CONTRACT DOCUMENTS AND SPECIFICATIONS

TOWN OF HUNTLAND, TENNESSEE
WASTEWATER TREAMENT PLANT AND
DRIP DISPERSAL FACILITIES

MARCH 2021 – IFB
EDA INVESTMENT #04-01-07294

Prepared By:

FOXPE
ENGINEERING FOR THE WATER ENVIRONMENT

233 Oceola Avenue #200
Nashville, Tennessee 37209

Prepared For:

100 Banks Street
Huntland, TN 37345

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WASTEWATER TREAMENT PLANT AND
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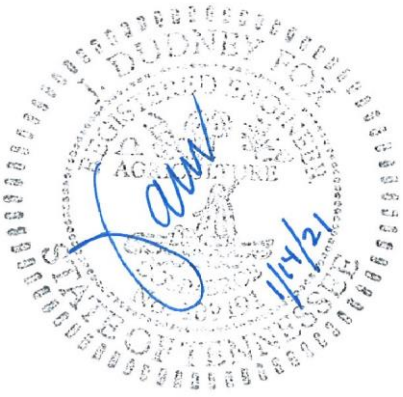
JANUARY 2021 - IFA

SEAL



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SECTION 00 1100

ADVERTISEMENT FOR BIDS

Sewer Collection System

Town of Huntland
(Owner)

Separate sealed Bids for furnishing of all materials, labor, tools, equipment, and appliances necessary for the construction of Wastewater Treatment Plant and Drip Dispersal Facilities will be received by the Owner at 100 Banks Street, Huntland, TN, 37345, until 2:00 p.m., local time, on Thursday, July 15, 2021, and then at said office publicly opened and read aloud.

The Project consists of the following major elements: construction of a package fixed film wastewater treatment system, including FRP tankage, pumps, mixers, filters, UV disinfection equipment, drip dispersal facilities, and associated site and electrical work for a complete project as shown or specified in the Contract Documents.

A non-mandatory pre-bid meeting will be held at 10:00 a.m. local time, on Wednesday, July 7, 2021 at the Huntland Community Center (100 Moore Lane).

Copies of the Contract Documents and Specifications, including bidding documents and requirements and Contract Drawings may be obtained from the Engineer, FOXPE LLC, Nashville, TN (Address below), upon payment of $250 for each set. This payment is not refundable. Copies may be examined at the following locations:

FOXPE LLC, 233 Oceola Avenue, Suite 200, Nashville, Tennessee 37209, 615.476.0706

Builders Exchange of Tennessee (Nashville Office), 2322 Winford Ave. Nashville, TN 37211

Builders Exchange of Tennessee (Knoxville Office), 300 Clark Street Knoxville, TN 37921

Nashville Minority Business Center, 1919 Charlotte Ave, Nashville, TN 37203

Bidders must be listed on Engineer's list of plan holders who have purchased the Contract Documents, Specifications, and Drawings.

No bid may be withdrawn within 90 days after the scheduled time for receipt of bids.

Engineer shall be provided with the following information: mailing address for U.S. Postal Service, physical delivery address, telephone number, email address, and name of contact person.

This project is being funded by a State Revolving Fund loan on or after 2014 EPA Fiscal Year. The loan recipient must be in compliance with all applicable Davis-Bacon Act and American Iron and Steel requirements.

Any contract or contracts awarded by the Owner through this invitation for bids will be funded by a State Revolving Fund (SRF) loan from the State of Tennessee. State and Federal funds will be involved in this project, and, as a result, Bidders must comply with the SRF Loan Program's

Disadvantaged Business Enterprises (DBE) requirements including contacting a minimum of 10 qualified DBE sub-contractors, professional service providers, vendors, and/or suppliers by certified mail to solicit bids. The apparent successful Bidder must submit to the Owner copies of the certified letters and return receipts prior to contract award. Neither the State of Tennessee nor any of its departments, agencies, or employees is or will be a party to this Invitation for Bids or any resulting contract(s) awarded by the Owner.

All qualified Disadvantaged Business Enterprises (DBE) firms desiring to bid as a General Contractor, sub-contractor, professional service provider, supplier, or equipment vendor are encouraged to contact Ms. Marilyn Robinson at the Nashville Minority Business Center listed above or FOXPE, 233 Oceola Avenue, Suite 200, Nashville, Tennessee 37209, 615-640-0757 in order to obtain a list of prospective bidding General Contractors or to obtain copies of bidding/contract documents.

All bidders must be licensed General Contractors as required by the Contractor's Licensing Act of 1994 of the General Assembly of the State of Tennessee and qualified for the type of construction being bid upon.

Attention of bidders is particularly called to the requirements as to conditions of employment to be observed and minimum wage rates to be paid under the contract, Section 3, Segregated Facility, Section 109 and E.O. 11246.

The U.S. Department of Commerce Economic Development Administration is providing partial funding for this project (EDA Investment No. 04-01-07294).

Town of Huntland

Date:_____ Dolton Steele, Mayor

SECTION 00 2100

INFORMATION FOR BIDDERS

1. RECEIPT AND OPENING OF BIDS

The Town of Huntland (herein called the "Owner"), invites Bids on the form attached hereto, all blanks of which must be appropriately filled in. Bids will be received by the Owner at the location and time noted in the Advertisement for Bids. The envelopes containing the Bids shall be sealed.

The Owner may consider informal any Bid not prepared and submitted in accordance with the provisions hereof and may waive any informalities or reject any and all Bids. Any Bid may be withdrawn prior to the above scheduled time for the opening of Bids or authorized postponement thereof. Any Bid received after the time and date specified shall not be considered. No Bidder may withdraw a Bid within 90 days after the actual date of the opening thereof.

2. PREPARATION OF BID

Each Bid shall be submitted on the Bid forms bound in the Contract Documents. All blank spaces for Bid prices must be filled in, in ink or typewritten, in both words and figures. (In case of discrepancy, the amount shown in words will govern.) All required enclosed certifications must be fully completed and executed when submitted.

Each Bid must be submitted in a sealed envelope, addressed to the Owner. Each sealed envelope containing a Bid must be plainly marked on the outside as Wastewater Treatment Plant and Drip Dispersal Facilities, and include all other information required by the state of Tennessee law.

If forwarded by mail, the sealed envelope containing the Bid must be enclosed in another envelope addressed to the Owner at 100 Banks Street, Huntland, TN 37345.

Any and all Bids not meeting the aforementioned criteria for Bid submittal, will be declared nonresponsive, will **not** be opened, and will be returned to the Bidder unopened.

3. SUBCONTRACTS

The Bidder is specifically advised that any person, firm, or other party to whom it is proposed to award a subcontract under this Contract must be acceptable to the Owner and funding agencies and shall be subject to verification by the state of Tennessee as to eligibility status.

4. FACSIMILE MODIFICATIONS

Any Bidder may modify his Bid by facsimile communication at any time prior to the scheduled closing time for receipt of Bids, provided such facsimile communication is received by the Owner prior to the closing time, and provided further, the Owner is satisfied that a written confirmation of the facsimile modification over the signature of the Bidder was

mailed prior to the closing time. The facsimile communication should not reveal the Bid price but should provide the addition or subtraction or other modification so that the final prices or terms will not be known by the Owner until the sealed Bid is opened. If written confirmation is not received within two days from the closing time, no consideration will be given to the facsimile modification.

