 days from equipment delivery.

Taxes: No sales or use taxes have been included in our pricing.

Freight: Prices quoted are F.O. B. shipping point with freight allowed to a readily accessible location nearest jobsite. Any claims for damage or loss in shipment to be initiated by purchaser.

Submittals: Full submittals will be supplied approximately 4 to 6 weeks after receipt and acceptance of purchase order at the SAVÉCO North America offices. We allow 2-3 weeks for submittal approval at which time we will commence fabrication of the equipment and controls.

Shipment: Shipment time is approximately 20-22 weeks after approved submittal is received at the SAVÉCO North America offices. Under no circumstances will verbal approval be accepted.

Additional Field Service: This service may be scheduled at $1,250.00 per day plus expenses or is available through a yearly service contract.

Material of Construction: SAVÉCO North America is providing the equipment from the type of material specified for this project. If from 304L stainless steel the concentration of chloride and hydrogen sulfide (H2S) in the equipment operating environment shall be kept below the following values:

- Chloride <200 mg/L
- Hydrogen Sulfide (H2S) <6ppm

If not already done so, SAVÉCO North America can provide the equipment from 316L stainless steel for a price adder for environments that exceed the values noted above.

Please issue Purchase Orders to:
SAVÉCO® North America, Inc.
1570 St Paul Avenue
Gurnee, IL 60031

Attn: Matt Bodwell
Phone: 224-302-0326
Email: matt.bodwell@savecowaterna.com

SECTION 15101

PROCESS VALVES AND APPURTENANCES

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Provide and process valves and appurtenances as indicated and in compliance with Contract Documents.

1. Provide sizes and capacities as indicated or specified.

1.02 REFERENCES:

A. American Society of Mechanical Engineers (ASME):

1. B1.20.7: Hose Coupling Screw Threads.

2. B16.1: Standard for Cast Iron Pipe Flanges and Flanged Fittings, 125 lb.

3. B16.4: Cast-Iron Threaded Fittings, Class 125 and 250.

4. B16.10: Face-to-Face and End-to-End Dimensions of Ferrous Valves.

B. ASTM International (ASTM):

1. A48: Standard Specification for Gray Iron Castings.

2. A126: Standard Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings.

3. A536: Standard Specification for Ductile Iron Castings.

C. American Water Works Association (AWWA):

1. C500: Metal-Seated Gate Valves for Water Supply Service.

2. C504: Rubber-Seated Butterfly Valves.

3. C509: Standard Specifications for Resilient-Seated Gate Valves for Water and Sewage Systems.

4. C516: Large Diameter Rubber-Seated Butterfly Valves.78-inch (2000 mm) and Larger

5. D102: Coating Steel Water-Storage Tanks.

D. NSF International (NSF):

1. 61: Drinking water system components Health effects

1.03 SUBMITTALS:

A. Submit the following in accordance with Section 01300:

1. Data, regarding valve characteristics and performance including Cv.

2. Shop drawing data for accessory items.

3. Manufacturer's literature as needed to supplement certified data.

4. Operating and maintenance instructions and parts lists.

5. Listing of reference installations as specified with contact names and telephone numbers.

6. Valve shop test results.

7. Qualifications of field service technician.

8. Shop and Field inspections reports.

9. List of recommended spare parts other than those specified.

10. Recommendations for short and long term storage.

11. Special tools.

12. Shop and field testing procedures and equipment to be used.

13. Number of service technician days provided and per diem field service rate.

14. Manufacturer’s product data and specifications for shop painting.

15. Provide a layout drawing, plan and section showing orientation of plug, gate, check, ball valves and actuators and nearest obstructions for each valve.

16. Manufacturer's product data and specifications for shop painting.

17. Provide a listing of the materials recommended for each service specified and indicated. Provide documentation showing compatibility with process fluid and service specified and indicated.

18. The latest ISO 9001 series certification or quality system plan.

19. Material Certification:

a. Provide certification from the equipment manufacturer that the materials of construction specified are recommended and suitable for the service conditions specified and indicated. If materials other than those specified are proposed based on incompatibility with the service conditions, provide technical data and certification that the proposed materials are recommended and suitable for the service conditions specified and indicated including an installation list of a minimum of five (5) installations in operation for a minimum of five (5) years. Provide proposed materials at no additional cost to the Owner.

b. Where materials are not specified, provide technical data and certification that the proposed materials are recommended and suitable for the service conditions specified and indicated.

B. A copy of this specification section with addenda and all referenced specification sections with addenda, with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations and clarifications from the specified requirements.

1. If deviations and clarifications from the specifications are indicated, therefore requested by the Contractor, provide a detailed written justification for each deviation and clarification.

2. Failure to include a copy of the marked-up specification sections and or the detailed justifications for any requested deviation or clarification will result in submittal return without review until marked up specification and justification are resubmitted with the entire package.

1.04 SPARE PARTS:

A. Comply with requirements specified in Section 01600.

1.05 QUALITY ASSURANCE:

A. Comply with the requirements specified in Section 01400.

B. Provide enclosures for the area classifications specified and indicated.

C. Contractor responsible for verifying outside diameter of pipe to be tapped.

D. Services of Manufacturer’s Representative as stated in Section 01400 and specified herein.

E. Manufacturer of valve shall have a minimum of five (5) operating installations with pumps of the size specified and in the same service as specified operating for not less than five (5) years.

F. If equipment proposed is heavier, taller, different laying length or requires more operating space than specified and indicated; provide all structural, architectural, mechanical, electrical and plumbing revisions at no additional cost to the Owner.

1. If equipment is heavier than specified, the Contractor shall provide all hoisting equipment sized to maintain the minimum safety factor between the specified maximum equipment weight and the lifting capacity of the hoisting equipment indicated and specified.

1.06 DELIVERY, STORAGE AND HANDLING:

A. Comply with the requirements specified in Section 01610 and as specified.

PART 2 - MATERIALS

2.01 RESILIENT SEAT GATE VALVES 3-INCH (75 MM) AND LARGER:

A. Resilient Seat Gate Valves:

1. Manufacturers-OS&Y and NRS Type Valves:

a. J&S

b. Kennedy.

c. American.

B. General:

1. Provide valves that conform to NSF Standard 61.

2. Non-potable water service: Provide resilient seat gate valves for all sizes indicated. If resilient seat valves are not available provide solid wedge gate valves.

3. Potable water service: Provide resilient seat gate valves for all sizes indicated. If resilient seat valves are not available provide double revolving disc gate valves.

4. Provide metallic seated valves conforming to AWWA C500 except as herein modified. (Valves larger than 48-inch (1200 mm), size shall comply with the intent of AWWA C500.)

5. Provide resilient seated valves conforming to AWWA C509 except as modified herein.

C. Materials:

1. Body and Bonnet: ASTM A536 ductile iron.

2. Wedge: ASTM A536 ductile iron encapsulated with EPDM.

3. Provide all other materials as specified in AWWA C500 and C509. Working water pressure:

Valve Size		Pressure Rating	
inch	**mm**	**psi**	**kPa**
3 to 16	75 to 400	250	1750
18 & Larger	450 & Larger	150	1050

4. Exposed Valves: Flanged OS&Y valves. Face-to-face dimensions to comply with ANSI B16.10, flanges to comply with ANSI B16.1.

5. Buried Valves: Mechanical joint or push-on joint ends, non-rising stem valves with operating nut in lieu of hand wheel. Provide gate boxes, steel extension stems or universal-joint operating rods with 2-in (50 mm) square operating nuts at upper end with coupling connected to valve stem to bring to operating nut to within 6 inches (150 mm) of ground surface.

6. Provide counterclockwise rotation to open valves.

7. Provide handwheels with arrow and word "open" to indicate open direction.

8. Provide geared operators for all valves 16-inch (400 mm) and larger. Gearing shall be steel with enclosed cases.

    a. Provide spur gears for buried valves with stems vertical

    b. Provide bevel gears where required by position of valve.

    c. Provide buried valves with totally enclosed gear cases to enclose both the gears and valve stuffing box and provide gasketed Type 316 stainless steel removable cover plates with Type 316 stainless steel fasteners to allow access to the stuffing box.

9. Chainwheels: Provide where required as specified herein. Provide beveled gear operator to mount chainwheel in vertical position. Provide valve mounted so that the arrow indicator will be visible from the floor level.

10. Provide conventional packing in OS&Y valves.

11. Provide conventional packing or double O rings in non-rising stem valves.

12. Valves capable of being repacked or O ring replaceable while under pressure.

13. Provide Type 316 stainless steel bolts and bronze nuts for stuffing box follower.

14. Provide bypass valves for valves 16-inch (400 mm) and larger where required for opening under pressure with a maximum 40-lb (18 kg) rim pull at the valve pressure rating.

D. Provide all gate valves with all internal and external wetted parts coated with a fusion bonded epoxy in accordance with ANSI/AWWA C550.

2.02 BALL VALVES – GENERAL SERVICE:

A. Manufacturers:

1. Jamesbury

2. KF

3. Inline

4. Kitz

B. Valves 1/2-inch (13 mm) through 4-inch (100 mm)

1. Materials:

a. Body and End Cap: Three piece, ASTM A351 Grade CF8M.

b. Body Seal: PTFE.

c. Seat: RTFE.

d. Ball: Type 316 stainless steel.

e. Stem: Type 316 stainless steel.

2. Pressure Rating:

a. 1/2-inch (13 mm) through 2-inch (50 mm): 1000 psi at 100 degrees F (7000 kPa at 38 degrees C)

b. 2-1/2-inch (65 mm) through 4-inch (100 mm): 800 psi at 100 degrees F (5600 kPa at 38 degrees C)

3. Ends:

a. 2-inch (50 mm) and Smaller: Screwed or flanged.

b. 3-inch (75 mm) and larger: Flanged.

C. Valves 4-inch (100 mm) through 12-inch (300 mm).

1. Materials:

    a. Body and Adaptor: Two piece, ASTM A351 Grade CF8M.

    b. Seat: TFE.

    c. Ball: Type 316 stainless steel.

    d. Stem: Type 316 stainless steel.

2. Pressure Rating: ANSI Class 150.

3. Ends: Flanged.

D. Actuators:

1. Manual:

    a. 4-inch (100 mm) and Smaller: Lever.

    b. 6-inch (150 mm) and Larger: Gear operator.

    c. Provide chainwheels where required as specified herein.

2.03 SWING CHECK VALVES – 3-INCH (75 MM) AND SMALLER:

A. Valves 1/2-inch (13 mm) to 2-inch (50 mm):

1. Working Pressure: 200 psi (1400 kPa)

2. Type: Y-Pattern

3. Ends: Threaded ASME 1.20.1

4. Materials:

    a. Body, Cap Disc and Hinge Arm: ASTM A351 CF8M

    b. Hinge Pin, Disc Nut Disc Washer and Plug: ASTM A276 Type 316 stainless steel

    c. Seal and Gaskets: PTFE

B. Valves 1/2-inch (13 mm) to 3-inch (75 mm):

1. Working Pressure: ANSI Class 150

2. Type: Swing check with bolted cover

3. Ends:

a. 1/2-inch (13 mm) through 2-inch (50 mm): Threaded ASME 1.20.1

b. 1/2-inch (13 mm) thru 3-inch (75 mm): Flanged

4. Materials:

a. Body, Cap Disc and Hinge Arm: ASTM A351 CF8M

b. Hinge Pin and Plug: ASTM A276 Type 316 stainless steel

c. Plug Seals and Gaskets: PTFE

2.04 SOLENOID VALVES:

A. Manufacturers:

1. JD Gould.

2. ASCO.

3. Berkert.

B. Type:

1. Size: 1/8-inch (3 mm) to 2-inch (50 mm).

2. Globe type.

3. 2-way, internal piston pilot operated.

4. Energize to open.

5. Operating Pressure Differential: 150 psi (1050 kPa).

C. Materials:

1. Body: Type 316 stainless steel.

2. Seat Discs: PTFE.

3. Piston Assembly: Type 316 stainless steel.

4. Pilot Assembly: Type 316 stainless steel jacket welded on steel core.

D. Coil: Class F.

E. Electrical: 120 Volt, 1 phase, 60 Hertz.

F. Ends: Threaded.

G. Enclosure: NEMA 4X for locations in non-classified areas and NEMA 7 for use in classified areas.

2.05 POSITION INDICATORS:

A. Manufacturer:

1. Trumbull Industries.

B. Provide position indicators installed on all multi-turn valves and quarter turn valves with gear boxes 3 inch (75 mm) and larger.

1. Type: Planetary gear design.

C. Materials:

1. Provide the sun gear, planet gear, ring gears and scale plate constructed of Delrin.

2. Housings of carbon steel or aluminum are not acceptable.

3. Hardware and Fasteners: Type 316 stainless steel.

D. Position Indicator Design Features:

1. Provide the position indication to show the position of the valve, from fully open to fully closed, identified at ground level.

2. Movement of the indicating arrow must be visible through a window covering a minimum of 300 degrees of the circumference of the indicator.

3. Size of the characters and numerals: minimum 3/16-inch (5 mm).

4. Provide the top scale plate with markings representing the number of turns, contain the word “CLOSED”, and a directional arrow.

5. Provide permanently recessed, embossed or engraved markings in the scale plate. The use of adhesive labels is not acceptable.

6. Provide the “OPEN” line marked on a transparent polycarbonate window, field adjusted for the number of turns of each valve size.

7. Provide the position of the adjustable “OPEN” window secured to the top surface of the scale plate by the outside diameter of three Type 316 stainless button head cap screws.

8. Provide all adapters to secure the position indicator, for installation in either a valve box, floor box or wall bracket as indicated and required.

9. Provide the position indicator and adapter with matching flat sides to prevent rotation of the indicator during operation.

E. Exposed and Submerged Valves:

1. Provide a Type 316 stainless steel extension stem connected to a 2 inch (50 mm) square nut on the valve and extend up through the position indicator, terminating in a 2 inch (50 mm) square nut, operable by a standard waterworks tee-handle wrench.

F. Buried Valves:

1. Provide the position indicator installed in a valve box within 6 inches (150 mm) of grade.

G. Valves Installed Inside a Structure:

1. Provide the position indicator installed in a floor box.

2. Where a floor is not directly over the valve and extension stem, support position indicators with a Type 316 stainless steel wall bracket mounted to a side wall.

3. When installed in a floor, provide the adapter with a bronze bushing to support and center the extension stem with the bronze bushing retained in the cast iron floor adapter by two Type 316 stainless steel screws and drilled to an inside diameter 1/16-inch (1.6 mm) larger than the outside diameter of the extension stem.

2.06 SHOP PAINTING:

A. Coat internal and external ferrous surfaces of valve with NSF Certified Epoxy in accordance with ANSI/NSF Std. 61, and in conformance to AWWA D102 Inside System No. 1 for all valves not specified to have a fusion bonded epoxy coating.

B. Process Valve Color: Red.

PART 3 - EXECUTION

3.01 INSTALLATION:

A. Prior to installation, protect stored valves and appurtenances from damage due to exposure to sunlight, heat, dirt, debris, freezing and thawing, vandalism, etc.

B. Clean all debris, dirt, gravel, etc, from inside of piping before placing valves in place.

C. Erect and support valves in respective positions free from distortion and strain on appurtenances during handling and installation. Inspect material for defects in workmanship and material. Clean out debris and foreign material from valve openings and seats, test operating mechanisms to check functioning, and check nuts and bolts for

tightness. Repair, valves and other equipment which do not operate easily or are otherwise defective at no additional cost to the Owner.

D. Set plumb and support valves in conformance with instructions of manufacturer. Shim valves mounted on face of concrete vertically and grout in place. Install valves in control piping for access.

E. Provide bolted split sleeve coupling or flexible type grooved coupling on downstream side of buried valves to assist in valve removal.

F. Where indicated provide Type 316 stainless steel stem extension to operating floor elevation as shown and provide the bevel gear operator with a fabricated steel floorstand and handwheel.

3.02 GATE VALVES AND KNIFE GATE VALVES:

A. Install gate valve stem as shown or with stems between vertical and 45 degrees above the horizontal. Valves installed with stems horizontal or below horizontal are not acceptable.

3.03 CHECK VALVES:

A. Install check valves horizontally in pipelines unless otherwise indicated.

B. Install ball check valves in the vertical unless otherwise indicated.

3.04 FIELD TESTING:

A. Pressure test valves with pipeline pressure testing.

B. Test functions of each valve.

C. Make all adjustments necessary to place valves in specified working order at time of above tests.

D. Remove all replace valves and appurtenances at no additional cost to the Owner with equipment that will meet all requirements specified and indicated if unable to demonstrate to the satisfaction of the Engineer that valves will perform the service specified, indicated and as submitted and accepted.

3.05 FIELD TOUCH-UP PAINTING:

A. After installation and accepted testing by the Engineer, apply touch-up paint to all scratched, abraided and damaged shop painted surfaces. Coating type and color shall match shop painting.

3.06 CONTRACT CLOSEOUT:

A. Provide in accordance with Section 01700.

END OF SECTION

SECTION 15056

PIPE SUPPORTS

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Design, and provide a complete system of pipe supports with inserts, bolts, nuts, restraining and hanger rods, washers, miscellaneous steel, sliding Teflon plates, and accessories as indicated and in compliance with Contract Documents. The term pipe support includes hangers, guides, restraints, anchors and saddles.

B. Provide all support systems and the design of all support systems for all piping as specified herein. The Contractor shall provide pipe support locations, configurations and details through accepted shop drawing submittals stamped by a Registered Professional Engineer as specified herein.

C. The Contractor shall be responsible for the proper design, fabrication, location, shop drawings and installation of all pipe supports in accordance with the specified requirements.

D. Pipe support locations and types for piping 1/2-inch (13 mm) and larger shall be determined by the Contractor using the guidelines for support spacing specified herein and other criteria contained in this pipe support specification. Guidelines for pipe supports may need to be adjusted based upon field coordination, field routing, or other considerations outlined herein such as structural load limits. The Contractor may revise the pipe support locations and details through accepted shop drawing submittals stamped by a Registered Professional Engineer as specified herein. The Contractor is responsible for the proper design, installation and fabrication of all pipe supports in accordance with the specified requirements. For pipe supports 1/2-inch (13 mm) and larger pipe support shop drawings together with a marked up piping drawing showing support number, location and typical type shall be submitted by the Contractor for acceptance.

1. The Contractor shall be responsible for coordinating all pipe support designs for all trades to ensure compliance with all of the requirements of this specification, including but not limited to the total limitations specified herein.

E. Design and provide all temporary pipe supports required during installation and testing.

1.02 REFERENCES:

A. The American Society of Mechanical Engineers (AMSE):

1. B31.1: Power Piping.

B. ASTM International (ASTM):

1. A36: Standard Specification for Carbon Structural Steel

2. A307: Standard Specification for Carbon Steel Externally Threaded Standard Fasteners

3. A312: Seamless and Welded Austenic Stainless Steel Pipe

4. A500: Cold Formed Welded and Seamless Carbon Steel Structural Tubing.

5. A572: Specification for Steel Plate.

6. E165: Practice for Liquid Penetrant Inspection Method.

7. E709: Practice for Magnetic Particle Examination.

C. American Welding Society (AWS):

1. D1.1: Structural Welding

D. Canadian Standards Association (CSA):

1. 40.20: General Requirements for Rolled or Welded Structural Quality Steel

2. 40.21: Structural Quality Steel

3. Welding Procedure Specifications.

E. Fluid Sealing Association: Technical Handbook.

F. Manufacturers' Standardization Society (MSS):

1. SP-58: Pipe Hangers and Supports - Materials and Design.

2. SP-69: Pipe Hangers and Supports - Selection and Application.

3. SP-89: Pipe Hangers and Supports - Fabrication and Installation Practices.

4. SP-90: Guidelines on Terminology for Pipe Hangers and Supports.

G. National Association of Expansion Joint Manufacturers: Standards of the Expansion Joint Manufacturers Association, Inc.

1.03 SUBMITTALS:

A. Submit the following in accordance with Section 01300:

1. Pipe support drawings specified herein and including data for accessory items for acceptance prior to fabrication. The Contractor shall submit pipe support coordination drawings including all piping and pipe supports for all trades.

a. Detailed drawing of the device with dimensions.

b. A table of applied forces and moments.

c. A complete bill of materials.

d. A unique identification and revision level.

e. Stamp of a Registered Professional Engineer, registered in the state where this project is being constructed, experienced in pipe support design and pipe stress analysis as specified herein.

f. Detailed connections to existing structure.

g. Indicate all welds, both shop and field, by Standard Units of Measurement as specified in AWS D1.1.

2. Welding Procedure: Submit description required to illustrate each welding procedure to be performed in the specified work.

3. Welding Equipment: Submit descriptive data for welding equipment, including type, voltage and amperage.

4. Qualification for Welders: Provide certification that welders to be employed in work have satisfactorily passed AWS or ASME qualification tests. If recertification of welders is required, retesting is the Contractor's responsibility at no additional cost to the Owner.

5. Pipe support manufacturers' qualifications as specified herein.

   a. List of at least five (5) successful pipe support projects and current addresses and telephone numbers of persons in charge of representing the owner or the owner of those construction projects during the time of pipe support design, fabrication and installation.

   b. Qualification of manufacturers' Registered Professional Engineer, registered in the state where this project is being constructed, who stamps and seals shop drawings and designs.