5. GENERAL CONDITIONS AND REVISION OF QUANTITIES

The unit or lump sum price for each of the items in the proposal of each Bidder shall include its pro rata share of General Conditions costs so that the sum of the products obtained by multiplying the quantity shown for each item by the unit price represents the total Bid. Any Bid not conforming to this requirement may be rejected as informal. The special attention of all Bidders is called to this provision, for should conditions make it necessary to revise the quantities, no limit will be fixed for such increased or decreased quantities nor extra compensation allowed, provided the net monetary value of all such addition or subtraction in quantities of such items of work (i.e., difference in cost) shall not increase or decrease the total original contract price by more than 25 percent, except for work not covered in the Drawings and Detailed Specifications as provided for under General Conditions and Supplemental General Conditions.

6. QUALIFICATIONS OF BIDDER

The Owner may make such investigations as deemed necessary to determine the ability of the Bidder to perform the work, and the Bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any Bid if the evidence submitted by, or investigation of, such Bidder fails to satisfy the Owner that such Bidder is properly qualified to carry out the obligations of the Contract and to complete the work contemplated therein. Conditional Bids will not be accepted.

A Bidder must purchase a set of Contract Documents (including Bidding Requirements and Documents), Specifications, and Drawings through the Engineer in order to be considered a qualified bidder. Addenda will only be sent to those who have purchased documents and are on the list of planholders maintained by FOXPE LLC.

7. BID SECURITY

Each Bid must be accompanied by a cashier's check on a duly authorized bank, certified check of the Bidder, or a bid bond prepared on the form of bid bond attached hereto, duly executed by the Bidder as principal and having as security thereon a surety company listed in the latest issue of U.S. Treasury Circular 570, in the amount of 5 percent of the Bid. Certified checks or cashier's checks shall be made payable to the Owner. Such checks or bid bonds will be returned to all except the three lowest Bidders within three days after the opening of Bids; the remaining checks or bid bonds will be returned promptly after the Owner and the accepted Bidder have executed the contract, or, if no award has been made within 60 days after the date of the opening of Bids, upon demand of the Bidder at any time thereafter, so long as he has not been notified of the acceptance of his Bid.

8. LIQUIDATED DAMAGES FOR FAILURE TO ENTER INTO CONTRACT

The successful Bidder, upon his failure or refusal to execute and deliver the Contract and bonds required within 10 days after he has received notice of the acceptance of his Bid, shall forfeit to the Owner, as liquidated damages for such failure or refusal, the security deposited with his Bid.

9. TIME FOR COMPLETION AND LIQUIDATED DAMAGES

Bidder must agree to commence work on or before a date to be specified in a written Notice to Proceed of the Owner and to fully complete the Project within 550 consecutive calendar days thereafter. Bidder must agree also to pay as liquidated damages the sum of $600 for each consecutive calendar day in default as hereinafter provided in the General Conditions and Supplemental General Conditions.

10. CONDITIONS OF WORK

Each Bidder must inform himself fully of the conditions relating to the construction of the Project and the employment of labor thereof. Failure to do so will not relieve a successful Bidder of his obligation to furnish all material and labor necessary to carry out the provision of his Contract. Insofar as possible the Contractor, in carrying out his work, must employ such methods or means as will not cause any interruption of or interference with the work of any other Contractor or the operations of the Owner.

11. ADDENDA AND INTERPRETATIONS

No interpretation of the meaning of the Drawings, Specifications, or other prebid documents will be made to any Bidder orally.

Every request for such interpretation should be in writing addressed to Dudney Fox, P.E.(dudney@foxpe.com); FOXPE LLC, at 233 Oceola Avenue #200, Nashville, Tennessee 37209, and to be given consideration must be received at least five days prior to the date fixed for the opening of Bids. Any and all such interpretations and any supplemental instructions will be in the form of written addenda to the Specifications which, if issued, will be transmitted electronically to all prospective Bidders not later than two days prior to the date fixed for the opening of Bids, or in accordance with Tennessee statute. Failure of any Bidder to receive any such addendum or interpretation shall not relieve such Bidder from any obligation under his Bid as submitted. All addenda so issued shall become a part of the Contract Documents.

12. SECURITY FOR FAITHFUL PERFORMANCE

Simultaneously with his delivery of the executed Contract, the Contractor shall furnish a surety bond or bonds as security for faithful performance of this Contract and for the payment of all persons performing labor on the Project under this Contract and furnishing materials in connection with this Contract, as specified in the General Conditions included herein. Surety companies executing bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located.

13. POWER OF ATTORNEY

Attorneys-in-fact who sign bid bonds or contract bonds must file with each bond a certified and effectively dated copy of their power of attorney.

14. NOTICE OF SPECIAL CONDITIONS

Attention is particularly called to those parts of the Contract Documents and Specifications which deal with the following:

A. Inspection and testing of materials
B. Insurance requirements
C. Wage rates (if applicable)
D. Surveys, permits, and regulations
E. State Allowances

The federal regulations enclosed or herein referred to supersede all conflicting requirements of the Contract Documents.

15. LAWS AND REGULATIONS

The Bidder's attention is directed to the fact that all applicable state laws, municipal ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the Project shall apply to the Contract throughout, and they will be deemed to be included in the Contract the same as though herein written out in full.

16. OBLIGATION OF BIDDER

At the time of the opening of Bids, each Bidder will be presumed to have inspected the site and to have read and to be thoroughly familiar with the Drawings and Contract Documents (including all addenda). The failure or omission of any Bidder to examine any form, instrument, or document shall in no way relieve any Bidder from any obligation in respect of his Bid. Each bidder must inform him/herself fully of the conditions relating to the construction of the project and the employment of labor thereof. Failure to do so will not relieve a successful bidder of his/her obligation to furnish all material and labor necessary to carry out the provisions of his/her contract. Insofar as possible, the contractor, in carrying out the work, must employ such methods as will not cause any interruption of or interference with the work of any other contractor.

17. EXECUTION OF BID DOCUMENTS

The Contractor, in signing his Bid on the whole or any portion of the work, shall conform to the following requirements:

A. Bids which are not signed by individuals making them shall have attached thereto a power of attorney evidencing authority to sign the Bid in the name of the person for whom it is signed.

B. Bids which are signed for a partnership shall be signed by all of the partners or by an attorney-in-fact. If a Bid is signed by an attorney-in-fact, there should be attached to the Bid a power of attorney executed by the partners evidencing authority to sign the Bid.

C. Bids which are signed for a corporation shall have the correct corporate name thereof and the signature of the President or other authorized officer of the corporation manually written below the corporate name following the wording "By _____." Corporation seal shall also be affixed to the Bid.

18. METHOD OF AWARD - LOWEST QUALIFIED BIDDER

The Contract will be awarded to the responsive, responsible Bidder submitting the lowest Bid complying with the conditions of the Information for Bidders. Award will be made on the basis of the prices given in the Base Bid either with or without alternates at the discretion of the Owner. The Bidder to whom the award is made will be notified at the earliest possible date. The Owner reserves the right to reject any and all Bids and to waive any informality in Bids received whenever such rejection or waiver is in its interest. Conditional bids will not be accepted.

A responsive Bidder shall be one who submits his Bid in the proper form without qualification or intent other than as called for in the Specifications and on the Contract Drawings and who binds himself on behalf of his Bid to the Owner with the proper bid bond or certified check completed and attached, and who properly completes all forms required to be completed and submitted at the time of the bidding.

A responsible Bidder shall be one who can fulfill the following requirements:

A. The Bidder shall maintain a permanent place of business. This requirement applies to the Bidder where the Bidder is a division of a corporation, or where the Bidder is 50 percent or more owned by a person, corporation, or firm.

B. The Bidder shall demonstrate that he has adequate construction management experience and sufficient equipment resources to properly perform the work under and in conformance with these Contract Documents. This evaluation will be based upon a list of completed and active projects and a list of construction equipment available to the Bidder to perform the work.

C. The Bidder shall demonstrate that he is familiar with the work under these Contact Documents. This evaluation will be based upon a list of major equipment items the Bidder proposes to furnish and a list of subcontractors the Bidder proposes to use in prosecuting the work.

D. The Bidder shall demonstrate that he has financial resources of sufficient strength to meet the obligations incident to the performance of the work covered by these Contract Documents. The Bidder shall complete the Statement of Bidder's Qualifications in the Bid forms. The ability to obtain the required Performance and Payment Bonds will not alone demonstrate adequate financial capability.

E. The Bidder may demonstrate financial capability by submitting a suitable financial statement of an Equity Partner, provided an agreement is executed binding the Bidder and said Equity Partner, jointly and severally, to fulfill all duties, obligations, and responsibilities of the Contractor under these Contract Documents if the Contract is awarded to the Bidder. The agreement shall be submitted with the Bid and shall be satisfactory to the Owner's attorney or the Bid may be declared nonresponsive.

F. The Bidder shall furnish all data required by these Contract Documents. Failure to do so may result in the Bid being declared nonresponsive. Acceptance of the Bidder's documentation and substantiation or contract award by the Owner does not relieve the Bidder of liability for nonperformance as covered in the Contract Documents, nor will the Bidder be exempted from any other legal recourse the Owner may elect to pursue.

19. EMPLOYMENT OF LOCAL LABOR

Preference in employment on the Project shall, insofar as practicable, be given to qualified local labor.

20. BID ENVELOPE

All Bidders must be licensed contractors in the State of Tennessee. In compliance with all the requirements of Chapter No. 135, Public Acts of 1945 of the General Assembly of the State of Tennessee, and House Bill No. 2180 (Public Chapter No. 882) known as the Contractor's Licensing Act of 1976 (and all amendments thereto), the envelope in which the Bid is contained must also bear on the outside the following:

A. Name of Bidder

1. Address of the Bidder;
2. Name of Project for which Bid is submitted;
3. Bidder's License Number;
4. Bidder's License Category or Classification; and
5. Bidder's License Expiration Date.

B. Name of Electrical; Plumbing; Heating, Ventilation and Air Conditioning; or Masonry Sub-Contractors

1. Contractor's License Number;
2. Contractor's License Expiration Date; and
3. License Classification.

Bid envelopes that do not bear the above information will be returned to the Bidder unopened.

A copy of the form found on the last page of this section properly completed to provide the required information as identified above shall be affixed to the front of the envelope containing the Bidder’s proposal.

21. SAFETY STANDARDS AND ACCIDENT PREVENTION

With respect to all work performed under this contract, the Contractor shall:

a. Comply with the safety standards provisions of applicable laws, building and construction codes and the "Manual of Accident Prevention in Construction" published by the Associated General Contractors of America, the requirements of the Occupational Safety and Health Act of 1970 (Public Law 91-596), and the

requirements of Title 29 of the Code of Federal Regulations, Section 1518 as published in the "Federal Register", Volume 36, No. 75, Saturday, April 17, 1971.

b. Exercise every precaution at all times for the prevention of accidents and the protection of persons (including employees) and property.

c. Maintain at his/her office or other well-known place at the job site, all articles necessary for giving first aid to the injured and shall make standing arrangements for the immediate removal to a hospital or a doctor's care of persons (including employees), who may be injured on the job site. In no case shall employees be permitted to work at a job site before the employer has made a standing arrangement for removal of injured persons to a hospital or a doctor's care.

CONTRACTOR'S IDENTIFICATION

This form shall be attached to the sealed envelope containing the Bid. Failure to provide the following information on the sealed envelope will be considered a non-responsive Bid.

BIDDER:

Name _____

Address _____

_____

_____

Tennessee License No._____

Expiration Date _____

Monetary Limit $_____

Classification _____

_____

_____

Complete the following for all applicable Electrical; Plumbing; Heating, Ventilation and Air-Conditioning; or Masonry Subcontractors:

Subcontractor: _____

_____

Tennessee License No._____

License Expiration Date _____

License Classification _____

Subcontractor: _____

_____

Tennessee License No._____

License Expiration Date _____

License Classification _____

Subcontractor: _____

_____

Tennessee License No._____

License Expiration Date _____

License Classification _____

_____

SEALED BID PROPOSAL FOR THE CONSTRUCTION OF

WASTEWATER TREATMENT PLANT AND DRIP DISPERSAL FACILITIES

FOR the TOWN OF HUNTLAND

Bid Date _____ Bid Time _____

SECTION 00 4100

BID

Project Description: Wastewater Treatment Plant and Drip Dispersal Facilities

Proposal of_____

(hereinafter called "Bidder"), doing business as_____
(a corporation, a partnership, an individual)

to Town of Huntland (hereinafter called "Owner").

Gentlemen:

The Bidder, in compliance with your Advertisement for Bids for the construction of this project having examined the Drawings and Specifications with related documents and the site of the proposed work, and being familiar with all of the conditions surrounding the construction of the proposed project including the availability of materials and labor, hereby proposes to furnish all labor, materials, and supplies, and to construct the project in accordance with the Contract Documents, within the time set forth therein, and at the price(s) stated below. This price(s) is to cover all expenses including overhead and profit incurred in performing the work required under the Contract Documents, of which this proposal is a part.

Bidder hereby agrees to commence work under this contract on or before a date to be specified in written Notice to Proceed of the Owner and to fully complete the project within 550 consecutive calendar days thereafter as stipulated in the Specifications. Bidder further agrees to pay as liquidated damages, the sum of $600 for each consecutive calendar day thereafter as hereinafter provided in the General Conditions.

Bidder acknowledges receipt of the following addenda:

_____

_____

_____

Bidder agrees to perform all the construction of the project complete with appurtenant and accessory work described in the Specifications and shown on the plans for the attached price(s).

The attached price(s) shall include all labor, materials, bailing, shoring, removal, overhead, profit, insurance, etc., to cover the finished work of the several kinds called for.

Bidder understands that the Owner reserves the right to reject any or all Bids and to waive any informalities in the bidding.

The Bidder agrees that this Bid shall be good and may not be withdrawn for a period of 90 calendar days after the scheduled closing time for receiving Bids.

Upon receipt of written notice of the acceptance of this Bid, Bidder will execute the formal contract attached within ten days and deliver a surety bond or bonds as required by the General Conditions. The Bid security attached in the sum of 5 percent of the total Bid is to become the property of the Owner in the event the contract and bond are not executed within the time above set forth, as liquidated damages for the delay and additional expense to the Owner caused thereby.

Respectfully submitted:

_____

By_____
(Signature)

Title_____

_____

_____
(Business Address)

ATTEST:

_____

Name_____
(Please Type)

Title_____ (SEAL)

Note: Attest for a corporation must be by the corporate secretary; for a partnership by another partner; for an individual by a Notary.