6. Coordination drawings for pipe supports shall include as a minimum the following information.

   a. Coordination drawings shall include all pipe supports covered by specifications.

   b. These coordination drawings will be used by the Contractor to ensure that the pipe supports do not obstruct access, access for equipment operation or

removal including all mechanical and electrical equipment, panels, valves, gauges, and instrumentation.

c. The Contractor shall be responsible for including and coordinating the work of all subcontractors into the coordination drawings.

d. Prepare reproducible coordination drawings, indicating equipment, piping, valves, expansion joints, ductwork, conduit, cable trays, junction boxes, lighting fixtures, sleeves, inserts, embedments, supports, hangers and appurtenances at not less than 1/4-inch (5 mm) scale. Drawings shall show beams, columns, ceiling heights, wall, floors, partitions and structural features as indicated on the contract drawings. Individual pipes and conduit 2-inches (50 mm) or less in diameter that will be field routed need not be shown on coordination drawings.

e. Coordination drawings shall include large-scale details as well as cross and longitudinal sections required to fully delineate all conditions. Particular attention shall be given to the location, size, and clearance dimensions of equipment items, shafts, operators and necessary maintenance access.

f. Make all minor changes in duct, pipe or conduit routings that do not affect the intended function, but items may not be resized or exposed items relocated without the approval of the Owner. No changes shall be made in any wall locations, ceiling heights, door swings or locations, window or other openings or other features affecting the function or aesthetic effect of the building. If conflicts or interferences cannot be resolved, the Owner shall be notified. Any problems of coordination that require architectural or structural changes of design shall be submitted to the Owner for resolution.

g. After the reproducible drawings have been coordinated and all changes have been made, the drawings shall be signed by the Contractor and all subcontractors indicating that all work on that drawing has been coordinated with all associated vendors and subcontractors and all conflicts have been resolved.

h. Relocation of any duct, pipe, conduit or other material that has been installed without proper coordination among all trades shall be performed at no additional cost to the Owner.

7. Written notification of any deviations from the requirements of this specification.

8. Support documentation and justification as specified.

9. Certificates of Design signed by a Registered Professional Engineer for all pipe supports.

10. Manufacturer’s product data and specifications for shop painting.

B. Material Certification:

1. Provide certification from the manufacturer that the materials of construction specified are recommended and suitable for the service conditions specified and indicated. If materials other than those specified are proposed based on incompatibility with the service conditions, provide technical data and certification that the proposed materials are recommended and suitable for the service conditions specified and indicated including an installation list of a minimum of five (5) installations in operation for a minimum of five (5) years. Provide proposed materials at no additional cost to the Owner.

2. Where materials are not specified, provide technical data and certification that the proposed materials are recommended and suitable for the service conditions specified and indicated.

C. A copy of the contract mechanical process, and structural drawings, with addenda that are applicable to the equipment specified in this section, marked to show all changes necessary for the equipment proposed for this specification section. If no changes are required, mark all drawings with "No changes required" or provide a statement that no changes are required.

1. Failure to include all drawings or a statement applicable to the equipment specified in this section will result in submittal return without review until a complete package is submitted.

2. A copy of this specification section with addenda and all referenced specification sections with addenda, with each paragraph check-marked to indicate specification compliance or marked and indexed to indicate requested deviations and clarifications from the specified requirements.

a. If deviations and clarifications from the specifications are indicated, therefore requested by the Contractor, provide a detailed written justification for each deviation and clarification.

b. Failure to include a copy of the marked-up specification sections and or the detailed justifications for any requested deviation or clarification will result in submittal return without review until marked up specifications and justifications are submitted in a complete package.

1.04 QUALITY ASSURANCE:

A. Provide in accordance with Section 01400 and as specified.

B. Provide manufacturer's certification in writing, that materials meet or exceed minimum requirements as specified.

C. Welder Qualifications:

1. Quality and certify welding procedures, welders, and operators in accordance with ANSI B31.1, paragraph 127.5 for shop and project site welding of piping work.

D. Pipe supports: All supports and parts shall conform to the latest requirements of the Code for Pressure Piping ASME/ANSI B31.1 and Manufactures Standardization Society (MSS) Standard Practice SP-58, SP-69, SP-89 and SP-90 except as supplemented or modified by the requirements of this specification.

E. Structural Concrete: Conform to the requirements of Section 03300. Concrete strength: 4,000 PSI (28 MPa) unless noted otherwise.

F. Conform to the requirements of the latest edition of the AISC Manual of Steel Construction for miscellaneous and supplementary steel. Tube steels are ASTM A500 Grade B, structural shapes A36, plates A-572 or equal. Stainless steel structural members shall conform to ASTM requirement Type 316L.

G. Pipe Support Manufacturer Qualifications:

1. Must possess a written quality assurance program.

2. Have a minimum of 5 years experience in the design and fabrication of pipe supports.

3. Have completed the design and fabrication of at least 5 successful pipe support projects of equal size, complexity, and systems as this project within the past 10 years.

4. Retains the services of a Registered Professional Engineer, registered in the state where this project is being constructed, with a minimum of ten years experience in the design of piping systems and pipe supports.

5. Manufacturers' Standardization Society (MSS) Member.

6. Have a field service technician on staff with at least 5 years experience in resolving field installation, interference and interface problems associated with the design, installation and manufacture of pipe supporting components.

H. Hanger inspections shall be performed in accordance with MSS-SP-89 and ASME B31.1.

1.05 DELIVERY, STORAGE AND HANDLING:

A. Comply with the requirements specified in Section 01610.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Provide materials used in pipe supports, which are compatible with the pipes to which they are attached. Provide Type 316L stainless steel supports for all stainless steel piping. Copper plated pipe supports are not acceptable.

B. Allowable materials: As indicated in ANSI B31.1 Appendix A and MSS-SP-58 Table 2.

C. Provide Type 316L stainless steel for pipe supports, hangers, guides, restraints, and anchors that are exterior or interior submerged, in potentially wetted areas in wet wells, channels, screening and grit removal areas and in chemically corrosive atmospheres.

D. Provide only new material. Previously used and/or scrap material is not acceptable.

E. Provide tube steels that are ASTM A500 Grade B, Structural shapes A-36, plates A-572 or equal.

F. Provide sliding Teflon plates. The sliding surfaces shall be a nominal 3/8-inches (10 mm) glass filled Teflon bonded to stainless steel backup plate with a 10 gauge minimum thickness. The bearing pad upper and lower units shall be as follows: Conslide Type CSA elements as manufactured by Con-Serv. Inc., Balco TFE Slide Bearing Plates 10N-cs as manufactured by Balco Inc., or Dynalon Slide Bearings as manufactured by JVI, Inc. or acceptable equivalent product.

1. The blended TFE material used for this bearing shall be composed of virgin (unreprocessed) TFE resin tested per ASTM D1457 and reinforcing agents milled glass fibers. This structural material shall have the following representative mechanical and physical properties:

2. Tensile strength -2,000 psi (14 MPa).

3. Elongation –225 percent

4. Specific Gravity -2.17 to 2.22

5. The coefficient of friction shall average 0.06 under compressive load of 2,000 psi (14 MPa).

6. The compressive creep shall be a minimum of 2 percent at 2,000 psi (14 MPa) and 70 degrees F (21 degrees C).

7. The elements shall be flat, clean and prepared for installation in the structure. Slots and holes shall be fabricated in the bearing manufacturer’s plant.

G. Concrete anchor bolts - Hilti Kwik-Bolt II Stud Anchors, Rawl Bolt, Phillips Wedge Anchors, or equal.

2.02 DESIGN, LOCATION, AND TYPE OF PIPE SUPPORTS:

A. Design and provide pipe supports for piping 1/2-inch (13 mm) and larger to include the following loads:

1. Gravity Force: This force includes the weight of pipe, pipe contents (hydro load), valves, in-line equipment, insulation and any other weight imposed on the piping and/or pipe support.

2. Thermal Expansion Force: This force is developed by the restraint of free end displacement of the piping due to thermal growth.

3. Hydrostatic/Dynamic Forces: These forces are developed due to the internal pressure (positive and negative) during operation of the piping system. These forces include the forces due to water hammer, pressure pulses due to rapid valve closure, fluid discharge resulting from pump startup, operation of positive displacement pumps, etc.

4. Wind Loadings: Wind loadings.

B. Provide supports, guides, anchors, flexible couplings and expansion joints in accordance with the coupling and joint manufacturers' specifications and requirements.

C. For all pump suction and discharge nozzles provide an anchor located between the pump nozzles and the nearest expansion joint or non-rigid coupling.

D. Where possible, provide pipe supports, which are the manufacturers' standard products.

1. Provide pipe supports with individual means of adjustment for alignment.

2. Provide pipe supports complete with appurtenances including locking and adjusting nuts.

3. Hanger rods shall be subjected to tension only.

4. Where lateral or axial pipe movement occurs, provide hangers for the necessary swing without exceeding 4 degrees. Provide base supports designed using pipe slides. The bearing surfaces: 0.06 coefficient of friction or less.

5. Provide concrete inserts capable of supporting the design loads.

6. Metal framing systems will be acceptable to support piping 2 inch (50 mm) and smaller.

7. Provide insulated piping supported using rigid load bearing insulation (baton board type) with 16 gauge (1.5 mm) shields to fit between the insulation and the support. Shields to encompass a minimum 1/3 of the pipe circumference and be 12 inch (300 mm) in length.

8. Provide load-bearing insulation capable of supporting the load, as a minimum on the bottom 60 degrees of the pipe support. Cope insulation and adjust to avoid interference of steel structures.

9. Provide supplementary steel as needed.

10. Do not support pipes from other pipe, conduits or metal stairs.

11. Chain, strap, T-bar, perforated bar and/or wire hangers are not acceptable.

12. Contact between piping and dissimilar metals such as hangers, building structural work or equipment subject to galvanic action is not acceptable.

13. All pipe supports located in fluid flow shall be supplied with double nutting.

E. Provide thrust anchors to resist thrust where required. Wall pipes may be used as thrust anchors if so designed. Welded attachments shall be of material comparable to that of the piping, and designed in accordance with governing codes.

F. Provide expansion joints where indicated and where required based on Contractor's design of the pipe support system. Indicate expansion joints on submittal drawings.

G. For piping 2-inch (50 mm) and smaller provide manufacturer’s standard supports and standard spacing guidelines

H. Pipe supports connected to structural framing and slabs are subject to the following limitations:

1. Less than 100 lb (45 kg) horizontal load per support.

2. Vertical loads not to exceed an average of 15 P.S.F. for slabs, with a maximum vertical load per hanger of 1,500 lbs.

3. For a maximum of one pipe support per foot (300 mm) of slab width perpendicular to the span.

4. Vertical loads not to exceed 1,500 lbs. per column or 1,500 lbs. per support at walls.

5. Piping not supported from floors by metal framing must meet the limitations as specified above.

I. All outside above ground supports shall be Type 316L stainless steel as specified herein.

J. Provide pipe supports that do not overload or over stress the piping, equipment, or structure that they are supporting or to which they are attached. Allowable pipe stress to be within ANSI B31.1 code allowable.

K. The Contractor shall provide the services of a field service technician (preferably from the pipe support manufacturer) to field coordinate the locations of supports and resolve interferences and conflicts encountered during installation.

2.03 FABRICATION:

A. Provide pipe supports formed in accordance with paragraph 5.1 of MSS-SP-58.

B. Providing welding in accordance with Structural Welding Code.

C. Provide dimensional tolerances as specified in MSS-SP-89.

D. Provide threading and tapping in accordance with MSS-SP-89.

2.04 SHOP PAINTING:

A. Primer and Finish Paint: Shop apply to all exterior ferrous surfaces, high solids epoxy in accordance with Section 09940.

B. Ferrous surfaces which are not to be painted shall be given a shop applied coat of grease or rust resistant coating.

C. Provide additional shop paint coating for touch-up to all surfaces after installation and testing is completed and equipment accepted.

PART 3 - EXECUTION

3.01 INSTALLATION:

A. Install items in accordance with manufacturers' printed instructions and as indicated and specified herein.

B. Perform welding in accordance with Structural Welding Code:

1. Visually inspect welding while the operators are making the welds and again after the work is completed in accordance with AWS D1.1 Section 6.0. After the welding is completed, hand or power wire brush welds, and clean them before the Qualified Inspector makes the check inspection. The Qualified Inspector shall inspect welds with magnifiers under light for surface cracking, porosity, and slag inclusions; excessive roughness; unfilled craters; gas pockets; undercuts; overlaps; size and insufficient throat and concavity. The Qualified Inspector shall inspect the preparation of grove welds for throat opening and for snug positioning for back-up bars.

2. Nondestructive evaluation of welds connecting structural steel members subjected to critical stresses: Perform in accordance with the weld quality and standards of acceptance in AWS D1.1.

3. Magnetic Particle Inspection: Perform in accordance with ASTM E709.

4. Liquid Penetrant Inspection: Perform in accordance with ASTM E165.

5. For weld areas containing defects exceeding the standards of acceptance in accordance with AWS D1.1, Section 3.7. Provide additional testing of the repaired area at no additional cost to the Owner.

6. Test Locations: As selected by the Owner.

7. Correct any deficiencies detected as directed by the CM at no additional cost to the Owner.

C. Proceed with the installation of the pipe supports only after required building structural work has been completed and concrete support structure has reached its 28-day compressive strength as specified in Section 03300.

D. Install pipe supports to comply with MSS-SP-89. Group parallel runs of horizontal piping to be supported together on trapeze type hangers.

E. Install pipe supports to provide indicated pipe slopes. Do not exceed maximum pipe deflection allowed by ANSI B31.1.

F. For exposed continuous pipe runs, install pipe supports of same type and style as installed for adjacent similar piping.

G. Install pipe supports to allow controlled movement of piping systems. Permit freedom of movement between pipe anchors, and facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

H. Piping to be free to move when it expands or contracts except where fixed anchors are indicated or required by the Contractor's pipe support systems. Where hanger rod swing length cannot be provided or where pipe movement based on expansion of 1 inch/100 feet (10 mm/10 m), for each 100 degrees F (50 degrees C) change in temperature exceed 1/2-inch (13 mm), provide sliding supports.

I. Prevent contact between dissimilar metals. Where concrete or metal support is used, place 1/8-inch (3 mm) thick Teflon, neoprene rubber, or plastic strip under piping at point of bearing. Cut to fit entire area of contact between pipe and pipe support.

J. Prevent electrolysis in support of copper tubing by use of pipe supports which are plastic coated. Electrician's tape is not an acceptable isolation method.

K. Apply an anti-seize compound to nuts and bolts on all pipe supports.

L. Locate reinforcing steel in concrete structure with x-ray prior to drilling for embedment plates and anchor bolts. Avoid contact or interference with reinforcing steel.

3.02 INSTALLATION OF BUILDING ATTACHMENTS:

A. Support piping from structural framing, unless otherwise indicated.

B. Concrete Inserts:

1. Use existing embedded concrete items whenever possible.

2. Use expansion anchors only when existing embedded attachment points are not available or unsuitable. Attach to hardened concrete or completed masonry.

3.03 THRUST ANCHORS AND GUIDES:

A. Thrust Anchors:

1. Center thrust anchors between expansion joints and between elbows and expansion joints for suspended piping. Anchors must hold pipe rigid to force expansion and contraction movement to take place at expansion joints and/or elbows and to preclude separation of joints.

2. Restraining rod size and number shall be as indicated and adhere to manufacturers recommendations as a minimum.

B. Pipe guides: Provide adjacent to sliding expansion joints in accordance with recommendations of the National Association of Expansion Joint Manufacturers and the specific joint manufacturer.

3.04 PIPE SUPPORTS:

A. Where piping of various sizes is to be supported together, space supports for the largest pipe size and install intermediate supports for smaller diameter pipes.

B. Provide minimum of two pipe supports for each pipe piece.

C. Where pipe connects to equipment, support pipe independently from the equipment. Do not use equipment to support piping.

D. Provide pipe supports so that there is no interference with maintenance or removal of equipment.

E. Unless otherwise indicated or authorized by the Engineer, place piping running parallel to walls approximately 1-1/2 inch (40 mm) out from face of wall and at least 3 inches (75 mm) below ceiling.

F. Pedestal pipe supports: adjustable with stanchion, saddle, and anchoring flange. Provide grout between baseplate and floor.

G. Piping supports for vertical piping passing through floor sleeves: use hot dipped galvanized steel riser clamps.

H. Support piping to prevent strain on valves, fittings, and equipment. Provide pipe supports at changes in direction or elevation, adjacent to flexible couplings, adjacent to non-rigid joints, and where otherwise indicated. Do not install pipe supports in equipment access areas or bridge crane runs.

I. Stacked horizontal runs of piping along walls may be supported by metal framing system attached to concrete insert channels.

J. Do not support piping from other piping.

K. Designs generally accepted as exemplifying good engineering practice, using stock or production parts, shall be utilized whenever possible.

L. Whenever possible, pipe attachments for horizontal piping shall be pipe clamps.

M. All rigid rod hangers shall provide a means of vertical adjustment after erection.

N. Where the piping system is subjected to shock loads, such as disturbances due to pump discharge or thrust due to actuation of safety valves, hanger design shall include provisions for rigid restraints or shock absorbing devices.

O. Hanger rods shall be subject to tensile loading only. At hanger locations where lateral or axial movement is anticipated suitable linkage shall be provided to permit rod swing.

P. Hanger spacing shall not exceed the spacing listed below:

1. In the case of concentrated loads the supports shall be placed as close as possible to the load to reduce the bending stress.

2. Where changes in direction of the piping system occur between supports, the total length between supports shall be kept to less than three-fourths of the full span. When practical, a support shall be placed immediately adjacent to any change in direction of the piping system.

Q. Where practical, riser piping shall be supported independently of the connected horizontal piping. Pipe support attachments to the riser piping shall be riser clamp shear lugs. Welded attachments shall be of material comparable to that of the piping, and designed in accordance with governing codes. If friction is relied upon to support riser piping proper justification and documentation shall be submitted to ensure that enough friction force is provided to resist the applied loading.

R. Hanger components shall not be used for purposes other than for which they were designed. They shall not be used for rigging and erection purposes.

S. All threads shall be UNC unless otherwise specified.

T. TFE slide bearing plates with steel backup plates shall be stitch weld attachments to the structure. A 1/8-inch (3 mm) fillet weld, 1/2-inch (13 mm) long every 3 inches (75 mm)

on center each side of an element shall be used unless otherwise indicated or specified by the manufacturers' written recommendations. Bearing elements with slots or holes shall be stitch welded in place for location. The TFE surfaces of the bearings shall be maintained clean and free from grit, dirt or grease.

3.05 INSULATED PIPING:

A. Attach clamps, including spacers (if any), to piping with clamps projecting through insulation; do not exceed allowable pipe stresses.

B. Where vapor barriers are indicated on water piping, install coated protective shields.

3.06 CONTRACT CLOSEOUT:

A. Provide in accordance with Section 01700.

END OF SECTION

SECTION 15370

PROCESS PIPING AND APPUTENANCES

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Provide and test process piping and appurtenances as indicated and in compliance with Contract Documents.

1.02 REFERENCES:

A. American Society of Mechanical Engineers (ASME):

1. B16.1: AN Standard for Cast Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250 and 800

2. B16.3: Malleable Iron Threaded Fittings Classes 150 and 300

3. B16.5: AN Standard for Pipe Flanges and Flanged Fittings, Steel Nickel Alloy and Other Special Alloys

4. B16.9: Factory-Made Wrought Buttwelding Fittings

5. B16.15: Standard for Cast Bronze Threaded Fittings, 125 and 250 lb

6. B16.18: Standard for Cast Copper Alloy Solder-Joint Pressure Fittings

7. B16.22: Standard for Wrought Copper and Bronze Solder-Joint Pressure Fittings

8. B16.26: Standard for Cast Copper Alloy Fittings for Flared Copper Tubes

9. B31.1: Power Piping

B. ASTM International (ASTM):

1. A36: Standard Specification for Carbon Structural Steel

2. A47: Standard Specification for Ferritic Malleable Iron Castings

3. A53: Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

4. A105: Standard Specification for Carbon Steel Forgings for Piping Applications

5. A139: Standard Specification for Electric-Fusion (Arc)-Welded Steel Pipe (NPS 4 and Over)

6. A181: Standard Specification for Carbon Steel Forgings, for General-Purpose Piping

7. A193: Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications

8. A194: Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both

9. A197: Standard Specification for Cupola Malleable Iron

10. A216: Standard Specification for Steel Castings, Carbon, Suitable for Fusion Welding, for High Temperature Service

11. A240: Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications

12. A256: Standard Method of Compression Testing of Cast Iron

13. A269: Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service

14. A278: Standard Specification for Gray Iron Castings for Pressure-Containing Parts for Temperatures Up to 650°F (350°C)

15. A307: Standard Specification for Carbon Steel Externally Threaded Standard Fasteners

16. A312: Seamless and Welded Austenic Stainless Steel Pipe

17. A351: Standard Specification for Castings, Austenitic, for Pressure-Containing Parts

18. A449: Standard Specification for Hex Cap Screws, Bolts and Studs, Steel, Heat Treated, 120/105/90 ksi Minimum Tensile Strength, General Use

19. A536: Ductile Iron Castings

20. B62: Standard Specification for Composition Bronze or Ounce Metal Castings

21. B75: Specification for Seamless Copper Tube

22. B88: Specification for Seamless Copper Water Tube

23. C177: Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus

24. C1136: Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation

25. D256: Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics

26. D570: Standard Test Method for Water Absorption of Plastics

27. D638: Standard Test Method for Tensile Properties of Plastics

28. D696: Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between-30 Degree C and 30 Degree C with a Vitreous Silica Dilatometer

29. D790: Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials

30. D792: Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement

31. D1330: Standard Specification for Rubber-Sheet Gaskets

32. D1457: Standard Specification for Polytetrafluoroethylene (PTFE) Molding and Extrusion Materials

33. D1599: Standard Test for Short-Time Rupture Strength of Plastic Pipe, Tubing and Fittings

34. D1784: Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds

35. D1785: Standard Specification for Polyvinylchloride (PVC) and Chlorinated Polyvinylchloride (CPVC) Plastic Pipe, Schedules 40, 80 and 120

36. D2000: Rubber Products in Automotive Applications

37. D2105: Standard Test for Longitudinal Tensile Properties of Reinforced Thermosetting Plastic Pipe and Tube

38. D2412: Standard Test for External Loading Properties of Plastic Pipe by Parallel-Plate Loading

39. D2467: Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80

40. D2564: Standard Specification for Solvent Cements for Polyvinylchloride (PVC) and Chlorinated Polyvinylchloride (CPVC) Plastic Pipe and Fittings

41. D2855: Standard Practice for Making Solvent Cemented Joints with Polyvinylchloride (PVC) and Chlorinated Polyvinylchloride (CPVC) Pipe and Fittings

42. D2996: Filament-Wound "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe

43. D3035: Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter

44. D3222: Standard Specification for Unmodified Polyvinylidene Fluoride (PVDF) Plastic-Lined Ferrous Metal Pipe and Fittings

45. D3350: Standard Specification for Polyethylene Plastics Pipe and Fittings Materials

46. D5685: Standard Specification for “Fiberglass” (Glass-Fiber-Reinforced Thermosetting-Resin) Pressure Pipe Fittings

47. E84: Standard Test Method for Surface Burning Characteristics of Building Materials

48. F441: Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80

49. F491: Standard Specification for Polyvinylidene Fluoride (PVDF) Plastic-Lined Ferrous Metal Pipe and Fittings

50. F593: Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.

51. F1476: Standard Specification for the Performance of Gasketed Mechanical Couplings for Use In Piping Applications.

C. American Welding Society (AWS):

1. B3.0: Welding Procedure and Performance Qualification

D. American Water Works Association (AWWA):

1. C213: Fusion-Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines

2. C219: Bolted, Sleeve-Type Couplings for Plain-End Pipe

3. C606: Grooved and Shouldered Joints

F. Expansion Joint Manufacturers Association Standards.

G. Fluid Sealing Association - Technical Handbook.

H. Manufacturer's Standardization Society (MSS):

1. SP-67: Butterfly Valves

2. SP-69: Pipe Hangers and Supports - Selection and Application

1.03 SUBMITTALS:

A. Submit the following in accordance with Section 01300:

1. Submit manufacturer's certificates of conformance.

2. Submit certified copies of test reports.

3. Piping layouts in full detail.

4. Location of pipe hangers and supports.

5. Large scale details of wall penetrations and fabricated fittings.

6. Schedules of all pipe, fittings, special castings, flexible connectors, adapters, couplings, expansion joints, and other appurtenances.

7. Reports as required for welding certifications per ASME B31.1 Paragraph 127.6.

8. Catalog cuts of joints, couplings, harnesses, expansion joints, gaskets, fasteners and other accessories.

B. Grooved joint couplings and fittings: Provide product submittals with products specifically identified by the manufacturer’s style or series designation.

1. Brochures and technical data on coatings and linings and proposed method for application and repair.

2. Manufacturer's descriptive literature and technical data on insulation and proposed method of installation.

3. Shop drawing data for accessory items.

4. Manufacturer’s literature as needed to supplement certified data.

5. Operating and maintenance instructions and parts lists.

6. Schematic control and power wiring diagrams.

7. Shop and Field inspections reports.

8. List of recommended spare parts other than those specified.

9. Recommendations for short and long term storage.

10. Special tools.

11. Shop and field testing procedures and equipment to be used.

12. Provide a listing of the materials recommended for each service specified and indicated. Provide documentation showing compatibility with process fluid and service specified and as indicated.

13. The latest ISO 9001 series certification or quality system plan.

14. Material Certification:

    a. Provide certification from the piping and equipment manufacturers that the materials of construction specified are recommended and suitable for the service conditions specified and as indicated. If materials other than those specified are proposed based on incompatibility with the service conditions, provide technical data and certification that the proposed materials are recommended and suitable for the service conditions specified. And indicated including an installation list of a minimum of five (5) installations in operation for a minimum of five (5) years. Provide proposed materials at no additional cost to the Authority.

    b. Where materials are not specified, provide technical data and certification that the proposed materials are recommended and suitable for the service conditions specified and indicated.

C. A copy of the contract mechanical process, civil, structural, electrical and instrumentation drawings, with addenda that are applicable to the equipment specified in this section, marked to show all changes necessary for the equipment proposed for this specification section. If no changes are required, mark all drawings with "No changes required".

    1. Failure to include all drawings applicable to the equipment specified in this section will result in submittal return without review.

D. A copy of this specification section with addenda and all referenced specification sections with addenda, with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations and clarifications from the specified requirements.

    1. If deviations and clarifications from the specifications are indicated, therefore requested by the Contractor, provide a detailed written justification for each deviation and clarification.

    2. Failure to include a copy of the marked-up specification sections and or the detailed justifications for any requested deviation or clarification will result in submittal return without review until marked up specification and justification are resubmitted with the entire package.

1.04 QUALITY ASSURANCE:

A. Welder Qualifications:

1. Qualify and certify welding procedures, welders, and operators in accordance with ANSI B31.1, for shop and project site welding of piping work.

2. Qualification for welders: Welding shall be performed by welders holding current certification for the welding procedures in use.

3. Visually inspect welding while the operators are making the welds and again after the work is completed. After the welding is completed, hand or power wire brush welds and clean them before the inspector makes the check inspection. Inspect welds for defects exceeding tolerances allowed by code under which the weld was made. Repair all defects exceeding tolerance.

B. Provide all grooved joint couplings, fittings, valves, and specialties to be the products of a single manufacturer. Grooving tools used must be of the same manufacturer as the grooved components.

1. Provide all castings used for coupling housings, fittings, and valve bodies date stamped for quality assurance and traceability.

C. Job Conditions:

1. Coordinate dimensions and drillings of flanges with flanges for valves, pumps, and other equipment to be installed in piping system.

1.05 DELIVERY, STORAGE AND HANDLING:

A. Provide in accordance with Section 01610.

B. During loading, transportation and unloading, prevent damage to pipes and coatings. Load and unload each pipe under control at all times. Under no circumstances will a dropped pipe be used unless inspected and accepted by CM. Place skids or blocks under each pipe in the shop and securely wedge pipe during transportation to protect pipe, lining, and coating.

PART 2 - PRODUCTS

2.01 DUCTILE IRON PIPE AND FITTINGS:

A. Provide in accordance with Section 02615.

2.02 PVC PIPE AND FITTINGS:

A. Schedule 80

B. Material: Type I, Grade I Polyvinyl Chloride (PVC) compound with a Cell Classification of 12454 per ASTM D1784.

C. Provide pipe and fittings manufactured in compliance to ASTM D1785 meeting and/or exceeding the Quality Assurance test requirements of this standard with regard to material, workmanship, burst pressure, flattening, and extrusion quality.

D. Provide pipe and fittings manufactured in the USA, using domestic materials, by an ISO 9002 certified manufacturer. Store all pipe shall be stored indoors after production at the manufacturing site until shipped from factory.

E. Provide standard lengths of pipe sizes 10-inch (250 mm) and larger beveled each end by the pipe manufacturer.

F. Provide pipe and fittings with the National Sanitation Foundation (NSF) seal of approval for potable water applications.

G. Joining:

1. Solvent cementing process.

2. Provide flanges at valves, pumps and equipment only or as indicated and specified.

3. Provide Type 316 stainless steel flange bolting and hardware for all piping system.

2.03 STAINLESS STEEL PIPE AND FITTINGS 1/2-INCH (13 MM) TO 2-INCH (50 MM):

A. Provide either Pressfit, grooved or a socket welded system.

1. Provide a sufficient number of unions for Vic-Press and socket welded systems to allow removal of all valves and inline devices.

2. Provide threaded connections only where required.

B. Vic-Press Schedule 10S System:

1. Vic-Press system, 1/2-inch (13 mm) through 2-inch (50 mm) Schedule 10S comprised of stainless steel Vic-Press fittings, couplings and pipe.

2. Type 316 stainless steel Pressfit couplings and fittings and Type 316 stainless steel Pressfit pipe UL classified to ANSI/NSF 61 for cold +86 degrees F (+30 degrees C) and hot +180 degrees F (+82 degrees C) potable water service.

a. Maximum working pressure of 500 psi (3490 kPa) for water, oil, gas, chemical, air and vacuum services.

3. Couplings, Fittings: Pressfit products formed of Type 316/316L stainless steel tubing including a self-contained o-ring seals molded of synthetic HNBR rubber suitable for water operating temperatures to +210 degrees F (+98 degrees C).

4. Valves 1/2-inch (13 mm) through 2-inch (50 mm) ball valves with Type 316 stainless steel plain ends for Pressfit assembly. Victaulic Series 569.

   a. Pressure Rating: 300 PSI (2195 kPa).

   b. CF8M stainless steel body and ball

   c. Type 316 stainless steel stem

   d. PTFE seats.

5. Pipe: Type 316/316L ASTM A312 stainless steel

   a. Schedule 10S.

C. Socket Welded System:

1. Schedule 40 Type 316L stainless steel pipe and fittings with socket welded connections.

D. Grooved System:

1. Schedule 10S type 316L stainless steel pipe and fittings with Type 316 stainless steel grooved end connections and couplings.

2. Fittings: ASTM A403 or be factory fabricated from ASTM A312 stainless steel pipe.

3. Provide couplings consisting of ductile iron or stainless steel housings, with pressure responsive elastomer gasket.

   a. Rigid Type: Victaulic Style 489 (SS) or equal.

   b. Flexible Type: Victaulic Style 77S (SS) or equal.

   c. Installation-Ready, for sizes through 4 inches (100 mm), with ductile iron housings. Victaulic Style 107H (rigid) and Style 177 (flexible) or equal.

   d. 14-inch (350 mm) and Larger: AGS Series, with lead-in chamfer on housing key and wide width FlushSeal gasket. Victaulic Style W89 (rigid) or equal.

2.04 PRESSURE GAUGES:

A. Gauges:

1. Non-liquid filled type.

2. Helical wound bourdon tube, Inconel X-750.

3. Welded parts: Type 316 stainless steel.

4. Bearings: Precision Sapphire Type.

5. 1/2-inch (13 mm) NPT bottom male thread connection.

6. Accuracy: 1/2 percent of scale range.

7. 4-1/2-inch (114 mm) diameter with ABS plastic case.

8. Provide external adjustment.

9. Pipe and Fittings: Schedule 5 Pressfit or Schedule 40 threaded or socket welded, Type 316L stainless steel.

10. Pump Suction Gauges: Provide gauges with range to cover both the normal operating range and the range of pressures that will result from flushing.

11. Pump Discharge Gauges: Provide gauges with range to cover the normal operating range, above the pump shutoff head and the range of pressures that will result from flushing.

12. Seal Water Gauges: Provide gauges with range to cover both the normal operating range and the range of pressures that will result from flushing.

13. Double Wall Stainless Steel Expansion Joint Gauges: Provide gauges with ranges to suit process line pressure as specified and indicated for the service specified in the Process Piping Schedule.

B. Pipe and fittings: Type 316L stainless steel, provide as specified herein.

C. Ball valves: General service stainless steel ball valves in accordance with Section 15101.

D. Pressure Sensor Rings:

1. 1-inch (25 mm) and Larger: Provide sensor/isolators that fit inside the bolt circle of 150-lb (Class 150) or 300-lb (Class 300) ANSI flanges as required.

2. 3/4-inch (19 mm) and Smaller: Provide sensor/isolators full flange or threaded as specified and indicated. For chemical system provide full flange, threaded connections are not acceptable.

3. Face to face length of the sensor: Conform to Specification MSS-SP67.

4. Type: Flow through design with flexible sleeve around full circumference. The center section shall have a cavity behind the sleeve filled with silicone fluid to transfer pressure to the gauge.

5. Rigidly support all pressure instruments by a post at least 7/8 inch (22 mm) diameter welded to the isolator. On sensor rings with more than one instrument, provide all connections 1/2-inch (13 mm) NPT as a minimum, 1/4-inch (6 mm) NPT fittings are not acceptable.

6. Provide sensor/isolator rings that do not have any fill plugs or valves that can be inadvertently removed with the resultant loss of fill fluid. Pressure sensor/isolators using valves are not acceptable.

7. Provide liquid filled sensor/isolators permanently vacuum sealed at the factory with a modular seal consisting of a membrane and needle fitting to allow removal and replacement of pressure instruments without compromising the vacuum fill. Sensor/isolators using valves are not acceptable.

8. Provide the needle fitting with both 1/4-inch (6 mm) NPT(F) threads and 1/2-inch (13 mm) NPT(M) threads.

9. Provide the pressure sensor/isolator capable of operating under pressure with all pressure instruments removed with no loss of fill fluid. Provide an intergral block valve, separate isolation valves are not acceptable.

10. Attach pressure instruments to the isolator with a hand tightened lock ring.

11. It shall be possible to remove or attach pressure instruments to the isolator without requiring the use of any tools.

12. Permanently fill the pressure sensor with high viscosity silicone instrument oil to damp out surges or pressure spikes without the requirement for a separate snubber.

13. Pressure rating: 200 psi (1400 kPa) minimum for all lines tested at 150 psi (1050 kPa) or less and 600 psi (4200 kPa) minimum per lines tested above 150 psi (1050 kPa).

14. Provide gauges as specified herein.

15. Materials:

    a. Pressure sensor/isolator rings: Provide materials suitable for the service conditions specified and indicated, as a minimum provide the following

Service	Body & Plates	Sleeve
Water	Type 316L Stainless Steel	Natural Rubber
Wastewater	Type 316L Stainless Steel	Natural Rubber
Sludge	Type 316L Stainless Steel	Natural Rubber
Scum	Type 316L Stainless Steel	Natural Rubber
Septage	Type 316L Stainless Steel	Natural Rubber
Grit	Type 316L Stainless Steel	Natural Rubber

2.05 WATER PRESSURE REGULATORS 1/2-INCH THROUGH 1-INCH (15 THRU 25 MM):

A. Manufacturers:

1. Cashco

2. Watts

B. Provide water pressure regulators as indicated and specified. Provide sizes and flow rates as indicated and specified or as required by the equipment manufacturer.

C. Provide self contained units operated by internal spring loaded diaphragms or pistons.

1. Provide large size regulators of spring-opposed piston type where not available in diaphragm configuration.

D. Materials:

1. Body and Spring Chamber: ASTM A351 CF8M stainless steel.

2. Cylinder, Piston, Body Cap and Pusher Plate: Type 316 stainless steel.

3. Piston Ring: Inconel X-750.

4. Diaphragm: FKM

5. Seat Disc: V-TFE.

E. End Connections: NPT Female

F. Provide regulators constructed such that all repairs may be performed with valve in-line.

G. Furnish regulators with top adjusting screw provided to set downstream pressure.

H. Provide regulators sized for required flows with inlet pressure and outlet pressure as indicated and specified or as required by equipment manufacturer.

I. Pressure variation at outlet greater than 15 psig (105 kPa) at maximum required flow is not acceptable.

2.06 COUPLINGS-SLEEVE TYPE:

A. Manufacturers:

1. Romac

2. Smith Blair

3. Viking Johnson

4. Dresser

B. Provide couplings meeting AWWA C219

C. Couplings 12-inch (300 mm) and smaller:

1. End rings and center rings: ASTM A536 ductile iron, fusion bonded epoxy coated

2. Gaskets: Buna-N, NSF 61 approved

3. Hardware: Type 316 stainless steel

D. Couplings 14-inch (350 mm) and larger:

1. End rings and center rings: ASTM A36 steel, fusion bonded epoxy coated

2. Gaskets: Buna-N, NSF 61 approved

3. Hardware: Type 316 stainless steel

E. Bridles and tierods: Minimum 3/4-inch (19 mm) diameter, except where tierods replace flange bolts of smaller size, in which case fit with nut on each side of pair of flanges.

1. Provide as indicated

2.07 COUPLINGS-BOLTED SPLIT SLEEVE TYPE:

A. Manufacturers:

1. Victaulic Depend-O-Lok

B. Type: Bolted, split-sleeve type coupling consisting of four basic components; one piece housing, gaskets assembly, bolts and nuts, and restraint rings as required for restraint.

1. Provide split-sleeve with a double arch cross section closing around pipe ends that are smooth for expansion or contraction requirements or pipe ends with end rings affixed for pipe end restraint requirements. As the coupling housing closes, it confines the elastomeric gasket beneath the arches of the sleeve to create the radial seal. The axial seal is affected by the sealing plate at the closure plates as the bolts pull the coupling housing snug around the pipe.

2. Provide sealing members comprised of two “O” ring gaskets and an elastomer sealing pad bonded to the integral sealing plate.

C. Provide couplings designed for the type, size, and working pressure of the piping system as indicated in the Process Piping Schedule and specified.

D. Materials:

1. Split-sleeve:

a. Carbon Steel and Ductile Iron pipelines: ASTM A36 Carbon Steel.

b. Stainless steel pipelines, ASTM A240 Type 316L stainless steel.

c. Provide stainless steel couplings where there is a transition for ductile iron to stainless steel piping.

2. Gaskets:

a. Material: Elastomers in accordance with ASTM D2000.

(1) Air Service: Silicone conforming to ASTM D2000 for air service up to 240 degrees F (115 degrees C) with intermittent exposure to 280 degrees F (138 degrees C).

(2) Liquid Service: Isoprene or Buna-N conforming to ASTM D2000 for service within the temperature range of -20 degrees F (-29 degrees C) to 180 degrees F (38 degrees C).

3. Bolts and Nuts:

a. Bolts: Stainless steel conforming to ASTM F593 Type 316, minimum tensile strength 85,000 psi (593 MPa), (or threaded studs to ASTM A193, Class 2 Grade B8M Type 316)

b. Nuts: ASTM F593 Type 316.

4. End Restraint Rings:

a. Provide restraint rings of the same material as the coupling housing.

b. Non-restrained (ExE) type couplings allows for up to 4 degree deflection. Provides for coupling joint where restraint is not required. If restraint is required, it must be provided independent of the coupling.

c. Fixed x Expansion (FxE) type couplings: Allows for thermal expansion and contraction at the pipe joint. Provide one or two restraint rings fixed to one end of the pipe to keep coupling in the proper location. Where split sleeve coupling FxE for expansion is used provide the expansion side of the coupling with a combination of fixed and sliding supports for thermal movement.

d. Fixed x Fixed (FxF) type couplings: Provides a fully restrained pipe joint. Provide one restraint ring welded to each of the pipe ends fitting beneath the coupling to prevent the pipe joint from pulling apart.

e. Provide type as indicated and specified.

f. Follow manufacturer's written recommendations and instructions for location dimensions and welding detail required to attach the restraint rings.

E. Provide a Type 316 stainless steel nameplate welded to each coupling with the following data:

1. Manufacturer and date fabricated.

2. Type of Coupling (ExE, FxE, FxF).

3. Working Pressure in psi (kPa).

4. Test Pressure in psi (kPa).

5. Materials for coupling, hardware and gaskets.

F. Protective Coating: Prior to installation, couplings shall be coated on the I.D. and O.D. in accordance with section 09940.

G. Couplings installed underground: Provide bitumastic coating or joint tape wrap.

H. Installation of couplings shall be in accordance with manufacturer's recommendation.

1. The coupling housing shall be assembled pulling the closure plates together with the bolts tightened to assure snug coupling housing contact with the pipe OD. Follow the manufacturer's recommendation regarding the installation and tightening of the bolts.

2.08 EXPANSION JOINTS-ELASTOMERIC FLEXIBLE CONNECTION:

A. General: Provide flexible connectors as indicated, specified and as required for ductile iron, steel and stainless steel piping

1. At equipment connection: To eliminate vibration and stress on equipment.

2. Elsewhere: Designed for expansion/contraction.

a. Hot Water Systems: 1.25 inch per 100 feet (1 mm per metre).

b. All other Piping Systems: 0.5 inch per 100 feet (0.4 mm per metre).

B. Manufacturers:

1. Mercer Rubber Co.

2. General Rubber Co.

3. Garlock, Inc.

4. Proco.

C. Products:

1. Straight-through or tapered design as required.

2. Filled arch type for wastewater, sludge and scum applications

3. Furnish control rods for test pressures as indicated or required.

4. Materials: Suitable for service specified and indicated.

5. At expansion joints, provide guide supports located per manufacturer's recommendations.

6. Flanges: 125 lb (Class 125) drilling.

7. Provide Type 316 stainless steel retaining rings.

D. Install joints in their neutral position.

2.09 EXPANSION JOINTS-STAINLESS STEEL:

A. Manufacturers:

1. Pathway

2. Flexonic

3. Adsco

4. Victaulic Omni-Flex

B. Design Criteria:

1. Liquid: Service as indicated in the Process Pump Schedule.

2. Liquid Temperature: As indicated in the Process Pump Schedule.

3. Minimum Pressure Rating: 150 psi (1050 kPa) minimum or as indicated in the Process Piping Schedule.

4. Minimum Lateral Movement: 0.125-inch (3 mm).

5. Minimum Axial Movement: 0.4-inch (10 mm).

6. For expansion joints used on pump discharge nozzles the Contractor shall coordinate the rod size and movement allowable with the pump manufacturer and provide a statement from the pump manufacturer that the expansion joint and rod size is acceptable for the pump provided.

C. Products:

1. Provide bellows of two ply construction formed from concentric tubes having only longitudinal seams.

2. For two ply construction, each ply shall be capable of retaining the rated pressure at the specified temperature independently.

3. For two ply construction, seal weld both plies so that no gas or liquid leaks out at the ends.

4. For two-ply construction, provide a pressure monitoring connection with pressure gauge and pressure switch as specified herein for the annular space.

5. Provide control rods for test pressure.

6. Provide minimum two lifting lugs on each joint. Each lug shall be designed to carry the entire weight of the assembly.

7. Provide each joint with a liner and mark a flow arrow on the outside to indicate direction of flow.

8. Provide each expansion joint with a Type 316 stainless steel nameplate indicating size, bellows material, pressure and temperature rating, lateral and axial limits on movement, date of manufacturer, and the manufacturer.