BID SCHEDULE
WASTEWATER TREATMENT PLANT AND DRIP DISPERSAL FACILITIES
TOWN OF HUNTLAND, TENNESSEE
EDA INVESTMENT NUMBER: 04-01-07294

SCHEDULE I - LUMP SUM BASE BID

Item No. 1 - Lump Sum Base Bid

The Lump Sum Base Bid for the furnishing of all labor, materials, and equipment for the construction of the Wastewater Treatment Plant and Drip Dispersal Facilities as required for a complete operating installation as described on the Drawings and in the Contract Documents, including all items of Major Equipment listed as Sub-Item (a) in the following tabulation of Major Equipment items, and Allowances provided in the schedule below, the lump sum of

_____ Dollars

and_____Cents

Total Amount of Bid: $_____ (In figures)

MAJOR EQUIPMENT ITEMS

The Specifications require the inclusion of certain major equipment items by specified manufacturers in the Base Bid. This requirement is not intended to restrict competition but is for the purpose of establishing the desired standard of quality and mechanical features without ruling out comparable competitive equipment.

Where appropriate, provision is made here for the Bidder to offer comparable equipment by other manufacturers for the Owner's consideration.

"a" Items
Equipment listed as "a" items shall be used in the Bidder's Base Bid. These items were used by the Engineer as the basis of design for this project. The Contractor shall circle the "a" item used in his Base Bid.

"b" Items
Named Suppliers and blanks have been provided for "b" items of equipment for which the bidder may submit additive/deductive prices from the base bid for supplying those alternate items.

Adjusted Contract Price
The Owner reserves the right to select any, all, or none of the proposed alternate items of a manufacturer/supplier. If the Owner selects any such items, the Contract Price shall be equal to the total base bid stated above, adjusted by the difference between the sum of all "a" items and the sum of any "b" items selected by the Owner plus any additive alternates selected by the Owner.

The Adjusted Contract Price shall be the basis for determination of the lowest responsive, responsible bidder.

Package Fixed Film Wastewater Treatment System, Section 46 0753

a. Aquapoint 46 0753.20

a. Orenco 46 0753.10

b. _____ (deduct) $_____

ALLOWANCES			
Section 01 2113	Miscellaneous Allowance	Per Section 01 2113	$25,000.00

BIDDER		DATE
BY	Signature	TITLE
ADDRESS		
CITY	STATE	ZIP CODE
TELEPHONE NUMBER	E-MAIL	

SECTION 00 4313

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned, _____

_____as Principal, and

_____as Surety,

are hereby held and firmly bound unto the Town of Huntland as Owner in the penal sum of five percent of the total Bid which equals _____

_____for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors, and assigns.

The condition of the above obligation is such that whereas the Principal has submitted to the Town of Huntland a certain Bid, attached hereto and hereby made a part hereof to enter into a contract in writing for the construction of the Wastewater Treatment Plant and Drip Dispersal Facilities.

NOW, THEREFORE,

a. If said Bid shall be rejected, or in the alternate,

b. If said Bid shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attached hereto (properly completed in accordance with said Bid) and shall furnish a bond for his faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said Bid,

then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall in no event exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its bond shall be in no way impaired or affected by any extension of the time within which the Owner may accept such Bid; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and Surety have executed this bond by causing their respective names to be hereunto subscribed and their seals to be hereunto affixed by their duly authorized officers, on this the _____ day of _____, 20 __.

CONTRACTOR - **PRINCIPAL**:

_____

By _____

Name _____
(Please Type)

Title _____

ATTEST:

_____

Name _____
(Please Type)

Title _____ (SEAL)

Note: Attest for a Corporation must be by the corporate secretary; for a partnership by another partner; for an individual by a Notary.

SURETY:

_____

By _____

Name _____
(Please Type)

Title _____
(Attach Power of Attorney)

ATTEST:

_____

Name _____
(Please Type)

Title _____ (SEAL)

Note: Surety companies executing bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located.

SECTION 00 4513

STATEMENT OF BIDDER'S QUALIFICATIONS

All questions must be answered and the data given must be clear and comprehensive. This statement must be notarized. If necessary, questions may be answered on separate attached sheets. The Bidder may submit any additional information he desires. Attach all additional sheets to these Contract Documents.

1. Name of Bidder.

2. Permanent main office address.

3. When organized.

4. If a corporation, where incorporated.

5. How many years have you been engaged in the contracting business under your present firm or trade name?

6. Contracts on hand: (Schedule these, showing amount of each contract and the appropriate anticipated dates of completion.)

7. General character of work performed by your company.

8. Have you ever failed to complete any work awarded to you? If so, where and why?

9. Have you ever defaulted on a contract? If so, where and why?

10. List the most important projects recently completed by your company, stating the approximate cost for each, and the month and year completed.

11. List your major equipment available for this project. (Use form provided in Section 00 4514.)

12. Experience in construction work similar in importance to this project.

13. Background and experience of the principal members of your organization, including officers.

14. Credit available: $ _____

15. Give bank reference.

16. Will you, upon request, fill out a detailed financial statement and furnish any other information that may be required by the Local Public Agency?

The undersigned hereby authorizes and requests any person, firm, or corporation to furnish any information requested by the Local Public Agency in verification of the recitals comprising this Statement of Bidder's Qualifications.

Dated this_____day of _____, 20___.

_____
Name of Bidder

By _____

Title _____

State of _____

County of _____

_____ being duly sworn deposes and says that he is

_____of _____

_____and that the answers to the foregoing

questions and all statements therein contained are true and correct. Subscribed and sworn to

before me this _____ day of _____ , 20 __ .

_____
Notary Public

My Commission Expires:

_____
(Date) (SEAL)

SECTION 00 4514

STATEMENT OF EQUIPMENT

Showing machinery and other equipment available to Contractor for prosecuting the work included in contract. (To be filled in by Contractor and submitted with Bid.)

Available Machinery and Other Equipment Kind-Size-Capacity	Location	Ownership	Date Proposed To be Placed On Work

The above is a true statement of the equipment available to the undersigned Bidder for prosecuting the work included in the contract. Where it is shown that the equipment is not owned by the Bidder, arrangements have been made with the owners to furnish the equipment.

Signed _____

Name _____

Title _____

SECTION 00 4519

NONCOLLUSION AFFIDAVIT OF PRIME BIDDER

State of _____)
)ss.
County of _____)

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

1. He is_____ of _____
(owner, partner, officer, representative, or agent)

_____ , the Bidder that has submitted the attached Bid;

2. He is fully informed respecting the preparation and contents of the attached Bid and of all pertinent circumstances respecting 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, owners, 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 other 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 against the _____ (Local Public Agency) or any person interested in the proposed Contract; and

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

(Signed)_____

_____
(Title)

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

_____

_____
(Title)
My commission expires _____
(Date) (SEAL)

SECTION 00 4544.10

PARTNERSHIP CERTIFICATE

STATE OF_____

COUNTY OF_____

On this _____ day of _____ , 20 _____, before me personally appeared

_____, known to me to be the person who executed the above instrument, who, being by me first duly sworn, did depose and say that he is a general partner in the firm of _____

and that said firm consists of himself and _____

and that he executed the foregoing instrument on behalf of said firm for the uses and purposes stated therein, and that no one except the above named members of the firm have any financial interest whatsoever in said proposed contract.

_____ Partner

_____ Partner

_____ Partner

_____ Partner

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

_____ Notary Public

My Commission Expires:

(Date) (SEAL)

NOTE: If only one partner signs, a power of attorney executed by all other partners authorizing him to act in the name of the company must be attached; otherwise, all partners must sign.

SECTION 00 4544.20

CORPORATE CERTIFICATE

I, _____, certify that I am the Secretary of the corporation named as Contractor in the foregoing proposal; that _____ _____, who signed said proposal in behalf of the Contractor was then _____ of said corporation; that said proposal was duly signed for and in behalf of said corporation by authority of its Board of Directors, and is within the scope of its corporate powers; that said corporation is organized under the laws of the State of _____.