D. Materials:

1. Bellows:

a. Inner Ply: Inconel alloy 625, minimum 0.048-inch (1.2 mm) thick.

b. Outer Ply: Inconel alloy 625, minimum 0.048-inch (1.2 mm) thick.

c. Fully annealed stainless steel, Type 316 or 321; to ASTM A240.

2. Liner: Type 316L stainless steel, minimum 0.1875-inch (4.8 mm) thick.

3. Flanges: Type 316L stainless steel, Class 150.

4. End Preparation: Stainless steel; suitable for installation with Victaulic Depend-O-Lok couplings.

5. Limit Rods/Nuts and Hardware: Type 316 stainless steel.

E. Install joints in their neutral position.

2.10 FLOW RATE INDICATORS:

A. Type: Rotometer with integral flow control valve.

B. Materials:

1. Polysulfone body with threaded ends,

2. Type 316 stainless steel float and guide.

C. Calibrate in gpm (L/min).

D. Accuracy +2 percent of full scale reading over 10:1 range.

E. Capacities as indicated. For pump seal water services provide with range as recommended by the pumping equipment manufacturer.

F. Working Pressure Rating: 150 psi (1050 kPa).

2.11 HOSE, HOSE FITTINGS AND ACCESSORIES:

A. Hose Manufacturers:

1. Goodrich, HPD Industries

2. Goodyear

3. United Rubber Supply

4. Goodall

B. Hose: 1-inch (25 mm):

1. Provide 4-ply rubber-lined and rubber-covered water hose for 150 psi (1050 kPa) working pressure.

2. Nozzle:

a. Shatter proof and UV resistant Lexan constant flow nozzle with bumper.

C. Hose Reels:

1. Type 316 stainless steel, mill finish.

2. Heavy duty square tubing frame.

3. Spring rewind with declutching arbor.

4. Stainless steel ball bearing swivel joint.

5. 1-inch (25 mm) female NPT.

6. 50 feet (15 m) of hose.

7. Provide a flexible connector between the inlet pipe and inlet swivel joint.

8. Manufacturer: Hannay Model SS800 or acceptable equivalent product.

2.12 Y-PATTERN STRAINERS-METALLIC:

A. 3-inch (75 mm) and Smaller:

1. Materials:

a. Body, Cover and Plug: ASTM A351 CF8M (316) stainless steel

b. Screen: Type 316 stainless steel

2. Screens:

a. 2-inch (50 mm) and Smaller: 20 mesh (840 micrometres).

b. 2-1/2-inch (65 mm) and 3-inch (75 mm): 0.045 perforations

3. Ends: Threaded

4. Pressure Rating: 1440 psi (10 MPa) 100 degrees F (38 degrees C) WOG

5. Blow Off: Provide an NPT tapped blow off connection of the size recommended by the strainer manufacturer.

2.13 WALL AND FLOOR SLEEVES:

A. Materials:

1. Schedule 40 Type 316L stainless steel with 2-inch water stop welded both sides to prevent thrust movement and provide positive water sealing.

2. Schedule 40 carbon steel with 2-inch water stop welded both sides to prevent thrust movement and provide positive water sealing. Model GPWSW manufactured by Advance Products & Systems, Inc., or Equal

3. HDPE, 2-inch thru 24-inch and only where indicated and specified.

B. Water Stops: Provide water stops welded on both sides. Provide water stops 1/4-inch (6 mm) thick and 2-inch (50 mm) high and centered on the wall thickness.

C. Provide modular, mechanical type seals, consisting of inter-locking synthetic rubber links shaped to continuously fill the annular space between the pipe and the wall opening.

1. Manufacturer:

a. Innerlynx

b. Or equal.

D. Provide the elastomeric elements sized and selected per manufacturer's recommendations and have the following properties as designated by ASTM. Coloration shall be throughout elastomer for positive field inspection. Each link shall have a permanent identification of the size and manufacturer's name molded into it.

E. Temperature Range: -40 to +250 degrees F (-40 to 121 degrees C).

1. Material: EPDM, ATSM D2000 M3 BA510

2. Color: Black

F. Modular seal pressure plates: Molded of glass reinforced Nylon Polymer with the following properties:

1. Izod Impact – Notched: 2.05ft-lb/in. (1.09 Nm/cm) per ASTM D256

2. Flexural Strength @ Yield: 30,750 psi (215 MPa) per ASTM D790

3. Flexural Modulus: 1,124,000 psi (7846 MPa) per ASTM D790

4. Elongation Break: 11.07 percent per ASTM D638

5. Specific Gravity:1.38 per ASTM D792

G. Hardware: Type 316 stainless steel.

2.14 TRANSITION COUPLINGS:

A. Provide coupling in accordance with AWWA C219 as specified herein

B. Sizes: 2-inch (50 mm) through 24-inch (600 mm).

C. Materials:

1. End rings and center rings: Ductile iron ASTM A536.

2. Gaskets: Virgin Styrene Butadiene Rubber (SBR) suitable for potable water and wastewater service, ASTM D2000 MBA 710.

3. Provide 5/8-inch (16 mm), Type 316 Stainless steel bolts and nuts

D. Working Pressure: 250 psi (1745 kPa).

E. Lining and Coating: Fusion bonded epoxy in accordance with AWWA C213.

2.15 DISMANTLING JOINTS:

A. Materials:

1. Flanged Spool: AWWA Class D steel ring flange compatible with ANSI class 125 and 150 bolt circles. Provide pipe of ASTM A36 plate 1 percent cold expanded to size.

2. End Ring and Body: ASTM A36 steel

3. Gaskets: ASTM 2000 Virgin NBR suitable for wastewater service

4. Bolts and Nuts: Type 316 stainless steel

5. Tie Rods: Type 316 stainless steel

B. Assembly Tolerance: 3 inches (76 mm)

C. Coating: Fusion bonded epoxy, NSF 61 certified

D. Pressure Rating: 150 psi (1050 kPa) working pressure

E. Manufacturers

1. Romac

2. Viking Johnson

2.16 STAINLESS STEEL HOSE AND FITTINGS:

A. Manufacturers:

1. Anamet, Inc Series 616

B. Provide corrugated stainless steel hose

C. Pressure Rating:

1. Maximum working pressure: Unbraided type

a. 3/8-inch (10 mm) and smaller: 250 psi (1745 kPa)

b. 1/2-inch (13 mm): 60 psi (420 kPa)

c. 3/4-inch (19 mm) to 1-inch (25 mm): 40 psi (280 kPa)

d. 1-1/4-inch (32 mm): 20 psi (140 kPa)

e. 1-1/2-inch (38 mm): 15 psi (730 kPa)

f. 2-inch (50 mm) to 3-inch (80 mm): 10 psi (70 kPa)

2. Maximum working pressure: Single braided type

a. 1/2-inch (13 mm) and smaller: 1000 psi (700 kPa)

b. 3/4-inch (19 mm) to 2-inch (50 mm): 450 psi (3140 kPa)

c. 2-1/2-inch (65 mm) to 4-inch (100 mm): 300 psi (2100 kPa)

3. Safety Factor: 4:1

D. Material:

1. Core: Type 316

2. Braid: Type 316L stainless steel

3. Ends: Type 316L stainless steel

E. Ends: Provide type as indicated

1. 3/4 -inch (19 mm) to 3-inch (75 mm): 150-lb (Class 150) welded female union end

2. 3/4-inch (19 mm) and larger: 150-lb (Class 150) flat faced floating flanged

2.17 SHOP PAINTING:

A. Provide in accordance with Section 09940.

PART 3 - EXECUTION

3.01 INSTALLATION OF PIPE:

A. Install pipelines parallel to building walls wherever possible. Install piping to lines and grades indicated and support. Where temporary supports are used, provide temporary supports as specified in Section 15056 to prevent shifting or distortion of pipe. Provide for expansion.

B. Slope piping toward low points and provide for draining at low points.

C. Before assembly, remove debris from inside pipes and fittings.

D. Before flanges pieces are assembled, remove rust resistant coating from machined surfaces, clean gaskets and smooth burrs. Make up flanged joints tight, and prevent strain upon valves or other pieces of equipment.

1. Bolt threads must fully engage the nuts. At a minimum the bolt must be flush with the nut and no more than 1/2-inch (15 mm) excess thread protruding from the nut.

E. Install grooved joints in accordance with the manufacturer's written recommendations.

1. Grooved ends: Clean and free from indentations, projections, or roll marks.

2. Gaskets: Molded and produced by the coupling manufacturer of an elastomer suitable for the service pecified and indicated.

3. The coupling manufacturer's factory trained representative shall provide on-site training for the contractor's field personnel in the use of grooving tools and installation of product. The representative shall periodically visit the job site to ensure best practices in grooved product installation are being followed.

F. Install tierods, pipe clamps or bridles when sleeve type couplings or fittings are used in piping system as indicated, and at changes in direction or other places to prevent joints from pulling apart under pressures indicated in the Process Pipe Schedule.

G. Examine pieces for damage. Do not install pieces that are damaged according to CM. If any damaged piece should be discovered after having been installed, remove and replace with a sound piece at no additional cost to the Authority.

H. Handle pipe with equipment such as nylon slings and padded skids, designed to prevent damage to the coating. Repair abrasions and injuries to the coating prior to the application of insulation or prior to the application of final field coating.

I. Support piping laid in trenches in trench on bed of selected backfill material which maintains desired line and grade.

J. Use dielectric bushings or unions when ferrous pipes join nonferrous pipes carrying liquid either underground or elsewhere.

K. Welding in accordance with AN Standard B31 and AWS B3.0.

3.02 WALL SLEEVE SEALS:

A. Expand rubber against pipe and sleeve by tightening bolts when assembled around pipe and inserted in wall.

3.03 TEMPORARY PLUGS:

A. Close open ends of pipe with temporary plugs or caps when pipe installation is not in progress. Use watertight plugs for exterior, buried piping and if water or debris is in

trench when work is resumed, do not remove until adequate provision has been made to prevent any water or debris entering pipe even if it necessitates dewatering trench.

3.04 PHYSICAL CHECKOUT, FIELD AND FUNCTIONAL TESTING:

A. Clean dirt, dust, oil, grease and other foreign material, before pressure and leakage tests.

B. Water for testing provided by the Contractor.

C. Pressure and Leakage Tests:

1. Provide temporary testing plugs or caps; pressure pumps, pipe connections, meters, gages, equipment, and labor.

2. Test pipelines in sections of acceptable length.

3. Fill section of pipe with water and expel air.

4. Pressure and leakage test consists of first raising pressure (based on elevation of lowest point of section under test and corrected to gage location) to pressure in psi numerically equal to test pressures indicated in the Process Pipe Schedule.

5. No visible leakage in joint is acceptable.

6. If unable to achieve and maintain specified pressure for one hour with no additional pumping, section has failed to pass test.

7. If section fails pressure and/or leakage test, locate, uncover, and repair or replace defective pipe, fitting, or joint, and conduct additional tests and repairs until section passes test at no additional cost and without any time extensions.

D. Make piping connections to equipment with pipe in a free supported state and without application of vertical or horizontal forces to align piping with the equipment flanges.

E. Do not cover joints in underground piping with backfill material until piping has successfully passed pressure test.

F. Test pressures as indicated in Process Pipe Schedule.

G. Repair faulty joints even to extent of disassembling and remaking joint, remove defective pipe and fittings and replace in manner satisfactory to the Owner.

3.05 CONTRACT CLOSEOUT:

A. Provide in accordance with Section 01700.

END OF SECTION

SECTION 16050

ELECTRICAL WORK – GENERAL

PART 1 – GENERAL

1.01 DESCRIPTION

A. Provide complete and operational systems for systems specified herein, including the installation and wiring of miscellaneous equipment and devices. Perform all Work and testing as indicated and specified to provide operationally ready electrical systems.

1. Provide conduit, wiring and connections for power, motors, motor controllers, control devices, control panels, instrumentation and alarms and for equipment furnished by others as indicated on the contract drawings.

2. All electrically powered equipment and devices provided under other specification sections are connected to electrical systems as part of the Electrical Work. Provide all conduits, wiring and wiring terminations as indicated.

3. Provide all supervision, labor, materials, tools, test instruments or other equipment or services and expenses to test, adjust, set, calibrate, functionally and operationally check all Work and components of the various electrical systems and circuitry throughout the installation.

B. Provide, set up, and maintain all derricks, hoisting machinery, staging, and planking and perform all hoisting required to complete the Electrical Work.

1.02 NOT USED

1.03 RELATED WORK

A. Provide conduit, wiring and terminations for all field-mounted instruments furnished and mounted under other divisions, including process instrumentation primary elements, transmitters, local indicators and control panels. Install vendor furnished cables specified in Division 11 Section 11322.

B. Provide and install control stations shown on the Drawings local to equipment supplied under other divisions.

C. Provide and install safety disconnect switches shown on the Drawings local to equipment supplied under other divisions including all 120 volt circuit, valves, actuator, solenoid valves, etc.

D. All associated conduit, wire and terminations of motors shall be provided under Division 16.

1.04 REFERENCES

A. National Electrical Safety Code (NESC)

B. Occupational Safety and Health Administration (OSHA)

1. OSHA Part 1910; Subpart S, 1910.308

2. OSHA Part 1926; Subpart V, 1926.950 through 1926.960

C. National Fire Protection Association (NFPA)

1. ANSI/NFPA 70B: Electrical Equipment Maintenance

2. NFPA 70E: Electrical Safety Requirements for Employer Workplaces

3. ANSI/NFPA 70: National Electrical Code

4. ANSI/NFPA 101: Life Safety Code

D. National Electrical Manufacturers Association (NEMA)

E. American National Standards Institute (ANSI)

1. ANSI C2: National Electrical Safety Code

2. ANSI Z244-1: American National Standard for Personnel Protection

F. Insulated Cable Consultants Association (ICEA)

G. Instrument Society of America (ISA)

H. Underwriters Laboratories, Inc. (UL)

I. Factory Mutual (FM)

J. International Electrical Testing Association (NETA) – Acceptance Testing Specification for Electric Power Distribution Equipment and Systems (STD)

K. Institute of Electrical and Electronics Engineers (IEEE)

L. Connecticut Electrical Code

M. National Electric Code

N. All inspections and tests shall utilize the following references:

1. Project Design Specifications

2. Project Design Drawings

3. Manufacturer’s shop drawings submittals and instruction manuals applicable to each particular apparatus

1.05 SUBMITTALS

A. Submit the following in accordance with Section 01300:

1. Shop Drawings and Data: Include manufacturer's drawings, bills of material, panel and equipment layouts, catalog data, schematics diagrams, interconnection diagrams, wiring diagrams and other documentary or descriptive information for each assembly submitted in one package.

a. Bills of material: Include a numbered list of all components, with manufacturer's name, catalog number, rating, and other identification. Place item number or identification on all other drawings where item appears.

b. Submit equipment installation instructions in separate submittals from other shop drawings.

c. Mark shop drawings and data submitted showing only items applicable to this specific contract.

d. Make submission of drawings for those components where dimensions of equipment and location of conduit entrances are required to facilitate construction in accordance with the construction schedule.

e. Include one-line diagrams, schematic diagrams, wiring diagrams, control sequence diagrams, relay diagrams, and metering. Submit only completed drawings showing all local and remote devices associated with each item. Submit one complete package of shop drawings. Partial submittals will be returned without action.

f. Submit time-current characteristic curves for all circuit breakers and fuses.

g. Submit instruction manuals for installation, operation, and maintenance of equipment, and parts list. Mark standard publications showing only items applicable to this specific contract. Cross out, blank out, or

otherwise delete non-applicable items. Submittals which do not clearly indicate items and features provided will be rejected.

h. Install permanent nameplates on all devices or pieces of equipment for which use or identification is not readily apparent, such as starters, relays, contactors, pushbuttons, indicating lights, and switches. Make sure position of nameplates are readable after equipment installation.

i. Provide services of the manufacturer's representative as specified in the applicable specification sections.

2. Submit inspection and testing forms for all electrical distribution equipment to be inspected and tested under this section.

3. Submit data sheets for the insulation resistance testing of conductors and equipment prior to performing operating testing. List all cables and equipment to be tested.

4. Provide space on data sheet forms to enter the results of testing, instruments used with serial numbers, and name of personnel performing testing. This data to be filled out during testing.

5. Shop drawings and data are required for the following list:

   a. Starting Equipment Data List -Submit blank list initially to verify acceptable format. Submit final list at completion of the project.

   b. Conduit and Fittings

   c. Wire and Cable

   d. Wiring Devices

   e. Grounding Equipment and Devices

   f. Control Stations

   g. Enclosures

   h. Control Panels

   i. Safety Switches

   j. Field Acceptance Test Reports

   k. Record Drawings

1.06 QUALITY ASSURANCE

A. Provide in accordance with Section 01400 and as specified herein.

B. Install electrical Work in conformance with latest rules and requirements of National Fire Protection Association Standard No. 70 (National Electrical Code) and the Connecticut Electrical Code.

1.07 INTERFERENCE AND ERRONEOUS LOCATIONS

A. Locations of electrical equipment, devices, outlets, and similar items, as indicated, are approximate only. Exact locations shall be determined during construction.

B. In case of interference with other work or erroneous locations with respect to equipment or structures, furnish all labor and materials to complete the work.

1.08 NOT USED

1.09 APPROVAL AND MARKING EQUIPMENT

A. All devices and materials shall be listed and/or labeled by Underwriters Laboratories, Inc., wherever standards have been established by that agency. Where Underwriters Laboratories listing is not available for equipment, submit certified test reports of recognized, independent testing laboratory, approved by the local inspecting authority, indicating that equipment is in conformance with local code requirements or any other applicable requirements.

B. Mark equipment, devices and material with name or trademark of manufacturer and rating in volts and amperes and other information on a nameplate.

1.10 NOT USED

1.11 NOT USED

1.12 NOT USED

1.13 CODE, INSPECTION AND FEES

A. Equipment, materials and installations shall comply with the requirements of the local authority having jurisdiction.

B. Obtain all permits and arrange for all inspections.

1.14 NOT USED

1.15 INTERPRETATION OF DRAWINGS

A. Coordinate the conduit installation with other trades and the actual supplied equipment. Coordinate equipment conduits top and/or bottom entries as required for the equipment installation and as specified and indicated on the contract drawings.

B. Install each 3-phase circuit in a separate conduit unless otherwise indicated.

C. Provide and install all conduits and wiring system as indicated on the contract electrical drawings. Conduits shall not be combined unless otherwise indicated on contract electrical drawings.

D. Conduit shown exposed shall be installed exposed; conduit shown concealed should be installed concealed.

E. All fittings and boxes shall be provided for a complete raceway installation.

F. Except where dimensions are shown, the locations of equipment indicated are approximate only. Obtain information relevant to the placing of electrical Work and in case of any interference with other Work.

G. Circuit layouts are not intended to show the number of fittings, pull boxes, or other installation details. Furnish all labor and materials to install and place in operation all power and other electrical systems indicated.

1.16 NOT USED

1.17 NOT USED

1.18 EQUIPMENT IDENTIFICATION

A. Identify equipment specified under Division 16 with the name of the equipment it serves. junction or terminal boxes shall have nameplate designations as indicated. Equipment nomenclature and identification system shall be as specified herein.

B. Nameplates shall be engraved, laminated plastic, 1/16-in. thick by 3/4-in by 2-1/2-in. with 3/16-in. high white letters on a black background.

C. Nameplates shall be screw mounted to NEMA 1 enclosures. Nameplates shall be bonded to all other enclosure types using a waterproof epoxy adhesive. Two sided foam adhesive tape shall not be used. Where the equipment size does not have space for mounting a nameplate the nameplate shall be permanently fastened to the adjacent mounting surface.

PART 2 – PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 PROTECTION OF ELECTRICAL EQUIPMENT

A. Store equipment in compliance with manufacturer's recommendations and as specified herein.

B. Protect electrical equipment from the weather, especially from water dripping or splashing upon it, at all times during shipment, storage, and construction.

C. Do not store equipment outdoors.

D. Where equipment is installed or stored in moist areas, or unheated buildings, provide acceptable means to prevent moisture damage. Provide uniformly distributed source of heat in electrical equipment to prevent condensation and damage to electrical insulation systems.

3.02 DEFECTIVE OR DAMAGED EQUIPMENT

A. Damaged equipment shall not be used. Equipment damaged in shipment, storage, installation or through other means shall be replaced without additional cost.

B. All equipment showing signs of damage shall be rejected regardless of dielectric test results.

C. All electrical equipment is considered "in storage" regardless of location until first energized. Manufacturer's recommendations for storage precautions, conditions and care shall be followed.

D. Equipment that is found to be damaged shall be replaced at no additional cost.

3.03 NOT USED

3.04 EQUIPMENT ENCLOSURE

A. The equipment enclosure classification of the building areas are indicated within the Area Classification Schedule shown on the contract electrical drawings. Provide all equipment, devices, installations and material meeting the requirements of this schedule.

3.05 AS-BUILT DRAWINGS

A. At the completion of the Project, provide two sets of contract drawings that are marked to show the as-installed equipment, devices, conduits, underground duct lines locations, layouts, wiring and any revisions to the contract drawings that occurred during

construction. As-built drawings shall be complete and provide a detailed and accurate representation of as installed field conditions of all equipment provided under this contract.

3.06 NOT USED

3.07 CUTTING AND PATCHING

A. Arrange installation of all Work such that cutting and patching is not required.

B. Do not cut joints, beams, girders, columns or any other structural members.

3.08 CONTRACT CLOSEOUT

A. Provide in accordance with Section 01700.

END OF SECTION

SECTION 16110

ELECTRICAL RACEWAY SYSTEMS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide raceway systems, with matching accessories, fittings and boxes, as indicated and specified. When non-metallic raceway systems are specified, provide green insulated grounding conductor sized per Connecticut Electrical code requirements in all conduits.

B. All raceway runs are indicated diagrammatically to outline general routing of raceway. Unless specifically identified for installation in concrete walls or slabs, raceways shall be run exposed with raceway supporting systems. Avoid interfering with pipes, ducts, structural members, or other equipment.

C. Raceways and conductors shall be provided for complete and operating systems. Raceways shall be installed exposed unless otherwise indicated on the Electrical Drawings. Avoid conflicts with HVAC ducts, cranes, hoists, monorails, equipment hatches, doors, windows, structural beams and process equipment.

D. Provide raceway systems in accordance with the following:

1. In NEMA 1 or NEMA 12 areas, use galvanized rigid steel raceway systems, fittings and accessories.

2. In NEMA 4 areas, and where subject to wetting or wash down, use PVC coated galvanized rigid steel raceway systems, fitting and accessories.

3. In the chemical areas and in areas designated NEMA 4X, use PVC coated rigid steel raceway systems, fittings and accessories.

4. In classified hazardous areas designated as Class I, Division I and Class 1, Division 2, use PVC coated rigid steel raceway systems, fittings and accessories with tapered threads and sealing fittings as required by the Connecticut Electrical Code for hazardous applications.

E. All raceway systems shall be installed in accordance with the criteria described in this specification section.

1. Use Type 316 stainless steel support systems for exterior application, hazardous areas, NEMA 4, NEMA 4X areas.

2. NEMA 1 and NEMA 12 areas shall use hot dipped galvanized steel support systems.

F. Aluminum conduit and boxes shall not be used.

G. Provide fire stops for all electrical penetrations through fire rated walls and floors.

1.02 REFERENCES

A. National Fire Protection Association (NFPA):

1. National Electrical Code (NEC)

B. Connecticut Electrical Code

C. Underwriters Laboratories, Inc. (UL):

1. UL-1: Electrical Flexible Metal Conduit

2. UL-6: Rigid Metal Electrical Conduit

3. UL-360: Electrical Liquid-Tight Flexible Steel

4. UL-651: Schedule 40 and 80 PVC Conduit

5. UL-886: Electrical Outlet Boxes and Fittings for Use in Hazardous Locations, Class 1, Groups A, B, C, and D and Class 11, Groups E, F, and G

D. National Electrical Manufacturers Association (NEMA):

1. RN-1: Polyvinylchloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit

2. TC-2: Electrical Plastic Tubing (EPT) and Conduit (EPC-40 and EPC-80)

1.03 QUALITY ASSURANCE

A. Comply with the requirements specified in Section 01400.

1.04 SUBMITTALS

A. Shop Drawings: Submit the following in accordance with Section 01300.

1. Submit shop drawings and manufacturer’s product data for all raceway systems, accessories, supports and miscellaneous hardware in accordance with the requirements of Section 16050 and as specified herein.

2. A copy of this specification section with addenda and all referenced specification sections with addenda, with each paragraph check-marked to indicate specification compliance.

    a. Failure to include a copy of the marked-up specification sections will result in submittal return without review until marked up specifications are submitted in a complete package.

1.05 NOT USED

1.06 DELIVERY, STORAGE AND HANDLING:

A. Comply with the requirements specified in Section 01610.

B. Protect all equipment placed into storage from weather, humidity and temperature variations, dirt, dust, and other contaminants.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Rigid Metal Conduit and polyvinylchloride-coated rigid steel conduit:

1. Triangle/PWC, Inc.

2. Perma-Cote Industries.

3. Republic Steel Corporation.

4. Robroy Industries.

5. Or approved equal.

B. Polyvinychloride (PVC) Conduit:

1. Triangle/PWC, Inc.

2. Robroy Industries.

3. Carlon Electrical Sciences, Inc.

4. Or approved equal.

C. Flexible Conduit:

1. American Flexible Conduit Company.

2. Anamet, Inc.
3. Electri-Flex Company.
4. International Metal Hose Company.
5. Or approved equal.

D. Boxes and Fittings:

1. O.Z./Gedney Company.
2. Crouse-Hinds Electrical Construction Materials.
3. Appleton Electric Company.
4. Or approved equal.

E. Fiberglass-Reinforced Polyester Boxes:

1. Crouse-Hinds Electrical Construction Materials.
2. Fibox.
3. Hoffman Engineering Company.
4. Vynckier Enclosure Systems.
5. Or approved equal.

F. Support Systems:

1. Michigan Hanger Co., (O-Strut).
2. Thomas & Betts (Superstrut).
3. Unistrut Corp.
4. Or approved equal.

G. Not Used

2.02 MATERIALS AND COMPONENTS

A. Rigid Metal Conduit:

1. Provide galvanized rigid metal conduit, each with a coupling on one end and thread protector on other end.

2. Hot-dip galvanize rigid steel conduit over entire length, along interior and exterior surfaces, including threads. Conduit shall conform to UL-6.

B. Flexible-Metal Conduit:

1. Provide liquid tight flexible-metal conduit for use in NEMA-1 and NEMA-12 dry areas and match fittings, size, and material to rigid conduit to which it is connected. Flexible-metal conduit shall conform to UL-1.

2. Provide liquid-tight PVC coated flexible-metal conduit for use in NEMA-4 and NEMA 4X damp areas consisting of flexible-metal conduit, with liquid-tight, sunlight-resistant jacket extruded over the conduit. All fittings and accessories shall be PVC coated. On larger than 1-1/4-in., furnish separate external ground wire. Liquid-Tight flexible-metal conduit shall conform to UL-360.

3. Provide stainless steel braided flexible conduit in all hazardous areas.

C. Polyvinylchloride-Coated Rigid Steel Conduit:

1. Provide polyvinylchloride-coated (PVC-Coated), rigid steel conduit conforming to NEMA Standard RN-1 consisting of hot-dipped galvanized rigid steel conduit, with a polyvinylchloride jacket bonded to the outside of all conduit surfaces with a nominal thickness of 40 mils meeting the requirements of NEMA RN-1, 3.1. The adhesive strength of the bonding to equal or exceed tensile strength of the coating. Provide couplings and fittings for this conduit conforming to the requirements of NEMA RN-1, 3.5.

2. A two-part urethane coating shall be applied to the interior of all conduit and fittings at a two mil thickness. The interior coating shall be flexible to allow field bending without cracking or flaking.

D. Boxes:

1. In NEMA 1 and NEMA 12 areas, provide standard, sheet-metal, outlet and junction boxes constructed of code-gauge, galvanized sheet steel. Size each box by the Connecticut Electrical Code.

2. Provide boxes containing fixture studs for hanging fixtures. Use concrete-tight boxes for installation in concrete. Do not use shallow boxes unless building construction is such that it is impossible to use standard-depth boxes.

3. Provide outlet boxes, junction boxes, pull boxes and fittings for hazardous locations conforming to UL-886 for class, group, and division indicated. Outlet boxes and fittings for hazardous areas shall also meet requirements of NEMA 4 areas.

4. Provide boxes and covers for polyvinylchloride-coated steel conduit made of fiberglass reinforced resin or, in classified areas and outside, galvanized cast iron, with a polyvinylchloride factory-applied coating over the galvanizing. Provide coating thickness of 40- mil. Boxes shall have hubs with extruded sleeves extending beyond the hub in the same manner as specified for conduit couplings. Provide cover screws of Type 316 stainless steel.

5. Provide boxes for use with polyvinylchloride conduit made of polyvinylchloride for use as junction boxes and provide high impact strength fiberglass-reinforced polyester boxes for use as device boxes, pull boxes, and terminal boxes. Size each box as required by the Connecticut Electrical Code.

6. Provide terminal blocks in all terminal boxes, panels, and instrumentation cabinets/panels requiring terminations as indicated or by wiring diagrams for equipment actually purchased. All terminals shall be rated 600V, 20 amp. All terminals shall be screw type with provisions for white markers.

7. In NEMA 4 and NEMA 4X areas, provide stainless steel outlet and junction boxes. Size each box as required by the Connecticut Electrical Code.

E. Fittings:

1. Provide cast-iron fittings of malleable iron or a mixture of gray iron and cast steel.

2. Provide expansion fittings where conduits cross expansion joints. Furnish these fittings with grounding straps, clamps, and copper bonding jumpers.

3. For PVC conduit, provide PVC fittings that can be solvent welded to match conduit.

4. Provide PVC-coated coupling and fittings for PVC-coated conduit with an integral, bonded, overlapping pressure-sealing sleeve of the same thickness as conduit coating.

Provide extended sleeves one pipe diameter or 2-in. (whichever is less) beyond the end of the coupling so sleeve of coupling makes a watertight fit with the plastic jacket on the conduit when coupled together. Sealing sleeves at threaded connections shall seal out vapors and liquids.

5. Provide PVC coated fittings and accessories with PVC-coated rigid galvanized steel conduit.

F. Supports:

1. Provide raceway component supports which are meant to function with the raceway, and will support the raceway as indicated and meet the NEC and manufacturer's requirements.

2. Provide Type 316 stainless steel hangers, threaded rods, channels, straps, clips, and clamps for raceways provided in hazardous areas, NEMA-4 and NEMA-4X areas. Provide stainless steel bolts, nuts and washers.

3. Provide hot dipped galvanized steel support system for raceways installed exposed in NEMA 1 and NEMA 12 areas.

4. Provide support for flexible conduit with components which do not compress and do not deform conduit.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Provide all material, equipment, and labor to install the electrical raceway systems as indicated and as specified herein.

B. Perform all Work in accordance with the Connecticut Electrical Code and National Electrical Code.

C. Use no conduit less than 3/4-in. in diameter.

D. Install raceways, boxes, enclosures, and cabinets as indicated, according to manufacturer's printed instructions.

3.02 METHODS OF RESTRAINING RACEWAYS

A. Utilize threaded rod with rod stiffeners and transverse channel braces at 45 degrees angle, at 15-ft. on center, maximum, and on one side of rod support.

B. Utilize longitudinal bracing with channel braces at 30 feet on center, maximum.

C. Strap raceways directly to transverse channel braces, using pipe strap with both ends of strap bolted into the channel brace.

D. Do not rigidly brace raceways to different parts of a building that may respond differently during an earthquake. Seismic restraints shall not limit expansion and contraction of the raceway support system.

E. Provide flexible connections for conduits 2-in. outside diameter or greater when terminating to fixed equipment to prevent loss of raceway integrity in the event of an earthquake.

3.03 INSTALLATION OF FITTINGS

A. Install expansion fittings and bonding jumpers wherever conduits cross structural expansion joints. Keep the fittings in line with conduit, and install with regard to temperature so that full working range of expansion is available.

B. Do not install fittings to replace elbows and pull boxes. Use oversize fittings whenever large cable is installed, in order to maintain bending radius.

C. Equip ends of all conduits with conduit fittings. Fit conduits terminating at motor control center or power distribution equipment, or in box above or below, with grounding type bushings, or solidly ground by locknuts or other fittings. Connect each grounding bushing to ground bus by a bare or green-covered copper wire. Do not use ground wire smaller than 12 awg. Install ground wire larger than 12 gauge when indicated. Where conduits terminate in unprotected areas or where bonding is required over expansion joint, flexible conduit or equivalent; use ground wires No. 6 Awg. copper or larger. Copper bonding jumpers are required over expansion joints.

D. Terminate conduits entering gasketed sheet-metal boxes or gasketed sheet-metal equipment enclosures with gasketed hubs.

E. Terminate conduits entering nongasketed sheet-metal boxes or enclosures with double locknuts and insulated bushings, or equivalent.

F. Make joints tight. Use raceway fittings compatible with raceway use and location. Use threaded rigid steel conduit fittings, except as otherwise indicated.

1. Make raceway terminations tight. Use bonding bushings or wedges at connections subject to vibration. Use bonding jumpers where joints cannot be made tight.

2. Use insulating bushings to protect conductors.

3. Tighten set screws of threadless fittings.

3.04 INSTALLATION OF RACEWAYS

A. Install exposed raceways parallel or at right angles to walls and ceiling beams. Make all changes in directions with bends, elbows, and pull boxes. Space parallel runs evenly throughout. Attach in place with hangers and fasteners. Ground raceways by connection to grounded enclosures, bonding, or other means, to obtain permanent low resistance path to ground throughout installation. Raceway sections in single run and in parallel runs shall be of same type and finish.

1. Run parallel or banked raceways together, on common supports.

2. Install raceways level and square. Provide minimum 7 ft. headroom.

B. Support raceways concealed above suspended ceilings from slab above ceiling in same manner as exposed raceways. Do not support raceways from ceiling supports.

C. Provide cast-in-place inserts in concrete to support all runs, unless otherwise permitted. Use stainless steel sleeve type concrete anchors for installing boxes, and conduit supports. Provide Type 316 stainless steel nuts, bolts, and washers, for use with concrete anchors. Wedge inserts shall not be used.

D. Support conduits by hangers or pipe straps spaced according to Connecticut Electrical Code, but in no case more than 10 feet on center.

E. Stub-Up Connections: Extend conduits through concrete floor for connection to freestanding equipment with an adjustable top or coupling threaded inside for plugs, and set flush with the finished floor. Extend conductors to equipment with PVC coated rigid steel conduit. Flexible metal conduit may be used 6 inches above the floor.

F. Provide sleeves passing through exterior walls and slabs which are wall entrance seals of watertight construction. Furnish watertight seal between slab and sleeve, and between sleeve and conduit or cable. Use wall-entrance seals of malleable iron with watertight sealing gland which may be tightened any time after installation.

G. Do not use dissimilar metals in conjunction with each other. Use insulation between adjoining surfaces so as to eliminate direct contact and any resultant electrolysis. Maintain electrical continuity of system. Use bituminous impregnated felt, heavy bituminous coatings, nonmetallic separators or washers as insulation.

H. Install fittings to match raceway being used.

I. Install expansion fittings wherever conduits cross structural expansion joints. Keep fittings in line with conduit, and install with regard to temperature so that full working range of expansion is available.

J. Provide separate metallic raceways for all low voltage raceways 50 volts and below, shielded wiring, instrumentation, communication, I/O data highway wiring, and fire alarm wiring and install 12-inches from control and power raceways.

K. Terminations: Where raceways are terminated with locknuts and bushings, align the raceway to enter squarely, and install the locknuts with dished part against the box; use two locknuts, one inside and one outside the box.

L. Where terminating in threaded hubs, screw the raceway or fitting tight into the hub so the end bears against the wire protection shoulder. Where chase nipples are used, align the raceway so the coupling is square to the box, and tighten the chase nipple so no threads are exposed.

M. Install pull wires in all empty raceways. Use No. 14 AWG zinc-coated steel or monofilament plastic line having 200-lb. tensile strength. Leave 12 inches of slack at each end of the pull wire.

N. Keep raceways 6 inches away from parallel runs of flues and steam or hot water pipes. Install horizontal raceway runs above water and steam piping.

O. Complete raceway installation before beginning conductor installation.

P. Use temporary closures to prevent foreign matter from entering raceway.

Q. Conduit in transition (from below to above grade, through walls and through concrete) shall be PVC coated rigid galvanized steel (PVC-RGS). The transition shall be made below grade at the final sweep before the transition for exposed conduit. PVC-RGS conduit shall extend one (1) foot minimum above transition finished floor.

3.05 BENDS

A. Make all bends to prevent distortion of circular cross section. Field bent conduit shall have an inside radius of nine diameters.

B. The maximum number of bends in any single conduit run shall be in accordance with the Connecticut Electrical Code requirements.

3.06 CUTTING, THREADING AND CONNECTING

A. Make all field cuts in conduits squarely, file cut ends, ream to remove rough edges and thread in accordance with Connecticut Electrical Code. No running thread shall be permitted. Make all connections mechanically strong and tight, with connectors. Where conduit surface coating is damaged or removed in the cutting, threading or reaming process, restore the surface to its original condition.

3.07 CONDUIT CLEANING

A. Clean conduits before and after installation, ream ends free of burrs, and free inside surfaces from all imperfections.

B. After installation of each new conduit run, snake the run with band to which is attached a tube cleaner with cylindrical mandrel of a diameter 85 percent of nominal diameter of conduit. Remove and replace all conduit through which mandrel will not pass.

C. Use a sponge with steel brush to clean steel conduit and use a sponge with nylon brush to clean PVC conduits.

D. After cleaning, protect ends of all conduit with standard caps to prevent entrance of water, concrete, debris, or other foreign substance.

3.08 CONDUIT DRAINAGE

A. Pitch conduit to drain to outlet boxes, or install so as to avoid trapping moisture. Where dips are unavoidable in exposed conduits, install fitting to match conduit system with drain hole at low point.

3.09 INSTALLATION OF BOXES

A. Unless otherwise indicated, install NEMA 1 or NEMA 12 sheet metal boxes only in dry, accessible locations. Install NEMA 4 and 4X rated boxes in exterior concrete or masonry walls, in floor slabs, in basements, all other below grade locations and elsewhere as indicated. Unless otherwise indicated, cast metal boxes shall be used where vapor-tight fixtures are required, for all surface mounting of wall switches and receptacles and for all outdoor use.

B. Install boxes in conformance with all the requirements of Connecticut Electrical Code. Install boxes designed for type of construction involved. Support boxes in same manner as conduit. Size boxes to provide bending radius for wire or cable of eight times diameter or in accordance with Connecticut Electrical Code, whichever is larger.

C. Center all outlets in panels, or spaces and adjust to structural finish. Where specific locations are not indicated, locate outlets with respect to equipment served.

D. Assemble cast-metal boxes with threaded conduit hubs in such manner that conduit connections and gasketed covers are watertight. Close all unused threaded openings with pipe plugs and compound.

E. Provide cast boxes with covers and device plates that can be used for the area classification. Install screws of Type 316 stainless steel or high brass for iron boxes.

3.10 FLEXIBLE CONNECTIONS TO MOTORS AND EQUIPMENT

A. At all motors and electrically operated equipment to which conduit connections are made, install with a connection between end of conduit and terminal box of motor or other equipment.

B. Install the conduits in locations permitting direct connection to motors.

C. Make connections between rigid raceway and motor or equipment subject to vibration and adjustment using flexible conduit. Make each connection with one quarter bend so that no vibration can be transmitted beyond flexible connection.

D. Use maximum of 6 feet of liquid tight flexible conduit for equipment subject to vibration, noise transmission, or movement; and for all motors. Use liquid tight flexible conduit in wet or damp locations. Locate conduit to reduce the possibility of damage to the exterior flexible conduit jacket. Use fittings that screw into flexible conduit and provide gaskets. Install separate ground conductor across flexible connections.

3.11 NOT USED

3.12 NOT USED

3.13 PROTECTION

A. Provide protection and install in accordance with manufacturer printed instructions such that coatings, finishes, and enclosures are without damage or deterioration at completion of Project.

B. Repair damage to PVC with matching touch-up coating recommended by the manufacturer.

3.14 NOT USED

3.15 CONTRACT CLOSEOUT

A. Provide in accordance with Section 01700.

END OF SECTION

SECTION 16120

ELECTRIC WIRES AND CABLES

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Provide wires, cables and termination and identification materials for complete electrical systems, as indicated and specified.

1.02 RELATED WORK:

A. Division 1: General Requirements

B. Division 16: Electrical Work – General

1.03 REFERENCES:

A. American Society for Testing and Materials (ASTM):

1. B3: Soft or Annealed Copper Wire.

2. B8: Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft.

3. B33: Tinned Soft or Annealed Copper Wire for Electrical Purposes.

B. Connecticut Electrical Code.

C. National Fire Protection Association (NFPA):

1. NFPA-70: National Electrical Code (NEC)

D. Underwriters Laboratories, Inc. (UL):

1. U.L. 44: Wires and Cables Rubber Insulated.

2. U.L. 83: Wires Thermoplastic-Insulated.

3. U.L. 854: Cables, Service Entrance.

4. U.L. 1479: Fire Tests of through Penetration Firestops.

E. National Electrical Manufacturer’s Association (NEMA):

1. WC 5: Thermoplastic Insulated Wire & Cable.

2. WC 8: Ethylene-Propylene-Rubber-Insulated Wire & Cable.

1.04 SUBMITTALS:

A. Submit the following in accordance with Section 01300:

1. Submit shop drawings and manufacturer's product data for all cables, terminations, terminal blocks, lugs, connectors, fire proofing tape, identification tags, etc. in accordance with the requirements of Section 16050 and as specified herein.

2. Submit the following data for fire stop material:

a. Manufacturer’s Listed Systems Designs.

b. Manufacturer’s Product Data Sheets.

c. Manufacturer’s Materials Safety Data Sheets.

d. Manufacturer’s printed instructions for installation on each proposed product. Identify where each material will be used at the Project site.

e. Manufacturer’s prefabricated devices providing descriptions for identification at the Project site.

3. A copy of this specification section with addenda and all referenced specification sections with addenda, with each paragraph check-marked to indicate specification compliance.

a. Failure to include a copy of the marked-up specification sections will result in return of the entire submittal without further review and consideration until the marked-up specification are re-submitted with the entire package.

1.05 NOT USED

1.06 DELIVERY, STORAGE AND HANDLING:

A. Provide in accordance with Section 01610 and as specified.

B. Protect all equipment placed into storage from weather, humidity and temperature variations, dirt, dust, and other contaminants.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS:

A. 600V Cable:

1. Prysmian.
2. Okonite.
3. The Rockbestos Company.
4. Or equal.

B. Metering and Instrumentation Wire, 600V:

1. The Rockbestos Company.
2. Okonite.
3. Prysmian.
4. Or equal.

C. Cable Fireproofing Tape:

1. MAC Products, Inc.
2. 3M Company.
3. Thomas & Betts Company.
4. Or equal.

D. Fire Stop Material and Barriers:

1. Nelson Fire Stop Products.
2. Dow Corning Corporation.
3. 3 M Company.
4. Or equal.

2.02 MATERIALS AND COMPONENTS:

A. Material and stranding of conductors to conform to ASTM B3, ASTM B33, and to ASTM B8.

B. Wires and Cables for Maximum 600-Volt power: Furnish copper conductors. For No. 8 and smaller, provide THWN/THHN type cable. Provide No. 6 and larger as XHHW/2. Provide No. 12 and No. 10 AWG as solid conductor. Provide No. 8 AWG and larger as stranded conductor. Provide wires and cable conforming to UL 83.