This _____day of _____, 20 _____.

_____

(SEAL)

SECTION 00 4545

JOINT VENTURE QUESTIONNAIRE

In the event a joint venture bid is submitted, the following questions shall be answered, submitted with the bid and signed by the owner, partner, officer, representative, or agent of each joint venturer.

1. What is the separate bonding capability of each member of the joint venture?

2. What other work is in progress by the total contract dollar amount and percentage of completion for each joint venturer?

3. Are there any particular risks associated with this Contract which contributed to the decision to joint venture, and if so, what?

4. Has consideration been given to utilization of subcontract as opposed to formation of a joint venture, and if so, why was the joint venture format chosen?

5. Has either member of the joint venture been separately awarded a contract by the Town of Huntland, and if so, what was the most recent contract awarded to each?

6. What will be the contribution of each participant in the joint venture with respect to personnel, equipment, and other resources of each company allocated to this contract?

7. What will be the specific contribution of each participant of the joint venture for the completion of work to be performed and material to be supplied under this Contract?

8. Will there be separate management for the joint venture? If not, which company will supervise, or how will the contract be supervised?

9. Why will the joint venture be more efficient than the possibility of both companies separately bidding and either company being awarded the contract separately.

10. Does the formation of the joint venture promote competition on this Contract, and if so, how?

11. Has the joint venture, or any participant therein, received any legal advice with respect to the antitrust implications of formation of a joint venture, and if so, from what attorneys?

_____	_____
Name of Joint Venturer	Name of Joint Venturer
By _____	By _____
Title _____	Title_____

State of _____

County of _____

_____being duly sworn deposes and says that he is _____of_____and

_____being duly sworn deposes and says that he is _____of_____and

that the answers to the foregoing questions and all statements therein contained are true and correct. Subscribed and sworn to before me this _____ day of _____, 20____.

_____
Notary Public

My Commission Expires:

_____ (SEAL)
(Date)

END OF SECTION

SECTION 00 4550

STATEMENT OF LICENSE CERTIFICATE

Each Contractor bidding shall fill in and sign the following:

This is to certify that _____
has fully complied with all the requirements of Chapter No. 135, Public Acts of 1945 of the General Assembly of the State of Tennessee and House Bill No. 2180 (Public Chapter No. 822), known as the Contractors Licensing Act of 1976. The Contractor's license number, other information outlined in the Instructions for Bidders, expiration date, and that part of classification applying to the Bid shall appear on the envelope containing the Bid, otherwise the Bid will not be considered.

The State Board for Licensing General Contractors issued to _____

_____Certificate No._____

which expires on _____, 20 _____.

Signed _____

Name _____

Title _____

SECTION 00 4560

ILLEGAL IMMIGRANTS

CERTIFICATE OF COMPLIANCE

EACH CONTRACTOR BIDDING SHALL FILL IN AND SIGN THE FOLLOWING:

This is to certify that _____ has fully complied with all the requirements of Chapter No. 878 (House Bill No. 111 and Senate Bill No. 411) which serves to amend Tennessee Code Annotated Title 12, Chapter 4, Part I.

All Bidders for construction services on this project shall be required to submit an affidavit (by executing this compliance document) as part of their bid, that attests that such Bidder shall comply with requirements of Chapter No. 878.

Signature _____

Print or Type Name _____

State of _____)
) ss
County of _____)

Personally appeared before me, _____ the undersigned Notary

Public,_____, the within named bargainer, with whom I am

personally acquainted, and known to me to be the _____of the
(President, Owner, Partner)

_____, and acknowledged to me that he executed the foregoing
(corporation, partnership, sole proprietorship)

document for the purposes recited therein.

Witness my hand, at office, this _____ day of _____ , 20 _____ .

_____
Notary Public

My commission expires _____

SECTION 00 4570

DRUG-FREE WORKPLACE AFFIDAVIT

STATE OF _____

COUNTY OF _____

The undersigned, principal officer of _____ , an employer of five (5) or more employees contracting with _____ government to provide construction services, hereby states under oath as follows:

1. The undersigned is a principal officer of_____ hereinafter referred to as the "Company"), and is duly authorized to execute this Affidavit on behalf of the Company.

2. The Company submits this Affidavit pursuant to T.C.A. §50-9-113, which requires each employer with no less than five (5) employees receiving pay who contracts with the state or any local government to provide construction services to submit an affidavit stating that such employer has a drug-free workplace program that complies with Title 50, Chapter 9, of the Tennessee Code Annotated .

3. The Company is in compliance with T.C.A. §50-9-113.

Further affiant saith not.

_____
Principal Officer

STATE OF _____

COUNTY OF _____

Before me personally appeared _____, with whom I am personally acquainted (or proved to me on the basis of satisfactory evidence), and who acknowledged that such person executed the foregoing affidavit for the purpose therein contain.

Witness my hand and seal at office this _____day of _____, 20_____.

_____
Notary Public

My Commission expires: _____

END OF SECTION

SECTION 00 4580

IRAN DIVESTMENT ACT

In compliance with the Iran Divestment Act (State of Tennessee 2016, Public Chapter No. 817), which became effective on July 1, 2016, certification is required of all bidders on contracts over $1,000.

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party hereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief that each bidder is not on the list created pursuant to T.C.A. § 12-12-106.

I affirm, under the penalties of perjury, this statement to be true and correct.

Date	Signature of Bidder
	Company

A bid shall not be considered for award nor shall award be made where the foregoing certification has been complied with; provided, however, that if in any case the bidder cannot make the foregoing certification, the bidder shall so state and shall furnish with the bid a signed statement which sets forth in detail the reasons therefor. The Town of Huntland may award a bid to a bidder who cannot make the certification, on case-by-case basis, if:

1. The investment activities in Iran were made before July 1, 2016, the investment activities in Iran have not been expanded or reviewed on or after July 1, 2016, and the person has adopted, publicized, and is implementing a formal plan to cease the investment activities in Iran and to refrain from engaging in any new investments in Iran; or

2. The Town of Huntland makes a determination that the goods or services are necessary for the Town of Huntland to perform its functions and that, absent such an exemption, the political subdivision will be unable to obtain the goods or services for which the contract is offered. Such determination shall be made in writing and shall be a public document.

This form must be completed and accompany the bid documents.

SECTION 00 5100

NOTICE OF AWARD

To: _____

_____

_____

Project Description: The site of the proposed work is the Wastewater Treatment Plant and Drip Dispersal Facilities in Huntland, Tennessee. The project consists of construction of a package fixed film wastewater treatment plant, including FRP tankage, pumps, mixers, filters, UV disinfection equipment, and associated site and electrical work.

The Owner has considered the Bid submitted by you for the above described work in response to its Advertisement for Bids dated _____ , 20 ___ , and Information for Bidders.

You are hereby notified that your bid has been accepted for items in the amount of

$ _____.

You are required by the Information for Bidders to execute the Contract and furnish the required Contractor's Performance Bond, Payment Bond and certificates of insurance within ten calendar days from the date of this notice to you.

If you fail to execute said Contract and to furnish said bonds within ten days from the date of this notice, said Owner will be entitled to consider all your rights arising out of the Owner's acceptance of your bid as abandoned and as a forfeiture of your Bid Bond will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this Notice of Award to the Owner.

Dated this _____ day of _____ , 20 ____ .

By_____

Name_____

Title_____

ACCEPTANCE OF NOTICE

Receipt of the above Notice of Award is hereby acknowledged by_____

_____, this the _____day of _____, 20___.

By_____

Name_____

Title_____

SECTION 00 5200

CONTRACT

THIS CONTRACT, made this _____ day of _____, 20_____by and between The Town of Huntland, Tennessee, hereinafter called "Owner" and _____ _____ doing business as a_____hereinafter called "Contractor"

(Corporation, Individual, or Partnership)

WITNESSETH: That for and in consideration of the payments and agreements hereafter mentioned:

1. The Contractor will commence and complete the Wastewater Treatment Plant and Drip Dispersal Facilities.
2. The Contractor will furnish all of the material, supplies, tools. equipment, labor and other services necessary for the completion of the work described herein.
3. The Contractor will commence the work required by the Contract Documents within 10 calendar days after the contract start date of the written Notice to Proceed and will complete the work within 550 consecutive calendar days unless the periods of completion are extended otherwise by the Contract Documents. The Contractor further agrees to pay as liquidated damages, the sum of $600 for each consecutive calendar day in default thereafter as hereinafter provided in the General Conditions.
4. Contractor agrees to perform all of the Work described in the Contract Documents and comply with the terms therein for the sum of $_____or as shown in the Bid Schedule.
5. The term "Contract Documents" means and includes the following:

    a. Advertisements for Bids
    b. Information for Bidders
    c. Bid
    d. Bid Bond
    e. Contract
    f. General Conditions
    g. Supplemental General Conditions
    h. Payment Bond
    i. Performance Bond

j. Notice of Award

k. Notice to Proceed

l. Change Order(s)

m. Drawings prepared by FOXPE LLC, number G1.0 through E4

n. Specifications prepared or issued by FOXPE LLC, dated March 2021

o. Addenda:

No. _____, dated _____, 20____

No. _____, dated _____, 20____

No. _____, dated _____, 20____

6. The Owner will pay to the Contractor in the manner and at such times as set forth in the General Conditions and Supplemental General Conditions such amounts as required by the Contract Documents.

7. This Contract shall be binding upon all parties hereto and their respective heirs, executors, administrators, successors, and assigns.

IN WITNESS WHEREOF, the parties hereto have executed, or caused to be executed by their duly authorized officials, this Contract in six (6) copies each of which shall be deemed an original on the date first above written.

OWNER:

Town of Huntland

By _____

Name _____

Title _____

WITNESS:

_____

Name _____

Title _____

(Please Print or Type)

(SEAL)

CONTRACTOR:

_____

By _____

Name_____

Title_____
(Please Type)

ATTEST:

_____

Name _____

Title _____ (SEAL)
(Please Type)

Note: Attest for a Corporation must be by the corporate secretary; for a partnership by another partner; for an individual by a Notary.

SECTION 00 5500

NOTICE TO PROCEED

To: _____

_____

_____

Project Description: The site of the proposed work is the Town of Huntland in Huntland, Tennessee. The project consists of the Wastewater Treatment Plant and Drip Dispersal Facilities.

You are hereby notified to commence work in accordance with the Contract dated _____ _____, 20 ___ , on or before _____ ____ , 20 ___ , and you are to complete the work within 550 consecutive calendar days thereafter. The date of completion of all work is therefore _____ ____, 20 __ .

Dated this _____ day of _____, 20 ___.

Town of Huntland

By _____

Name _____

Title _____

ACCEPTANCE OF NOTICE

Receipt of the above Notice to Proceed is hereby acknowledged by _____

_____, this the _____ day of _____, 20 _____.

By _____

Name _____

Title _____

SECTION 00 6113.13

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: that _____

_____
(Name and Address of Contractor)
_____ of the State of _____
(Corporation, Partnership, or Individual)
the "Principal," and _____

_____the "Surety,"
(Name and Address of Surety)

are held and firmly bound unto the Town of Huntland, the "Owner," existing under and by virtue of the laws of the State of Tennessee, in the sum of _____
_____($)
in lawful money of the United States, for the payment of which sum in lawful money of the United States well and truly to be made we do hereby bind ourselves, our heirs, executors, administrators, successors, and assigns jointly and severally.

The condition of this obligation is such that whereas Principal has entered into a certain Contract with the Owner, dated as of the _____ day of _____ , 20 __ , which is by reference incorporated in and made a part hereof as fully as if copied here verbatim, for the following work: Wastewater Treatment Plant and Drip Dispersal Facilities.

NOW, THEREFORE, if the Principal shall in all respects comply with and perform all the terms and conditions of the Contract (which includes the Drawings, Specifications, and Contract Documents) and such alterations as may be made in said contract as the documents therein provide for, during the original term thereof and any extensions thereof which may be granted by the Owner, with or without notice to Surety, and during the one-year warranty period, and if Principal shall satisfy all claims and demands and shall indemnify and save harmless the Owner against and from all costs, expenses, damages, injury, or conduct, want of care, skill, negligence, or default, including compliance with performance guarantees and patent infringement by the Principal, then this obligation shall be void; otherwise Principal and Surety jointly and severally agree to pay to Owner any difference between the sum to which the Principal would be entitled on completion of the contract and that which the Owner may be obliged to pay for the completion of the work by contract or otherwise, together with any damages, direct or indirect, or consequential, which Owner may sustain on account of such work, or on account of the failure of the Principal to keep and execute all provisions of the Contract.

Principal and Surety further bind themselves, their heirs, executors, administrators, and assigns, jointly and severally, that if the Principal shall keep and perform its agreement to repair or replace defective work or equipment during the warranty period of one (1) year as provided, then this paragraph shall be void; but if default shall be made by Principal in the performance of its contract to so repair or replace said work, then this paragraph shall be in effect and Owner shall have and recover from Principal and its Surety damages for all defective conditions arising by reason of defective materials, work, or labor performed by or on the account of Principal and

it is further understood and agreed that this obligation shall be a continuing one against the Principal and Surety hereon, and that successive recoveries may be had hereon for successive breaches until the full amount shall have been exhausted; and it is further understood that the obligation therein to maintain said work shall continue throughout said maintenance period, and the same shall not be changed, diminished, or in any manner affected from any cause during said time; and to fully save and hold the Owner harmless for any damages it may be caused to pay on account of injury to person, loss of life or damage to property.

And the Surety, for value received, hereby stipulates and agrees that the obligations of the Surety and this Bond shall in no way be impaired or affected by any extension of time, modification, omission, addition, or change in or to the contract, the work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provision thereof, or by any assignment subletting or other transfer thereof, or of any part thereof, of any work to be performed, or of any moneys due to become due thereunder; and the said Surety does hereby waive notice of any and all such extensions, modifications, omissions, additions, changes, payments, waivers, assignments, subcontracts, and transfer, and hereby stipulates and agrees that any and all things done and omitted to be done by and in relation to executors, administrators, successors, assignees, subcontractors, and other transferees shall have the same effect as to said Surety as though done or omitted to be done by and in relation to the Principal.

IN WITNESS WHEREOF, the Principal and Surety have executed this Bond by causing their respective names to be hereunto subscribed and their seals to be hereunto affixed by their duly authorized officers, on this the _____ day of _____ , 20 __ .

CONTRACTOR - PRINCIPAL:

_____

By _____

Name _____
(Please Print or Type)

Title _____

ATTEST:

_____

Name _____
(Please Print or Type)

Title _____ (SEAL)

Note: Attest for a corporation must be by the corporate secretary; for a partnership by another partner; for an individual by a Notary.

SURETY:

_____

By _____

Name _____
(Please Print or Type)

(Attach Power of Attorney)

WITNESS:

_____

Name _____
(Please Print or Type)

Title _____ (SEAL)

Note: Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located.