C. Wires and Cables for Maximum 600-Volt control, indicating, metering, or alarm circuits: Furnish copper conductors, type THWN/THHN stranded, rated 75C with thermoplastic insulation and nylon jacket. Provide wires and cable conforming to UL 83.

D. Shielded Cable for Instrumentation Wiring: Provide 19-strand tinned copper conductors, size No. 16 AWG. Insulate conductors individually with color coded polyethylene or polyvinylchloride. Twist pairs twisted with varying lay (if more than one pair) and cover with cable tape and copper or aluminum coated mylar shielding tape and tinned copper drain wire. Jacket shall be polyvinylchloride. Cables shall be rated 600 volts and 90 degrees C.

E. Category 6 (CAT6) Cable: Category 6 cable shall consist of 4 twisted pairs of different lay and ground wires, enclosed by an overall conductive mylar backed aluminum foil shield. This shall be enclosed by an overall thermoplastic jacket. The cable shall meet the applicable requirements of ANSI/TIA/IEA-568-B.

PART 3 - EXECUTION

3.01 GENERAL:

A. Provide all material, equipment, and labor to install the electric wire and cables as indicated and as specified.

B. Perform Work in accordance with the Connecticut Electrical Code.

C. Provide power cable identification as follows:

System Voltage	Neutral	Phase A	Phase B	Phase C
208/120V	WhiteBlack	Red	Blue	
240/120V	White-Gray Stripe	Black-Blue Stripe	Red-Blue Stripe	None
480/277V	Gray	Brown	Orange	Yellow

D. Use green to identify insulated ground conductors.

NOTE: Colored insulation, tapes or sleeves may be used to provide color coding, but they must be installed on all conductors at all pull and junction boxes. Insulated ground conductors must have green insulation.

E. Provide control, indicating, metering or alarm cable identification as follows:

1. AC Control Red

2. DC Control Blue

3.02 INSTALLATION OF WIRING:

A. Install wiring in accordance with applicable provisions of Connecticut Electrical Code, and as indicated.

B. Provide wire and cable sizes as indicated. However, in no case use smaller cable sizes than required by the Connecticut Electrical Code.

C. Unless otherwise indicated, use no conductor smaller than No. 12 AWG for power, No. 14 AWG for control, and No. 16 AWG for shielded applications.

D. Install conductors for branch lighting circuits so that voltage drop requirements of Connecticut Electrical Code are met.

E. Install conductors continuous from outlet to outlet and make no splices except within outlet or junction boxes.

F. There shall be no splices between connection points.

G. Draw all conductors contained within a single conduit at the same time.

H. Apply wire pulling compound to conductors being drawn through conduits.

I. Use no cable bend with radius of less than eight times its diameter.

J. Support cables in riser conduits at intervals as required by Connecticut Electrical Code.

K. Pull cables in underground conduit system without splices. Use lubricants recommended by the cable manufacturer. Do not exceed maximum pulling tension specified by the manufacturer. Use a gauge to measure pulling tension to ensure that the recommended limit is not exceeded.

L. Wrap cables in handholes on an individual cable basis with fireproof tape 2 inches wide. Extend fireproofing 1-inch into any duct. Install tape in accordance with manufacturer's instructions.

3.03 CONDUCTOR IDENTIFICATION:

A. Label each wire at both termination points. Label each wire at each end using equipment tag and circuit number where wire is coming from. Carry individual conductor or circuit identification throughout. Random numbering labels similar to what is used for "Quick Pulls" type wiring shall not be acceptable.

B. Identify each wire in junction boxes, cabinets, and terminal boxes. Where no termination is made use a plastic-coated, wire marker and where termination is made use a, plastic, pre-printed sleeve wire marker.

C. In cases where terminal boards are provided for the control, indicating, and metering wires, identify all wires including motor leads and other power wires too large for connection to terminal boards, by sleeve wire markers as specified above.

D. In handholes, identify each power wire by laminated plastic tag with "to" and "from" destinations identified. Tags shall be located to be visible. Control wires to be bundled and marked with "to" and "from" destinations identified.

3.04 CONNECTORS, TERMINAL LUGS AND BOARDS:

A. For wiring of circuits consisting of No. 10 or No. 12 AWG solid wires, such as for lighting branch circuits, utilize self-insulated pressure type connectors for all splices or joints.

B. Terminate all wires and conductors means of ring and tongue, nylon self-insulated, tin-plated copper pressure terminals.

C. Mark terminal strips with ink or indelible pencil. Mark each wire consistently throughout entire system, using notation of wires given on manufacturer's wiring diagrams.

D. Wire connections for which terminals are not supplied, for example, at solenoids or motor terminal junction boxes:

1. 10 AWG and smaller: Use self insulated pressure-type connectors.

2. 8 AWG and larger: Use insulated, mechanical type with set screw or follower bearing directly on the wire. Split bolt connectors are not acceptable.

3.05 FIELD CABLE TESTS:

A. Perform cable testing as specified herein and in accordance with product section:

1. 600 VAC Wire and Cable:

a) Before energizing, the continuity and insulation resistance of all wiring shall be measured with a megger from each wire to all others and ground.

b) All cables and wires to be checked for proper identification numbering and/or color coding.

c) Perform inspection checks and electrical tests in accordance with NETA.

3.06 CONTRACT CLOSEOUT:

A. Provide in accordance with Section 01700.

END OF SECTION

SECTION 16402

UNDERGROUND DISTRIBUTION SYSTEM

PART 1 – GENERAL

1.01 DESCRIPTION:

A. Provide complete underground distribution system as indicated and specified.

B. Conform to lines, grades, elevations, and dimensions. Resolve interferences with other underground conduit and piping or equipment. Match components suitable for proper installation.

C. Provide concrete encasement of duct system. Include forms and reinforcing in installation. Perform work in accordance with Section 16050.

D. Provide Schedule 40 polyvinylchloride (PVC) conduits for power and control circuits within concrete encased ductbank system. Provide rigid galvanized steel conduits for instrumentation, communication, I/O, fire alarm and communication networks within a concrete encased ductbank system.

1.02 RELATED WORK:

A. Division 1: General Requirements

B. Section 16050: Electrical Work - General

C. Section 16110: Electrical Raceway Systems

D. Section 16120: Electric Wires and Cables

1.03 REFERENCES:

A. Connecticut Electrical Code.

B. National Electric Safety Code.

1.04 SUBMITTALS:

A. Submit the following in accordance with Section 01300:

1. A copy of this specification section with addenda and all referenced specification sections with addenda, with each paragraph check-marked to indicate specification compliance.

    a. Failure to include a copy of the marked-up specification sections will result in rejection of the entire submittal with no further review and construction.

2. Submit shop drawings and manufacturers' product data for all components and materials used in the construction of underground distribution systems in accordance with requirements of Section 16050.

3. Provide "As-Built" drawings of underground ductbank system.

PART 2 - PRODUCTS

2.01 MANUFACTURERS:

A. Polyvinylchloride (PVC) Conduit:

1. Specified in Section 16110.

B. Rigid Steel Conduit, Galvanized:

1. Specified in Section 16110.

C. Concrete Red Pigment:

1. Pulverized natural Iron Ore, Number 302 by DCS, Milwaukee, Wisc.

2. Red Iron Oxide Pigment by Bayer Corporation, Pittsburgh, PA.

3. Red Iron Oxide Pigment by Davis Colors, Beltville, MD.

4. Or equal.

2.02 MATERIALS AND COMPONENTS:

A. Conduit Spacers: Furnish conduit spacers made of plastic to maintain spacing between conduits.

B. Concrete: Minimum compressive strength, 4,000 psi.

C. Hot-dipped galvanized steel conduit used underground to be painted with bituminous paint.

PART 3 - EXECUTION

3.01 GENERAL:

A. Perform work in accordance with the Connecticut Electrical Code and project drawings.

3.02 INSTALLATION OF CONDUITS:

A. Lay conduits, indicated to be direct buried in the ground, in trench on 3-inch bed of sand and cover with an equivalent 3-inch bed of sand. Ensure that no rocks come in contact with conduit during backfilling. Dig trenches to depth and location indicated.

B. Provide minimum separation of power and control conduits of 3 inches both vertically and horizontally. Build ductbank layer by layer, backfill and compact each layer to provide support for next layer.

C. Separate power and control ducts from instrument telephone, fire alarm and signal ducts by a minimum of 12 inches.

D. Backfill ductbank in layers and tamp or puddle. Provide yellow ductbank marker tapes, reading "Caution - Electrical Lines Below", over entire length of ductline. Locate tapes 12 inches below grade. Provide a tape for every 12 inches of width of ductline.

E. Install conduit, encased in concrete with spacers and reinforcing, as specified. Rigid galvanized steel conduits to be painted with bituminous paint.

F. Install conduit runs following routing on drawing and running in straight lines. Where deviation from a straight line becomes necessary, install bends of radius which allow for rodding and installation of cable.

G. Accomplish changes in direction of runs exceeding total of 10 degrees, either vertical or horizontal, by long sweep bends having minimum radius of curvature of 25 ft. Manufactured bends can be used at ends of short runs of 100-ft. or less, and then only at or close to the end of run. Provide long sweep bends made up of one or more curved or straight sections and/or combinations thereof. Install manufactured bends with minimum radius of 36-in. where larger radius cannot be used.

H. Lay ductlines to minimum slope of 4 inches per 100-ft. Ductlines are to slope away from buildings.

I. Install spacers at intervals of approximately 4 ft. and stagger between tiers of ducts to provide not less than 12-in. of longitudinal separation. Install base spacers to provide at least 3-in. between bottom of trench and underside of bottom conduits. Completely fill space with concrete. Firmly wire conduits and spacers together before concrete is placed.

J. Ductbanks are to be formed, unless trench conditions allow for neat placement of concrete with specified clearances.

K. Prior to placing of concrete, remove all dirt, sand, and any other debris from between conduits and from trench bottoms. Hold conduits in place to prevent floating or accidental movement.

L. Stagger joints in conduits at least 6-in. Do not allow couplings to rest on bottom of trench. Install couplings for plastic conduit in accordance with manufacturer's recommendations.

M. Install concrete encasements so minimum clearance of 12-in. from concrete to parallel pipes, lines, structures, etc., is maintained. Where ducts cross, minimum clearance of 6 inches is required. Do not allow the top of concrete to be less than 30-in. below finished grade or paving. Submit special conditions which may require lesser clearances or special conditions which may require greater than 30 inch depth for approval.

N. Where a connection is made to existing ductline, bond or dowel concrete encasement to existing encasement. Use waterstop between ductpours and between manholes or buildings and ductwork as indicated.

O. Do not use power-driven vibrators for spading of concrete around ducts.

P. Roll and grade backfill, and restore surface to condition equal to the site finish grade, or as otherwise indicated.

Q. Keep conduits clean of concrete, dirt, and other substances during the course of construction. After the ductlines have been completed, pull a standard flexible mandrel not less than 12-in. long, having a diameter approximately 1/4-in. less than the inside diameter of the conduit, through each conduit, after which pull a brush with stiff bristles through each conduit to make certain that no particles of earth, sand, or gravel have been left in the line. Replace conduit runs that do not allow the passage of the mandrel. Pneumatic rodding may be used to draw in the lead wire. Install in spare conduits a pull wire or rope, and plug and seal spare conduits after cleaning.

R. Trowel Conduit Red pigment into the top of all ductbanks. Resulting surface is to be uniform in both texture and the color red. Blend 5 pounds of red ironoxide pigment with 94 pounds of cement and apply to freshly poured concrete surface after screeding. Trowel the pigment into the cement.

S. Conduit in transition (from below to above grade, through walls and through concrete) shall be PVC coated rigid galvanized steel (PVC-RGS). The transition shall be made below grade at the final sweep before the transition for exposed conduit. PVC-RGS conduit shall extend one (1) foot minimum above transition finished floor.

3.05 RECORD DRAWINGS OF UNDERGROUND WORK:

A. Furnish two sets of marked copies of contract drawings, showing exact routing and depths of all underground conduit. Furnish scaled plot plans, showing principal outline of buildings and structures. Reference conduits, ducts and all bends deviating from straight line, dimensionally from fixed objects or structures.

3.06 CONTRACT CLOSEOUT:

A. Provide in accordance with Section 01700.

END OF SECTION

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SECTION 16481

ELECTRIC HEAT TRACING

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Furnish, install, and test a complete electrical heat tracing system as indicated on the electrical drawings, and as specified herein.

B. The installed system will be required to provide freeze protection for the liquid in the pipes around which the electrical heat tracing is placed.

C. Provide pipe heat tracing continuing below grade for 4’-0”.

1.02 RELATED WORK:

A. Section 16050: Electrical Work – General

1.03 REFERENCE STANDARDS:

A. Underwriter's Laboratories (UL):

1. UL 515: Electrical Resistance heat Tracing for Commercial and Industrial Applications.

B. National Fire Protection Association (NFPA):

1. NFPA 70: National Electrical Code (NEC)

C. National Electrical Manufacturers Association (NEMA):

1. NEMA 250: Enclosures for Electrical Equipment (1000 Volts Maximum)

D. Institute of Electrical and Electronics Engineers, Inc. (IEEE):

1. IEEE Std. 515: Testing, Design, Installation, and Maintenance of Electrical Resistance heat Tracing for Commercial Applications.

1.04 SUBMITTALS:

A. Submit the following in accordance with Section 01300:

1. A copy of this specification section with addenda and all referenced specification sections with addenda, with each paragraph check-marked to indicate specification compliance.

    a. Failure to include a copy of the marked-up specification sections will result in rejection of the entire submittal with no further review and construction.

2. Complete list of equipment and materials, including manufacturer's descriptive and technical literature, catalog cuts, and installation instructions.

3. Complete wiring and schematic diagrams for the equipment furnished at each piping location.

4. Isometric piping layout indicating power and splice connections.

5. Other details required to demonstrate that system has been coordinated and will properly function.

6. Test Reports: Upon completion of installed system, submit in booklet form, all field tests performed.

7. A report for the system provided indicating the number of circuits and the required watts per foot of cable for each system layout. The report shall include the length of heat trace cable to establish circuit breaker requirement for each circuit.

B. A copy of this specification section with addenda and all referenced specification sections with addenda, with each paragraph check-marked to indicate specification compliance.

    1. Failure to include a copy of the marked-up specification sections will result in return of the entire submittal without further review and consideration until the marked-up specification are re-submitted with the entire package

1.05 QUALITY ASSURANCE:

A. Conduit size and wire quantity, size, and type shall be suitable for the equipment supplied. Contractor shall review the proper installation of each type of device with the equipment supplier prior to installation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS:

A. Chromalox Industrial Heating Products.

B. Tyco

C. Delta-therm

D. Or equal.

2.02 HEAT TRACING CABLE:

A. Provide heating cable consisting of flat, flexible parallel copper bus wires with a continuous inner core of self-regulating semi-conductive material. Provide cable with overall metal-braid and overall jacket. Cables are to operate at voltage shown on Electrical Drawings.

1. Cable shall be of parallel construction to allow cutting to length without changing power output per unit length.

2. The heater cable assembly shall have a monolithic heating core construction consisting of two parallel nickel-plated copper bus conductors with a semi conductive Positive Temperature Coefficient (PTC) polymer extruded over and between these parallel conductors. A polyethylene dielectric insulating jacket shall be extruded over the heating element core.

3. The semi conductive heating matrix and primary insulating jacket shall be cross-linked by irradiation.

4. The basic cable will be covered by means of a metallic braid of tinned copper. The braid will provide a nominal coverage of eighty percent (80%).

5. The cable shall be covered with a corrosion resistant over jacket of thermoplastic elastomer for possible exposure to aqueous solutions, mold acids or based) or fluoropolymer (for possible exposure to organic chemicals or corrosives).

6. Long term stability shall be established by the service life performance test per IEEE Standard 515.

7. Cable shall be rated for minimum 277V and maximum output of 15 watt/ft.

B. Provide on pipes a cable to maintain the medium in the pipe at a temperature of 50 deg. F.

2.03 CONTROLS:

A. Provide controls located in non-hazardous areas rated NEMA 4X.

B. Provide UL listed heat trace control panels.

C. Controls shall incorporate electronic controllers, thermostats, switching the heating system via electrical contactors.

D. Provide thermostat to control the desired pipe temperature as specified in 2.02.B.

E. Temperature sensing shall be performed by bulb and capillary style thermostats mounted on the pipe within the insulated system. Provide with heavy duty, 22 amp rated contacts. Thermostat sensing bulb and capillary shall be stainless steel.

F. Control enclosure shall provide sufficient terminals for all power and field cable connections.

G. Provide power connection boxes, devices, end seals, mounting hardware, all controls, wiring and conduit for operating heat tracing systems.

H. Provide an end-of-line LED white indicating lamp to show power is available to the entire heat-traced run.

2.04 GROUND FAULT PROTECTION:

A. All heat tracing systems shall be provided with ground-fault protection. Ground-fault breakers with 30 ma trip shall be provided as required.

B. The metallic covering on all heating cables shall be grounded.

PART 3 - EXECUTION

3.01 INSTALLATION:

A. Provide pipe heat tracing as called for in the drawings.

B. Heat trace cable shall be taped secure to the piping and located inside piping insulation.

C. Provide all material, equipment, and labor to install the electric heat tracing system as specified.

D. Install the system in accordance with manufacturer's instructions and reviewed shop drawings.

E. Minimize splices. Install a marker located at each splice on outside of insulation where the splice is concealed by insulation.

F. Locate a weatherproof label at 15 ft. intervals stating “CAUTION – ELECTRIC TRACED” and affix to the insulation system.

3.02 CHECKOUT AND TESTING:

A. Provide checkout, field and functional testing in accordance with Section 16050.

B. Measure the resistance between the heating cable bus wires and the braid.

C. Measure the insulation resistance between the braid and metal pipe.

D. Do not allow test leads to be in contact with junction boxes, which can cause inaccurate readings.

E. All insulation resistance values should be greater than 1000 megohms.

3.03 CONTRACT CLOSEOUT:

A. Provide in accordance with Section 01700.

END OF SECTION

SECTION 16900

ELECTRICAL CONTROLS AND MISCELLANEOUS ELECTRICAL EQUIPMENT

PART 1 – GENERAL

1.01 DESCRIPTION:

A. Provide and connect the electrical control equipment and miscellaneous electrical equipment, including such instruments and devices indicated and specified. Device enclosures for electrical equipment shall comply with the requirements of Connecticut Electric Code.

1.02 RELATED WORK:

A. Division 1: General Requirements

B. Division 11: Equipment

C. Division 16: Electrical

1.03 REFERENCES:

A. Underwriter's Laboratories, Inc. (U.L.):

1. UL-467: UL Standard for Safety, Grounding and Bonding Equipment.

2. UL-489: UL Standard for Safety, Molded-Case Circuit Breakers and Circuit Breaker Enclosures.

B. National Electrical Manufacturers Association (NEMA):

1. 250: Enclosures for Electrical Equipment (1000 volts maximum).

2. ICS 1: General Standards for Industrial Control and Systems.

3. ICS 2: Industrial Control Devices, Controllers and Assemblies.

4. ICS 4: Terminal Blocks for Industrial Use.

C. American Society for Testing and Materials (ASTM) Publications:

1. D 178: Specification for Rubber Insulating Matting.

D. National Fire Protection Association (NFPA):

1. NFPA-70 National Electrical Code (NEC).

E. Connecticut Electrical Code.

1.04 SUBMITTALS:

A. Submit the following in accordance with Section 01300:

1. Wiring diagrams to show control interface points provided with other equipment.

2. Submit time current characteristic curves for all circuit breakers.

3. Shop drawings to include:

a. Outline drawings with elevations.

b. Equipment arrangement drawings.

c. Anchor bolt location drawings.

d. Electrical schematics and wiring diagrams.

e. Electrical fuse/circuit breaker characteristic.

f. Equipment performance curves and technical data.

g. Bill of installation/assembly materials.

h. Equipment weights.

i. Completed manufacturer’s data sheets.

j. Assembly sizes and weights.

B. A copy of this specification section with addenda and all referenced specification sections with addenda, with each paragraph check-marked to indicate specification compliance.

1. Failure to include a copy of the marked-up specification sections will result in return of the entire submittal without further review and consideration until the marked-up specification are re-submitted with the entire package.

1.05 NOT USED

1.06 DELIVERY, STORAGE AND HANDLING:

A. Comply with the requirements specified in Section 01610.

B. Protect all equipment placed into storage from weather, humidity and temperature variations, dirt, dust, and other contaminants.

PART 2 - PRODUCTS

2.01 ACCEPTABLE ELECTRICAL DISTRIBUTION MANUFACTURERS:

A. Allen-Bradley

B. General Electric Company

C. Cutler-Hammer

D. Square D Company

E. Appleton Electric Company

F. Crouse-Hinds Company

G. O-Z/Gedney

H. Or equal.

2.02 ACCEPTABLE STAINLESS STEEL/GALVANIZED STEEL CHANNEL MANUFACTURERS:

A. Unistrut Corp.

B. Power-Strut.

C. B-Line Systems, Inc.

D. Or equal.

2.03 ACCEPTABLE FIBERGLASS CHANNEL MANUFACTURER:

A. Omnistrut, Champion Fiberglass.

B. Durostrut, Enduro Composite Systems.

C. Struttech, Entrum Industries.

D. Or equal.

2.04 NOT USED

2.05 NOT USED

2.06 NAMEPLATES:

A. Provide nameplates for equipment (including pushbutton and selector switch stations) listed in this Section to designate the equipment controlled and their function.

B. Nameplates shall be laminated black bakelite with one-quarter inch (1/4-in.) high, white, recessed letters. Securely attach to the equipment with Type 316 stainless steel screws, or rivets. Adhesives, glue or cements will not be permitted.