SECTION 00 6113.16

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: that_____
(Name and Address of Contractor)

_____

_____of the State of _____
(A Corporation, a partnership, or Individual)
the "Principal," and _____
(Name and Address of Surety)
_____the "Surety,"

are held and firmly bound unto the Town of Huntland, the "Owner," existing under and by virtue of the laws of the State of Tennessee, in the sum of _____

_____ ($ _____)

in lawful money of the United States, for the payment of which sum in lawful money of the United States well and truly to be made we do hereby bind ourselves, our heirs, executors, administrators, successors, and assigns jointly and severally.

The condition of this obligation is such that whereas Principal has entered into a certain Contract with the Owner, dated as of the _____ day of _____ , 20 __ , which is by reference incorporated in and made a part hereof as fully as if copied here verbatim, for the following work: Wastewater Treatment Plant and Drip Dispersal Facilities.

NOW, THEREFORE, if the Principal shall fully pay for all the labor and materials used by said Principal or any immediate or remote subcontractor or furnisher of labor or materials under him in the performance of the work in lawful money of the United States as the same shall become due, including all amounts due for materials, lubricants, oil, gasoline, electricity, coal and coke, repairs on machinery, equipment, and tools, consumed or used in connection with performance of the work and all insurance premiums and other charges incurred under said contract, then this obligation shall be void; otherwise to remain in full force and effect.

Principal and Surety further bind themselves, their heirs, executors, administrators, and assigns, jointly and severally, that they shall promptly make payments of all taxes, licenses, assessments, contributions, penalties, and interest thereon, when, and if, the same may be lawfully due the State of Tennessee, or any County, Municipality, or political subdivision thereof by reason of and directly connected with the performance of the Contract, or any part thereof.

And the Surety, for value received, hereby stipulates and agrees that the obligations of the Surety and this Bond shall in no way be impaired or affected by any extension of time, modification, omission, addition, or change in or to the contract, the work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provision thereof, or by any assignment subletting or other transfer thereof, or of any part thereof, of any work to be performed, or of any moneys due to become due thereunder; and the said Surety does hereby waive notice of any and all such extensions, modifications, omissions, additions, changes, payments, waivers, assignments, subcontracts, and transfer, and hereby stipulates and agrees that any and all things done and omitted to be done by and in relation to executors, administrators, successors, assignees, subcontractors, and other transferees shall

have the same effect as to said Surety as though done or omitted to be done by and in relation to the Principal.

IN WITNESS WHEREOF, the Principal and Surety have executed this Bond by causing their respective names to be hereunto subscribed and their seals to be hereunto affixed by their duly authorized officers, on this the _____ day of _____ , 20 ___ .

CONTRACTOR - PRINCIPAL:

_____

By _____

Name _____
(Please Print or Type)

Title _____

ATTEST:

_____

Name _____
(Please Print or Type)

Title _____ (SEAL)

Note: Attest for a corporation must be by the corporate secretary; for a partnership by another partner; for an individual by a Notary.

SURETY:

_____

By _____

Name _____
(Please Print or Type)

Title _____
(Attach Power or Attorney)

WITNESS:

_____

Name _____

Title_____ (SEAL)

Note: Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located.

SECTION 00 6363

CHANGE ORDER

Order No._____

Date: _____

Agreement Date: _____

NAME OF PROJECT: Wastewater Treatment Plant and Drip Dispersal Facilities
OWNER: Town of Huntland
CONTRACTOR: _____

The following changes are hereby made to the Contract Documents:

Change to Contract Price

Original Contract Price	$_____
Current Contract Price adjusted by previous Change Order	$_____
The Contract Price due to this Change Order will be increased/decreased by:	$ _____
The new Contract Price including this Change Order will be	$ _____

Change to Contract Time

The Contract Time will be increased/decreased by _____ calendar days.

The date for completion of all work will be _____ (date).

Justification

_____

_____

Approvals Required

To be effective this Order must be approved by the Federal agency if it changes the scope or objective of the Project, or as may otherwise be required by the Supplemental General Conditions.

Accepted by: _____ (CONTRACTOR)

Recommended by: _____ FOXPE LLC

Ordered by: _____ Town of Huntland

SRF DOCUMENTS

U.S. Environmental Protection Agency

CERTIFICATION REGARDING DEBARMENT, SUSPENSION AND OTHER RESPONSIBILTITY MATTERS

The prospective participant certifies to the best of its knowledge and belief that it and its principals:

(a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

(b) Have not within a three year period preceding this proposal been convicted of or had a civil judgement rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statues or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(c) Are not presently indicted for or otherwise criminally or civilly charged by a government entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph (b) of this certification; and

(d) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State, or local) terminated for cause or default.

I understand that a false statement on this certification may be grounds for rejection of this proposal or termination of the award. In addition, under 18 USC Sec. 1001, a false statement may result in a fine of up to $10,000 or imprisonment for up to 5 years, or both.

_____

Typed Name & Title of Authorized Representative

_____

Signature of Authorized Representative Date

____ I am unable to certify to the above statements. My explanation is attached.

CERTIFICATION BY PROPOSED PRIME OR SUBCONTRACTOR REGARDING EQUAL EMPLOYMENT OPPORTUNITY

_____

Name of Prime Contractor **Project Number**

INSTRUCTIONS

This certification is required pursuant to Executive Order 11246, Part II, Section 203 (b), 30 F.R. 12319-25). 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 previous 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 indicated that the prime or subcontractor has not filed a compliance report due under applicable instruction, such contractor shall be required to submit a compliance report.

CONTRACTOR'S CERTIFICATION

Contractor's Name: _____

Address: _____

_____

_____

1. Bidder has participated in a previous contract or subcontract subject to the Equal Opportunity Clause. Yes □ No □

2. Compliance Reports were required to be filed in connection with such contract or subcontract. Yes □ No □

   If yes, state what reports were filed and with what agency.

   _____

3. Bidder has filed all compliance reports due under applicable instructions, including SF-100. Yes □ No □

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. (A willfully false statement is punishable by law-U.S. Code, Title 18, Section 1001.)

_____

Name and title of signer (Please type)

_____ _____

Signature **Date**

Document: Tenn. Code Ann. § 66-34-103

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TN - Tennessee Code Annotated Title 66 Property Chapter 34 Prompt Pay Act Part 1 General Provisions

66-34-103. Withholding of retainage -- Violations -- Penalties.

(a) All construction contracts on any project in this state, both public and private, may provide for the withholding of retainage; provided, however, that the retainage amount may not exceed five percent (5%) of the amount of the contract.

(b) The owner, whether public or private, shall release and pay all retainages for work completed pursuant to the terms of any contract to the prime contractor within ninety (90) days after completion of the work or within ninety (90) days after substantial completion of the project for work completed, whichever occurs first. As used in this subsection (b), work completed shall be construed to mean the completion of the scope of the work and all terms and conditions covered by the contract under which the retainage is being held. The prime contractor shall pay all retainages due any subcontractor within ten (10) days after receipt of the retainages from the owner. Any subcontractor receiving the retainage from the prime contractor shall pay to any subsubcontractor or material supplier all retainages due the subsubcontractor or material supplier within ten (10) days after receipt of the retainages.

(c) Any default in the making of the payments shall be subject to those remedies provided in this part.

(d) In the event that an owner or prime contractor withholds retainage that is for the use and benefit of the prime contractor or its subcontractors pursuant to § 66-34-104(a) and (b),

neither the prime contractor nor any of its subcontractors shall be required to deposit additional retained funds into an escrow account in accordance with § 66-34-104(a) and (b).