C. Provide all junction boxes, pull boxes, disconnect switches and control panels with a nameplate to designate the system wiring contained within.

D. Install nameplates in a location near or on the equipment or devices.

2.07 TERMINAL BLOCKS:

A. Provide terminal blocks in all terminal boxes panels, control and instrumentation cabinets/panels requiring terminations as indicated on drawings or by wiring diagrams for equipment actually purchased. All terminals shall be rated 600V, 20 amp. All terminals shall be screw type with provisions for white wire markers.

2.08 CHANNEL:

A. Provide Type 316 stainless steel channel or fiberglass channel with corresponding accessories as specified in Section 16110 and herein.

B. Provide hot-dipped galvanized after fabrication for steel channel and accessories.

C. Provide channel of the proper material to match equipment classifications, per Section 16110.

PART 3 - EXECUTION

3.01 CHANNELS:

A. Install Type 316 stainless steel for mounting of electrical equipment in outdoor areas, NEMA 4 or 4X areas, and on below grade, outside building and structure walls.

B. Install galvanized steel channels for interior building mounting of electrical equipment except for those locations listed in Paragraph 3.02.A of this Section.

C. Install fiberglass channel in chemical areas with NEMA 4X enclosures.

3.02 PHYSICAL CHECKOUT AND TESTING:

A. Provide field and functional testing in accordance with Sections 16050 and as specified herein.

3.03 CONTRACT CLOSEOUT:

A. Provide in accordance with Section 01700.

END OF SECTION

SEPTAGE RECEIVING STATION
BRANFORD, CONNECTICUT

APPENDIX A

WAGE RATES

Minimum Rates and Classifications for
Heavy/Highway Construction

ID#: 22-36294

Connecticut Department of Labor
Wage and Workplace Standards Division

By virtue of the authority vested in the Labor Commissioner under provisions of Section 31-53 of the General Statutes of Connecticut, as amended, the following are declared to be the prevailing rates and welfare payments and will apply only where the contract is advertised for bid within 20 days of the date on which the rates are established. Any contractor or subcontractor not obligated by agreement to pay to the welfare and pension fund shall pay this amount to each employee as part of his/her hourly wages.

Project Number: 43 Project Town: Branford
State#: FAP#:
Project: Septage Receiving Station At The Branford Water Pollution Control Facility

CLASSIFICATION	Hourly Rate	Benefits
1) Boilermaker	44.46	28.51
1a) Bricklayer, Cement Masons, Cement Finishers, Plasterers, Stone Masons	38.27	34.47
2) Carpenters, Piledrivermen	36.07	26.15
2a) Diver Tenders	36.07	26.15
3) Divers	44.53	26.15
03a) Millwrights	36.32	26.81
4) Painters: (Bridge Construction) Brush, Roller, Blasting (Sand, Water, etc.), Spray	55.0	23.85
4a) Painters: Brush and Roller	37.22	23.40
4b) Painters: Spray Only	40.22	23.40
4c) Painters: Steel Only	39.22	23.40

4d) Painters: Blast and Spray	40.22	23.40
4e) Painters: Tanks, Tower and Swing	39.22	23.40
4f) Elevated Tanks (60 feet and above)	46.22	23.40
5) Electrician (Trade License required: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9)	40.6	32.21+3% of gross wage
6) Ironworkers: Ornamental, Reinforcing, Structural, and Precast Concrete Erection	39.7	38.77 + a
7) Plumbers (Trade License required: (P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2) and Pipefitters (Including HVAC Work) (Trade License required: S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4 G-1, G-2, G-8, G-9)	47.03	34.05
----LABORERS---- -		
8) Group 1: Laborer (Unskilled), Common or General, acetylene burner, concrete specialist	32.0	24.40
9) Group 2: Chain saw operators, fence and guard rail erectors, pneumatic tool operators, powdermen	32.25	24.40
10) Group 3: Pipelayers	32.5	24.40
11) Group 4: Jackhammer/Pavement breaker (handheld); mason tenders (cement/concrete), catch basin builders, asphalt rakers, air track operators, block paver, curb setter and forklift operators	32.5	24.40
12) Group 5: Toxic waste removal (non-mechanical systems)	34.0	24.40
13) Group 6: Blasters	33.75	24.40

Group 7: Asbestos/lead removal, non-mechanical systems (does not include leaded joint pipe)	33.0	24.40
Group 8: Traffic control signalmen	18.0	24.40
Group 9: Hydraulic Drills	32.75	24.40
----LABORERS (TUNNEL CONSTRUCTION, FREE AIR). Shield Drive and Liner Plate Tunnels in Free Air.----		
13a) Miners, Motormen, Mucking Machine Operators, Nozzle Men, Grout Men, Shaft & Tunnel Steel & Rodmen, Shield & Erector, Arm Operator, Cable Tenders	34.23	24.40 + a
13b) Brakemen, Trackmen, Miners' Helpers and all other men	33.26	24.40 + a
----CLEANING, CONCRETE AND CAULKING TUNNEL----		
14) Concrete Workers, Form Movers, and Strippers	33.26	24.40 + a
15) Form Erectors	33.59	24.40 + a
----ROCK SHAFT LINING, CONCRETE, LINING OF SAME AND TUNNEL IN FREE AIR:----		
16) Brakemen, Trackmen, Tunnel Laborers, Shaft Laborers, Miners Helpers	33.26	24.40 + a
17) Laborers Topside, Cage Tenders, Bellman	33.15	24.40 + a
18) Miners	34.23	24.40 + a
----TUNNELS, CAISSON AND CYLINDER WORK IN COMPRESSED AIR: ----		

18a) Blaster	40.72	24.40 + a
19) Brakemen, Trackmen, Groutman, Laborers, Outside Lock Tender, Gauge Tenders	40.52	24.40 + a
20) Change House Attendants, Powder Watchmen, Top on Iron Bolts	38.54	24.40 + a
21) Mucking Machine Operator, Grout Boss, Track Boss	41.31	24.40 + a
----TRUCK DRIVERS----(*see note below)		
Two Axle Trucks, Helpers	31.16	28.78 + a
Three Axle Trucks; Two Axle Ready Mix	31.27	28.78 + a
Three Axle Ready Mix	31.33	28.78 + a
Four Axle Trucks	31.39	28.78 + a
Four Axle Ready-Mix	31.44	28.78 + a
Heavy Duty Trailer (40 tons and over)	33.66	28.78 + a
Specialized earth moving equipment other than conventional type on-the road trucks and semi-trailer (including Euclids)	31.44	28.78 + a
Heavy Duty Trailer (up to 40 tons)	32.39	28.78 + a
Snorkle Truck	31.54	28.78 + a
----POWER EQUIPMENT OPERATORS----		

Group 1: Crane Handling or Erecting Structural Steel or Stone, Hoisting Engineer (2 drums or over). (Trade License Required)	50.27	26.80 + a
Group 1a: Front End Loader (7 cubic yards or over); Work Boat 26 ft. and over.	46.07	26.80 + a
Group 2: Cranes (100 ton rate capacity and over); Bauer Drill/Caisson. (Trade License Required)	49.91	26.80 + a
Group 2a: Cranes (under 100 ton rated capacity).	49.06	26.80 + a
Group 2b: Excavator over 2 cubic yards; Pile Driver ($3.00 premium when operator controls hammer).	45.71	26.80 + a
Group 3: Excavator; Gradall; Master Mechanic; Hoisting Engineer (all types of equipment where a drum and cable are used to hoist or drag material regardless of motive power of operation), Rubber Tire Excavator (Drott-1085 or similar);Grader Operator; Bulldozer Fine Grade (slopes, shaping, laser or GPS, etc.). (Trade License Required)	44.86	26.80 + a
Group 4: Trenching Machines; Lighter Derrick; CMI Machine or Similar; Koehring Loader (Skooper).	44.42	26.80 + a
Group 5: Specialty Railroad Equipment; Asphalt Paver; Asphalt Spreader; Asphalt Reclaiming Machine; Line Grinder; Concrete Pumps; Drills with Self Contained Power Units; Boring Machine; Post Hole Digger; Auger; Pounder; Well Digger; Milling Machine (over 24" mandrel)	43.73	26.80 + a
Group 5 continued: Side Boom; Combination Hoe and Loader; Directional Driller.	43.73	26.80 + a
Group 6: Front End Loader (3 up to 7 cubic yards); Bulldozer (rough grade dozer).	43.38	26.80 + a
Group 7: Asphalt Roller; Concrete Saws and Cutters (ride on types); Vermeer Concrete Cutter; Stump Grinder; Scraper; Snooper; Skidder; Milling Machine (24" and under Mandrel)	42.99	26.80 + a
Group 8: Mechanic, Grease Truck Operator, Hydroblaster, Barrier Mover, Power Stone Spreader; Welder; Work Boat under 26 ft.; Transfer Machine.	42.54	26.80 + a

Group 9: Front End Loader (under 3 cubic yards), Skid Steer Loader regardless of attachments (Bobcat or Similar); Fork Lift, Power Chipper; Landscape Equipment (including hydroseeder), Vacuum Excavation Truck and Hydrovac Excavation Truck (27 HG pressure or greater).	42.04	26.80 + a
Group 10: Vibratory Hammer, Ice Machine, Diesel and Air Hammer, etc.	39.7	26.80 + a
Group 11: Conveyor, Earth Roller; Power Pavement Breaker (whiphammer), Robot Demolition Equipment.	39.7	26.80 + a
Group 12: Wellpoint Operator.	39.63	26.80 + a
Group 13: Compressor Battery Operator.	38.97	26.80 + a
Group 14: Elevator Operator; Tow Motor Operator (Solid Tire No Rough Terrain).	37.66	26.80 + a
Group 15: Generator Operator; Compressor Operator; Pump Operator; Welding Machine Operator; Heater Operator.	37.2	26.80 + a
Group 16: Maintenance Engineer.	36.46	26.80 + a
Group 17: Portable Asphalt Plant Operator; Portable Crusher Plant Operator; Portable Concrete Plant Operator., Portable Grout Plant Operator, Portable Water Filtration Plant Operator.	41.39	26.80 + a
Group 18: Power Safety Boat; Vacuum Truck; Zim Mixer; Sweeper; (minimum for any job requiring CDL license).	38.61	26.80 + a

**NOTE: SEE BELOW

----LINE CONSTRUCTION----(Railroad Construction and Maintenance)----

20) Lineman, Cable Splicer, Technician	48.19	6.5% + 22.00

21) Heavy Equipment Operator	42.26	6.5% + 19.88
22) Equipment Operator, Tractor Trailer Driver, Material Men	40.96	6.5% + 19.21
23) Driver Groundmen	26.5	6.5% + 9.00
23a) Truck Driver	40.96	6.5% + 17.76
----LINE CONSTRUCTION----		
24) Driver Groundmen	30.92	6.5% + 9.70
25) Groundmen	22.67	6.5% + 6.20
26) Heavy Equipment Operators	37.1	6.5% + 10.70
27) Linemen, Cable Splicers, Dynamite Men	41.22	6.5% + 12.20
28) Material Men, Tractor Trailer Drivers, Equipment Operators	35.04	6.5% + 10.45

Welders: Rate for craft to which welding is incidental.

**Note: Hazardous waste removal work receives additional $1.25 per hour for truck drivers.*

***Note: Hazardous waste premium $3.00 per hour over classified rate*

Crane with 150 ft. boom (including jib) - $1.50 extra
Crane with 200 ft. boom (including jib) - $2.50 extra
Crane with 250 ft. boom (including jib) - $5.00 extra
Crane with 300 ft. boom (including jib) - $7.00 extra
Crane with 400 ft. boom (including jib) - $10.00 extra

All classifications that indicate a percentage of the fringe benefits must be calculated at the percentage rate times the "base hourly rate".

Apprentices duly registered under the Commissioner of Labor's regulations on "Work Training Standards for Apprenticeship and Training Programs" Section 31-51-d-1 to 12, are allowed to be paid the appropriate percentage of the prevailing journeymen hourly base and the full fringe benefit rate, providing the work site ratio shall not be less than one full-time journeyperson instructing and supervising the work of each apprentice in a specific trade.

~~Connecticut General Statute Section 31-55a: Annual Adjustments to wage rates by contractors doing state work ~~

The Prevailing wage rates applicable to this project are subject to annual adjustments each July 1st for the duration of the project.

Each contractor shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.

It is the contractor's responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's website.

The annual adjustments will be posted on the Department of Labor's Web page: www.ct.gov/dol. For those without internet access, please contact the division listed below.

The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project.

All subsequent annual adjustments will be posted on our Web Site for contractor access.

Contracting Agencies are under no obligation pursuant to State labor law to pay any increase due to the annual adjustment provision.

Effective October 1, 2005 - Public Act 05-50: any person performing the work of any mechanic, laborer, or worker shall be paid prevailing wage

All Person who perform work ON SITE must be paid prevailing wage for the appropriate mechanic, laborer, or worker classification.

All certified payrolls must list the hours worked and wages paid to All Persons who perform work ON SITE regardless of their ownership i.e.: (Owners, Corporate Officers, LLC Members, Independent Contractors, et. al)

Reporting and payment of wages is required regardless of any contractual relationship alleged to exist between the contractor and such person.

~~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 clause (29 CFR 5.5 (a) (1) (ii)).

Please direct any questions which you may have pertaining to classification of work and payment of prevailing wages to the Wage and Workplace Standards Division, telephone (860)263-6790.

As of: June 23, 2022

Connecticut Department of Labor
Wage and Workplace Standards Division
FOOTNOTES

⇨ Please Note: If the "Benefits" listed on the schedule for the following occupations includes a letter(s) (+ a or + a+b for instance), refer to the information below.

Benefits to be paid at the appropriate prevailing wage rate for the listed occupation.

If the "Benefits" section for the occupation lists only a dollar amount, disregard the information below.

Bricklayers, Cement Masons, Cement Finishers, Concrete Finishers, Stone Masons
(Building Construction) and
(Residential- Hartford, Middlesex, New Haven, New London and Tolland Counties)

a. Paid Holiday: Employees shall receive 4 hours for Christmas Eve holiday provided the employee works the regularly scheduled day before and after the holiday. Employers may schedule work on Christmas Eve and employees shall receive pay for actual hours worked in addition to holiday pay.

Elevator Constructors: Mechanics

a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day, Christmas Day, plus the Friday after Thanksgiving.

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

Glaziers

a. Paid Holidays: Labor Day and Christmas Day.

Power Equipment Operators
(Heavy and Highway Construction & Building Construction)

a. Paid Holidays: New Year's Day, Good Friday, Memorial day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day, provided the employee works 3 days during the week in which the holiday falls, if scheduled, and if scheduled, the working day before and the working day after the holiday. Holidays falling on Saturday may be observed on Saturday, or if the employer so elects, on the preceding Friday.

Ironworkers

a. Paid Holiday: Labor Day provided employee has been on the payroll for the 5 consecutive work days prior to Labor Day.

Laborers (Tunnel Construction)

a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day. No employee shall be eligible for holiday pay when he fails, without cause, to work the regular work day preceding the holiday or the regular work day following the holiday.

Roofers

a. Paid Holidays: July 4th, Labor Day, and Christmas Day provided the employee is employed 15 days prior to the holiday.

Sprinkler Fitters

a. Paid Holidays: Memorial Day, July 4th, Labor Day, Thanksgiving Day and Christmas Day, provided the employee has been in the employment of a contractor 20 working days prior to any such paid holiday.

Truck Drivers

(Heavy and Highway Construction & Building Construction)

a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas day, and Good Friday, provided the employee has at least 31 calendar days of service and works the last scheduled day before and the first scheduled day after the holiday, unless excused.

Informational Bulletin

THE 10-HOUR OSHA CONSTRUCTION SAFETY AND HEALTH COURSE

(applicable to public building contracts entered into *on or after July 1, 2007,* where the total cost of all work to be performed is at least $100,000)

(1) This requirement was created by Public Act No. 06-175, which is codified in Section 31-53b of the Connecticut General Statutes (pertaining to the prevailing wage statutes);

(2) The course is required for public building construction contracts (projects funded in whole or in part by the state or any political subdivision of the state) entered into on or after July 1, 2007;

(3) It is required of private employees (not state or municipal employees) and apprentices who perform manual labor for a general contractor or subcontractor on a public building project where the total cost of all work to be performed is at least $100,000;

(4) The ten-hour construction course pertains to the ten-hour Outreach Course conducted in accordance with federal OSHA Training Institute standards, and, for telecommunications workers, a ten-hour training course conducted in accordance with federal OSHA standard, 29 CFR 1910.268;

(5) The internet website for the federal OSHA Training Institute is http://www.osha.gov/fso/ote/training/edcenters/fact_sheet.html;

(6) The statutory language leaves it to the contractor and its employees to determine who pays for the cost of the ten-hour Outreach Course;

(7) Within 30 days of receiving a contract award, a general contractor must furnish proof to the Labor Commissioner that all employees and apprentices performing manual labor on the project will have completed such a course;

(8) Proof of completion may be demonstrated through either: (a) the presentation of a *bona fide* student course completion card issued by the federal OSHA Training Institute; *or* (2) the presentation of documentation provided to an employee by a trainer certified by the Institute pending the actual issuance of the completion card;

(9) Any card with an issuance date more than 5 years prior to the commencement date of the construction project shall not constitute proof of compliance;

(10) Each employer shall affix a copy of the construction safety course completion card to the certified payroll submitted to the contracting agency in accordance with Conn. Gen. Stat. § 31-53(f) on which such employee's name first appears;

(11) Any employee found to be in non-compliance shall be subject to removal from the worksite if such employee does not provide satisfactory proof of course completion to the Labor Commissioner by the fifteenth day after the date the employee is determined to be in noncompliance;

(12) Any such employee who is determined to be in noncompliance may continue to work on a public building construction project for a maximum of fourteen consecutive calendar days while bringing his or her status into compliance;

(13) The Labor Commissioner may make complaint to the prosecuting authorities regarding any employer or agent of the employer, or officer or agent of the corporation who files a false certified payroll with respect to the status of an employee who is performing manual labor on a public building construction project;

(14) The statute provides the minimum standards required for the completion of a safety course by manual laborers on public construction contracts; any contractor can exceed these minimum requirements; and

(15) Regulations clarifying the statute are currently in the regulatory process, and shall be posted on the CTDOL website as soon as they are adopted in final form.

(16) Any questions regarding this statute may be directed to the Wage and Workplace Standards Division of the Connecticut Labor Department via the internet website of http://www.ctdol.state.ct.us/wgwkstnd/wgemenu.htm; or by telephone at (860)263-6790.

THE ABOVE INFORMATION IS PROVIDED EXCLUSIVELY AS AN EDUCATIONAL RESOURCE, AND IS NOT INTENDED AS A SUBSTITUTE FOR LEGAL INTERPRETATIONS WHICH MAY ULTMATELY ARISE CONCERNIG THE CONSTRUCTION OF THE STATUTE OR THE REGULATIONS.

November 29, 2006

Notice

To All Mason Contractors and Interested Parties Regarding Construction Pursuant to Section 31-53 of the Connecticut General Statutes (Prevailing Wage)

The Connecticut Labor Department Wage and Workplace Standards Division is empowered to enforce the prevailing wage rates on projects covered by the above referenced statute.

Over the past few years the Division has withheld enforcement of the rate in effect for workers who operate a forklift on a prevailing wage rate project due to a potential jurisdictional dispute.

The rate listed in the schedules and in our Occupational Bulletin (see enclosed) has been as follows:

Forklift Operator:

- **Laborers (Group 4) Mason Tenders** - operates forklift solely to assist a mason to a maximum height of nine feet only.

- **Power Equipment Operator (Group 9)** - operates forklift to assist any trade and to assist a mason to a height over nine feet.

The U.S. Labor Department conducted a survey of rates in Connecticut but it has not been published and the rate in effect remains as outlined in the above Occupational Bulletin.

Since this is a classification matter and not one of jurisdiction, effective January 1, 2007 the Connecticut Labor Department will enforce the rate on each schedule in accordance with our statutory authority.

Your cooperation in filing appropriate and accurate certified payrolls is appreciated.

Information Bulletin
Occupational Classifications

The Connecticut Department of Labor has the responsibility to properly determine *"job classification"* on prevailing wage projects covered under C.G.S. Section 31-53(d).

Note: This information is intended to provide a sample of some occupational classifications for guidance purposes only. It is not an all-inclusive list of each occupation's duties. This list is being provided only to highlight some areas where a contractor may be unclear regarding the proper classification. If unsure, the employer should seek guidelines for CTDOL.

Below are additional clarifications of specific job duties performed for certain classifications:

- ***ASBESTOS WORKERS***

Applies all insulating materials, protective coverings, coatings and finishes to all types of mechanical systems.

- ***ASBESTOS INSULATOR***

Handle, install apply, fabricate, distribute, prepare, alter, repair, dismantle, heat and frost insulation, including penetration and fire stopping work on all penetration fire stop systems.

- ***BOILERMAKERS***

Erects hydro plants, incomplete vessels, steel stacks, storage tanks for water, fuel, etc. Builds incomplete boilers, repairs heat exchanges and steam generators.

- ***BRICKLAYERS, CEMENT MASONS, CEMENT FINISHERS, MARBLE MASONS, PLASTERERS, STONE MASONS, PLASTERERS. STONE MASONS, TERRAZZO WORKERS, TILE SETTERS***

Lays building materials such as brick, structural tile and concrete cinder, glass, gypsum, terra cotta block. Cuts, tools and sets marble, sets stone, finishes concrete, applies decorative steel, aluminum and plastic tile, applies cements, sand, pigment and marble chips to floors, stairways, etc.

- ***CARPENTERS, MILLWRIGHTS. PILEDRIVERMEN. LATHERS. RESILEINT FLOOR LAYERS, DOCK BUILDERS, DIKERS, DIVER TENDERS***

Constructs, erects, installs and repairs structures and fixtures of wood, plywood and wallboard. Installs, assembles, dismantles, moves industrial machinery. Drives piling into ground to provide foundations for structures such as buildings and bridges, retaining walls for earth embankments, such as cofferdams. Fastens wooden, metal or rockboard lath to walls, ceilings and partitions of buildings, acoustical tile layer, concrete form builder. Applies firestopping materials on fire resistive joint systems only. Installation of curtain/window walls only where attached to wood or metal studs. Installation of insulated material of all types whether blown, nailed or attached in other ways to walls, ceilings and floors of buildings. Assembly and installation of modular furniture/furniture systems. Free-standing furniture is not covered. This includes free standing: student chairs, study top desks, book box desks, computer furniture, dictionary stand, atlas stand, wood shelving, two-position information access station, file cabinets, storage cabinets, tables, etc.

- **LABORER, CLEANING**

• The clean up of any construction debris and the general (heavy/light) cleaning, including sweeping, wash down, mopping, wiping of the construction facility and its furniture, washing, polishing, and dusting.

- **DELIVERY PERSONNEL**

• If delivery of supplies/building materials is to one common point and stockpiled there, prevailing wages are not required. If the delivery personnel are involved in the distribution of the material to multiple locations within the construction site then they would have to be paid prevailing wages for the type of work performed: laborer, equipment operator, electrician, ironworker, plumber, etc.

• An example of this would be where delivery of drywall is made to a building and the delivery personnel distribute the drywall from one "stockpile" location to further sub-locations on each floor. Distribution of material around a construction site is the job of a laborer or tradesman, and not a delivery personnel.

- ***ELECTRICIANS***

Install, erect, maintenance, alteration or repair of any wire, cable, conduit, etc., which generates, transforms, transmits or uses electrical energy for light, heat, power or other purposes, including the Installation or maintenance of telecommunication, LAN wiring or computer equipment, and low voltage wiring. ****License required per Connecticut General Statutes: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9.***

- ***ELEVATOR CONSTRUCTORS***

Install, erect, maintenance and repair of all types of elevators, escalators, dumb waiters and moving walks. ****License required by Connecticut General Statutes: R-1,2,5,6.***

- ***FORK LIFT OPERATOR***

Laborers Group 4) Mason Tenders - operates forklift solely to assist a mason to a maximum height of nine (9) feet only.

Power Equipment Operator Group 9 - operates forklift to assist any trade, and to assist a mason to a height over nine (9) feet.

- ***GLAZIERS***

Glazing wood and metal sash, doors, partitions, and 2 story aluminum storefronts. Installs glass windows, skylights, store fronts and display cases or surfaces such as building fronts, interior walls, ceilings and table tops and metal store fronts. Installation of aluminum window walls and curtain walls is the "joint" work of glaziers and ironworkers, which require equal composite workforce.

- ***IRONWORKERS***

Erection, installation and placement of structural steel, precast concrete, miscellaneous iron, ornamental iron, metal curtain wall, rigging and reinforcing steel. Handling, sorting, and installation of reinforcing steel (rebar). Metal bridge rail (traffic), metal bridge handrail, and decorative security fence installation. Installation of aluminum window walls and curtain walls is the "joint" work of glaziers and ironworkers which require equal composite workforce.

- ***INSULATOR***

• Installing fire stopping systems/materials for "Penetration Firestop Systems": transit to cables, electrical conduits, insulated pipes, sprinkler pipe penetrations, ductwork behind radiation, electrical cable trays, fire rated pipe penetrations, natural polypropylene, HVAC ducts, plumbing bare metal, telephone and communication wires, and boiler room ceilings.

- ***LABORERS***

Acetylene burners, asphalt rakers, chain saw operators, concrete and power buggy operator, concrete saw operator, fence and guard rail erector (except metal bridge rail (traffic), decorative security fence (non-metal).

installation.), hand operated concrete vibrator operator, mason tenders, pipelayers (installation of storm drainage or sewage lines on the street only), pneumatic drill operator, pneumatic gas and electric drill operator, powermen and wagon drill operator, air track operator, block paver, curb setters, blasters, concrete spreaders.

- ***PAINTERS***

Maintenance, preparation, cleaning, blasting (water and sand, etc.), painting or application of any protective coatings of every description on all bridges and appurtenances of highways, roadways, and railroads. Painting, decorating, hardwood finishing, paper hanging, sign writing, scenic art work and drywall hhg for any and all types of building and residential work.

- ***LEAD PAINT REMOVAL***

• Painter's Rate

1. Removal of lead paint from bridges.
2. Removal of lead paint as preparation of any surface to be repainted.
3. Where removal is on a Demolition project prior to reconstruction.

• Laborer's Rate

1. Removal of lead paint from any surface NOT to be repainted.
2. Where removal is on a *TOTAL* Demolition project only.

- ***PLUMBERS AND PIPEFITTERS***

Installation, repair, replacement, alteration or maintenance of all plumbing, heating, cooling and piping. ****License required per Connecticut General Statutes: P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2 S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4.***

- ***POWER EQUIPMENT OPERATORS***

Operates several types of power construction equipment such as compressors, pumps, hoists, derricks, cranes, shovels, tractors, scrapers or motor graders, etc. Repairs and maintains equipment. ****License required, crane operators only, per Connecticut General Statutes.***

- ***ROOFERS***

Covers roofs with composition shingles or sheets, wood shingles, slate or asphalt and gravel to waterproof roofs, including preparation of surface. (demolition or removal of any type of roofing and or clean-up of any and all areas where a roof is to be relaid.)

- ***SHEETMETAL WORKERS***

Fabricate, assembles, installs and repairs sheetmetal products and equipment in such areas as ventilation, air-conditioning, warm air heating, restaurant equipment, architectural sheet metal work, sheetmetal roofing, and aluminum gutters. Fabrication, handling, assembling, erecting, altering, repairing, etc. of coated metal material panels and composite metal material panels when used on building exteriors and interiors as soffits, facia, louvers, partitions, canopies, cornice, column covers, awnings, beam covers, cladding, sun shades, lighting troughs, spires, ornamental roofing, metal ceilings, mansards, copings, ornamental and ventilation hoods, vertical and horizontal siding panels, trim, etc. The sheet metal classification also applies to the vast variety of coated metal material panels and composite metal material panels that have evolved over the years as an alternative to conventional ferrous and non-ferrous metals like steel, iron, tin, copper, brass, bronze, aluminum, etc. Fabrication, handling, assembling, erecting, altering, repairing, etc. of architectural metal roof, standing seam roof, composite metal roof, metal and composite bathroom/toilet partitions, aluminum gutters, metal and composite lockers and shelving, kitchen equipment, and walk-in coolers. To include testing and air –balancing ancillary to installation and construction.

- ***SPRINKLER FITTERS***

Installation, alteration, maintenance and repair of fire protection sprinkler systems. ****License required per Connecticut General Statutes: F-1,2,3,4.***

- ***TILE MARBLE AND TERRAZZO FINISHERS***

Assists and tends the tile setter, marble mason and terrazzo worker in the performance of their duties.

- **TRUCK DRIVERS**

~How to pay truck drivers delivering asphalt is under REVISION~

Truck Drivers are requires to be paid prevailing wage for time spent "working" directly on the site. These drivers remain covered by the prevailing wage for any time spent transporting between the actual construction location and facilities (such as fabrication, plants, mobile factories, batch plant, borrow pits, job headquarters, tool yards, etc.) dedicated exclusively, or nearly so, to performance of the contract or project, which are so located in proximity to the actual construction location that it is reasonable to include them. ****License required, drivers only, per Connecticut General Statutes.***

For example:

• Material men and deliverymen are not covered under prevailing wage as long as they are not directly involved in the construction process. If, they unload the material, they would then be covered by prevailing wage for the classification they are performing work in: laborer, equipment operator, etc.
• Hauling material off site is not covered provided they are not dumping it at a location outlined above.
• Driving a truck on site and moving equipment or materials on site would be considered covered work, as this is part of the construction process.

➢ *Any questions regarding the proper classification should be directed to:*
Public Contract Compliance Unit
Wage and Workplace Standards Division
Connecticut Department of Labor
200 Folly Brook Blvd, Wethersfield, CT 06109
(860) 263-6790.

Sec. 31-53b. Construction safety and health course. New miner training program. Proof of completion required for mechanics, laborers and workers on public works projects. Enforcement. Regulations. Exceptions. (a) Each contract for a public works project entered into on or after July 1, 2009, by the state or any of its agents, or by any political subdivision of the state or any of its agents, described in subsection (g) of section 31-53, shall contain a provision requiring that each contractor furnish proof with the weekly certified payroll form for the first week each employee begins work on such project that any person performing the work of a mechanic, laborer or worker pursuant to the classifications of labor under section 31-53 on such public works project, pursuant to such contract, has completed a course of at least ten hours in duration in construction safety and health approved by the federal Occupational Safety and Health Administration or, has completed a new miner training program approved by the Federal Mine Safety and Health Administration in accordance with 30 CFR 48 or, in the case of telecommunications employees, has completed at least ten hours of training in accordance with 29 CFR 1910.268.

(b) Any person required to complete a course or program under subsection (a) of this section who has not completed the course or program shall be subject to removal from the worksite if the person does not provide documentation of having completed such course or program by the fifteenth day after the date the person is found to be in noncompliance. The Labor Commissioner or said commissioner's designee shall enforce this section.

(c) Not later than January 1, 2009, the Labor Commissioner shall adopt regulations, in accordance with the provisions of chapter 54, to implement the provisions of subsections (a) and (b) of this section. Such regulations shall require that the ten-hour construction safety and health courses required under subsection (a) of this section be conducted in accordance with federal Occupational Safety and Health Administration Training Institute standards, or in accordance with Federal Mine Safety and Health Administration Standards or in accordance with 29 CFR 1910.268, as appropriate. The Labor Commissioner shall accept as sufficient proof of compliance with the provisions of subsection (a) or (b) of this section a student course completion card issued by the federal Occupational Safety and Health Administration Training Institute, or such other proof of compliance said commissioner deems appropriate, dated no earlier than five years before the commencement date of such public works project.

(d) This section shall not apply to employees of public service companies, as defined in section 16-1, or drivers of commercial motor vehicles driving the vehicle on the public works project and delivering or picking up cargo from public works projects provided they perform no labor relating to the project other than the loading and unloading of their cargo.

(P.A. 06-175, S. 1; P.A. 08-83, S. 1.)

History: P.A. 08-83 amended Subsec. (a) by making provisions applicable to public works project contracts entered into on or after July 1, 2009, replacing provision re total cost of work with reference to Sec. 31-53(g), requiring proof in certified payroll form that new mechanic, laborer or worker has completed a 10-hour or more construction safety course and adding provision re new miner training program, amended Subsec. (b) by substituting "person" for "employee" and adding "or program", amended Subsec. (c) by adding "or in accordance with Federal Mine
Safety and Health Administration Standards" and setting new deadline of January 1, 2009, deleted former Subsec. (d) re "public building", added new Subsec. (d) re exemptions for public service company employees and delivery drivers who perform no labor other than delivery and made conforming and technical changes, effective January 1, 2009.

STATUTE 31-55a

- SPECIAL NOTICE -

To: All State and Political Subdivisions,Their Agents, and Contractors

Connecticut General Statute 31-55a - Annual adjustments to wage rates by contractors doing state work.

Each contractor that is awarded a contract on or after October 1, 2002, for (1) the construction of a state highway or bridge that falls under the provisions of section 31-54 of the general statutes, or (2) the construction, remodeling, refinishing, refurbishing, rehabilitation, alteration or repair of any public works project that falls under the provisions of section 31-53 of the general statutes shall contact the Labor Commissioner on or before July first of each year, for the duration of such contract, to ascertain the prevailing rate of wages on an hourly basis and the amount of payment or contributions paid or payable on behalf of each mechanic, laborer or worker employed upon the work contracted to be done, and shall make any necessary adjustments to such prevailing rate of wages and such payment or contributions paid or payable on behalf of each such employee, effective each July first.

- The prevailing wage rates applicable to any contract or subcontract awarded on or after October 1, 2002 are subject to annual adjustments each July 1st for the duration of any project which was originally advertised for bids on or after October 1, 2002.
- Each contractor affected by the above requirement shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.
- It is the ***contractor's*** responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's Web Site. The annual adjustments will be posted on the Department of Labor Web page: www.ctdol.state.ct.us. For those without internet access, please contact the division listed below.

- The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project. All subsequent annual adjustments will be posted on our Web Site for contractor access.

Any questions should be directed to the Contract Compliance Unit, Wage and Workplace Standards Division, Connecticut Department of Labor, 200 Folly Brook Blvd., Wethersfield, CT 06109 at (860)263-6790.

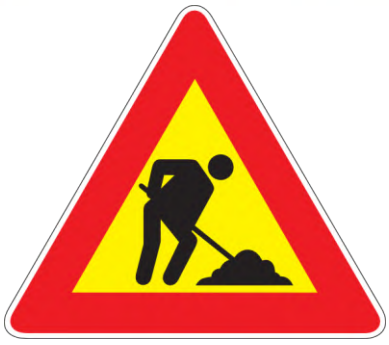
NOTICE

TO ALL CONTRACTING AGENCIES

Please be advised that Connecticut General Statutes Section 31-53, requires the contracting agency to certify to the Department of Labor, the total dollar amount of work to be done in connection with such public works project, regardless of whether such project consists of one or more contracts.

Please find the attached "Contracting Agency Certification Form" to be completed and returned to the Department of Labor, Wage and Workplace Standards Division, Public Contract Compliance Unit.

Inquiries can be directed to 860.263.6790.



CONNECTICUT DEPARTMENT OF LABOR
WAGE AND WORKPLACE STANDARDS DIVISION

Contracting Agency Certification Form

I,_____, acting in my official capacity as _____,
Authorized Representative Title

for _____, located at _____,
Contracting Agency Address

do hereby certify that the total dollar amount of work to be done in connection with

_____, located at _____,
Project name and number Address

shall be $_____, which includes all work, regardless of whether such project contains of one or more contracts.

Contractor Information

Name: _____

Address: _____

Authorized Representative: _____

Approximate Starting Date: _____

Approximate Completion Date: _____

_____ _____
Signature Date

Return to:

Connecticut Department of Labor
Wage & Workplace Standards Division
200 Folly Brook Blvd.
Wethersfield, CT 06109

Rate Schedule Issued (Date): _____

CONNECTICUT DEPARTMENT OF LABOR
WAGE AND WORKPLACE STANDARDS DIVISION

CONTRACTORS WAGE CERTIFICATION FORM

Construction Manager at Risk/General Contractor/Prime Contractor

I,_____ of _____
Officer, Owner, Authorized Rep. Company Name

do hereby certify that the _____
Company Name

_____
Street

_____
City

and all of its subcontractors will pay all workers on the

_____
Project Name and Number

_____
Street and City

the wages as listed in the schedule of prevailing rates required for such project (a copy of which is attached hereto).

_____
Signed

Subscribed and sworn to before me this _____ day of _____,_____.

_____
Notary Public

Return to:

Connecticut Department of Labor
Wage & Workplace Standards Division
200 Folly Brook Blvd.
Wethersfield, CT 06109

Rate Schedule Issued (Date): _____

[New] In accordance with Section 31-53b(a) of the C.G.S. each contractor shall provide a copy of the OSHA 10 Hour Construction Safety and Health Card for each employee, to be attached to the first certified payroll on the project.

In accordance with Connecticut General Statutes, 31-53
Certified Payrolls with a statement of compliance
shall be submitted monthly to the contracting agency.

PAYROLL CERTIFICATION FOR PUBLIC WORKS PROJECTS

WEEKLY PAYROLL

Connecticut Department of Labor
Wage and Workplace Standards Division
200 Folly Brook Blvd.
Wethersfield, CT 06109

CONTRACTOR NAME AND ADDRESS:

SUBCONTRACTOR NAME & ADDRESS

WORKER'S COMPENSATION INSURANCE CARRIER

POLICY #

EFFECTIVE DATE:
EXPIRATION DATE:

PAYROLL NUMBER | Week-Ending Date | PROJECT NAME & ADDRESS

PERSON/WORKER, ADDRESS and SECTION	APPR RATE %	MALE/ FEMALE AND RACE*	WORK CLASSIFICATION Trade License Type & Number - OSHA 10 Certification Number	DAY AND DATE S	M	T	W	TH	F	S	Total ST Hours Total O/T Hours	BASE HOURLY RATE TOTAL FRINGE BENEFIT PLAN CASH	TYPE OF FRINGE BENEFITS Per Hour 1 through 6 (see back)	GROSS PAY FOR ALL WORK PERFORMED THIS WEEK	TOTAL DEDUCTIONS FICA	FEDERAL WITH-HOLDING	STATE WITH-HOLDING	LIST OTHER	GROSS PAY FOR THIS PREVAILING RATE JOB	CHECK # AND NET PAY
				HOURS WORKED EACH DAY								$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $							
												$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $							
												$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $							
												$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $							

12/9/2013
WWS-CP1

*IF REQUIRED

*SEE REVERSE SIDE

PAGE NUMBER _____OF

OSHA 10 ~ATTACH CARD TO 1ST CERTIFIED PAYROLL

***FRINGE BENEFITS EXPLANATION (P):**

Bona fide benefits paid to approved plans, funds or programs, except those required by Federal or State Law (unemployment tax, worker's compensation, income taxes, etc.).

Please specify the type of benefits provided:

1) Medical or hospital care _____ 4) Disability_____

2) Pension or retirement _____ 5) Vacation, holiday_____

3) Life Insurance _____ 6) Other (please specify) _____

CERTIFIED STATEMENT OF COMPLIANCE

For the week ending date of _____,

I, _____of _____, (hereafter known as

Employer) in my capacity as _____ (title) do hereby certify and state:

Section A:

1. All persons employed on said project have been paid the full weekly wages earned by them during the week in accordance with Connecticut General Statutes, section 31-53, as amended. Further, I hereby certify and state the following:

a) The records submitted are true and accurate;

b) The rate of wages paid to each mechanic, laborer or workman and the amount of payment or contributions paid or payable on behalf of each such person to any employee welfare fund, as defined in Connecticut General Statutes, section 31-53 (h), are not less than the prevailing rate of wages and the amount of payment or contributions paid or payable on behalf of each such person to any employee welfare fund, as determined by the Labor Commissioner pursuant to subsection Connecticut General Statutes, section 31-53 (d), and said wages and benefits are not less than those which may also be required by contract;

c) The Employer has complied with all of the provisions in Connecticut General Statutes, section 31-53 (and Section 31-54 if applicable for state highway construction);

d) Each such person is covered by a worker's compensation insurance policy for the duration of his employment which proof of coverage has been provided to the contracting agency;

e) The Employer does not receive kickbacks, which means any money, fee, commission, credit, gift, gratuity, thing of value, or compensation of any kind which is provided directly or indirectly, to any prime contractor, prime contractor employee, subcontractor, or subcontractor employee for the purpose of improperly obtaining or rewarding favorable treatment in connection with a prime contract or in connection with a prime contractor in connection with a subcontractor relating to a prime contractor; and

f) The Employer is aware that filing a certified payroll which he knows to be false is a class D felony for which the employer may be fined up to five thousand dollars, imprisoned for up to five years or both.

2. OSHA~The employer shall affix a copy of the construction safety course, program or training completion document to the certified payroll required to be submitted to the contracting agency for this project on which such persons name first appears.

_____ _____ _____

(Signature) (Title) Submitted on (Date)

*****THIS IS A PUBLIC DOCUMENT*****
*****DO NOT INCLUDE SOCIAL SECURITY NUMBERS*****

Weekly Payroll Certification For Public Works Projects (Continued)

PAYROLL CERTIFICATION FOR PUBLIC WORKS PROJECTS

WEEKLY PAYROLL

Week-Ending Date:
Contractor or Subcontractor Business Name:

PERSON/WORKER, ADDRESS and SECTION	APPR RATE %	MALE/ FEMALE AND RACE*	WORK CLASSIFICATION Trade License Type & Number - OSHA 10 Certification Number	DAY AND DATE S	 M	 T	 W	 TH	 F	 S	Total ST Hours Total O/T Hours	BASE HOURLY RATE TOTAL FRINGE BENEFIT PLAN CASH	TYPE OF FRINGE BENEFITS Per Hour 1 through 6 (see back)	GROSS PAY FOR ALL WORK PERFORMED THIS WEEK	TOTAL DEDUCTIONS FICA	 FEDERAL WITH-HOLDING	 STATE WITH-HOLDING	 LIST OTHER	GROSS PAY FOR THIS PREVAILING RATE JOB	CHECK # AND NET PAY
				HOURS WORKED EACH DAY																
												$ Base Rate	1. $ 2. $ 3. $							
												$ Cash Fringe	4. $ 5. $ 6. $							
												$ Base Rate	1. $ 2. $ 3. $							
												$ Cash Fringe	4. $ 5. $ 6. $							
												$ Base Rate	1. $ 2. $ 3. $							
												$ Cash Fringe	4. $ 5. $ 6. $							
												$ Base Rate	1. $ 2. $ 3. $							
												$ Cash Fringe	4. $ 5. $ 6. $							
												$ Base Rate	1. $ 2. $ 3. $							
												$ Cash Fringe	4. $ 5. $ 6. $							

*IF REQUIRED

NOTICE: THIS PAGE MUST BE ACCOMPANIED BY A COVER PAGE (FORM # WWS-CP1)

Opportunity ⋆ Guidance ⋆ Support

CONNECTICUT DEPARTMENT OF LABOR

THIS IS A PUBLIC WORKS PROJECT

Covered by the

PREVAILING WAGE LAW

CT General Statutes Section 31-53

If you have QUESTIONS regarding your wages
CALL (860) 263-6790

Section 31-55 of the CT State Statutes requires every contractor or subcontractor performing work for the state to post in a prominent place the prevailing wages as determined by the Labor Commissioner.