(e)

(1) It is an offense for a person, firm or corporation to fail to comply with subsection (a) or (b) or § 66-34-104(a).

(2)

(A) A violation of this subsection (e) is a Class A misdemeanor, subject to a fine only of three thousand dollars ($3,000).

(B) Each day a person, firm or corporation fails to comply with subsection (a) or (b) or § 66-34-104(a) is a separate violation of this subsection (e).

(C) Until the violation of this subsection (e) is remediated by compliance, the punishment for each violation shall be consecutive to all other such violations.

(3) In addition to the fine imposed pursuant to subdivisions (e)(2)(A) and (B), the court shall order restitution be made to the owner of the retained funds. In determining the appropriate amount of restitution, the formula stated in § 40-35-304 shall be used.

History

Acts 2007, ch. 201, § 3; 2008, ch. 804, § 3; 2012, ch. 609, § 1.

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TN - Tennessee Code Annotated **Title 66 Property** **Chapter 34 Prompt Pay Act** **Part 1 General Provisions**

66-34-104. Retention of portion of contract price in escrow -- Applicability -- Mandatory compliance.

(a) Whenever, in any contract for the improvement of real property, a certain amount or percentage of the contract price is retained, that retained amount shall be deposited in a separate, interest-bearing, escrow account with a third party which must be established upon the withholding of any retainage.

(b) As of the time of the withholding of the retained funds, the funds shall become the sole and separate property of the prime contractor or remote contractor to whom they are owed, subject to the rights of the person withholding the retainage in the event the prime contractor or remote contractor otherwise entitled to the funds defaults on or does not complete its contract.

(c) In the event that the party withholding the retained funds fails to deposit the funds into an escrow account as provided herein, such party shall be responsible for paying the owner of the retained funds an additional three hundred dollar ($300) penalty per day for each and every day that such retained funds are not deposited into such escrow account.

(d) The party with the responsibility for depositing the retained amount in a separate, interest-bearing, escrow account with a third party shall have the affirmative duty to provide written notice that it has complied with the requirements of this section to any

prime contractor upon withholding the amount of retained funds from each and every application for payment, including:

(1) Identification of the name of the financial institution with whom the escrow account has been established;

(2) Account number; and

(3) Amount of retained funds that are deposited in the escrow account with the third party.

(e) Upon satisfactory completion of the contract, to be evidenced by a written release by the owner or prime contractor owing the retainage, all funds accumulated in the escrow account together with all interest on the account shall be paid immediately to the prime contractor or remote contractor to whom the funds and interest are owed.

(f) In the event the owner or prime contractor, as applicable, fails or refuses to execute the release provided for in subsection (c), then the prime contractor or remote contractor, as applicable, may seek any remedy in a court of proper jurisdiction and the person holding the fund as escrow agent shall bear no liability for the nonpayment of the fund to the prime contractor or remote contractor; provided, however, that all claims, demands, disputes, controversies, and differences that may arise between the owner, prime contractor or prime contractors, and remote contractor or remote contractors regarding the funds may be, upon written agreement of all parties concerned, settled by arbitration conducted pursuant to the Tennessee Uniform Arbitration Act, compiled in title 4, chapter 5, part 3, or the Federal Arbitration Act (9 U.S.C. § 1, et seq.), as may be applicable.

(g) In contracts to which the state or any department, board or agency of the state, including the University of Tennessee, is a party, interest shall be paid on the retained amounts at the same rate interest is paid on the funds of local governments participating in the local government investment pool established pursuant to § 9-4-704, for the contract period.

(h) This section shall be applicable to the state, any department, board or agency of the state, including the University of Tennessee, and all counties and municipalities and all departments, boards or agencies of the counties and municipalities, including all school and education boards, and any other subdivision of the state.

(i) This section shall be applicable to all prime contracts and all subcontracts thereunder for the improvement of real property when the contract amount of such prime contract is five hundred thousand dollars ($500,000) or greater, notwithstanding the amount of such subcontracts.

(j) Compliance with this section shall be mandatory, and may not be waived by contract.

(k) Failure to deposit the retained funds into an escrow account as provided herein, within seven (7) days' receipt of written notice regarding such failure, is a Class A misdemeanor.

History

Acts 1975, ch. 345, §§ 1-4; T.C.A., §§ 64-1148 -- 64-1151; Acts 1985, ch. 340, §§ 1, 2; 1986, ch. 551, § 9; 2007, ch. 189, § 43; 2007, ch. 201, §§ 1, 2; T.C.A. § 66-11-144; Acts 2008, ch. 804, §§ 1, 2; 2010, ch. 875, §§ 1, 2; 2012, ch. 609, §§ 2-5.

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TN - Tennessee Code Annotated **Title 66 Property** **Chapter 34 Prompt Pay Act** **Part 2 Owner/Contractor Payment**

66-34-203. Withholding of payment or retainage by owner.

Nothing in this chapter shall prevent the owner from reasonably withholding payment or a portion of a payment to the contractor; provided, that such withholding is in accordance with the written contract between the owner and the contractor. The owner may also withhold a reasonable amount of retainage as specified in the written contract between the owner and the contractor; provided, however, that the retainage amount may not exceed five percent (5%) of the amount of the contract.

History

Acts 1991, ch. 45, § 1; 2007, ch. 201, § 4.

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Disadvantaged Business Enterprise (DBE) Requirements
for
State Revolving Fund Loans Awarded after May 27, 2008

GUIDANCE DOCUMENT

Items included in the Guidance Document:

- **General Contract Administration Provisions Table**
- **Six Good Faith Efforts, Purpose and Definitions Table**
- **List of DBE Forms for Loans Awarded After May 27, 2008**

GENERAL CONTRACT ADMINISTRATION PROVISIONS—www.epa.gov			
Requirement	**Circumstance**	**Responsible Party:**	**Submitted To:**
A **Loan Recipient** must be notified in writing by its **Prime Contractor** prior to any termination of a **DBE Subcontractor** for convenience by the **Prime Contractor**.	Termination of a **DBE Subcontractor** for convenience by the **Prime Contractor**	**Prime Contractor**	**Loan Recipient**
A **Loan Recipient** must require its **Prime Contractor** to pay its **Subcontractor** for satisfactory performance no more than 30 days from the **Prime Contractor's** receipt of payment from the **Loan Recipient**.	**DBE Subcontractor's** satisfactory performance	**Loan Recipient** **Prime Contractor**	**DBE Subcontractor**
If a **DBE Subcontractor** fails to complete work under the subcontract for any reason, the **Loan Recipient** must require the **Prime Contractor** to employ the **Six Good Faith Efforts** (see Table below) if soliciting a replacement **Subcontractor**.	**DBE Subcontractor** fails to complete work under the subcontract for any reason and will be replaced	**Loan Recipient** **Prime Contractor**	**SRF Loan Program**
A **Loan Recipient** must require its **Prime Contractor** to employ the **Six Good Faith Efforts** (see Table below) even if the **Prime Contractor** has achieved its fair share objectives.	Employment of the **Six Good Faith Efforts**	**Loan Recipient** **Prime Contractor**	**SRF Loan Program**
Inclusion, completion, and/or transmittal of required **DBE Forms** as instructed below: **Loan Recipient Requirements** **Bidder Requirements** **DBE Participation/Certification Summary** **Advertisement for Bids and Publisher's Affidavit** 10 Certified Letters and Return Receipts to certified **DBEs** **Good Faith Letter** **Prime Contractor's Notice Letter** for EPA Form 6100-2 **EPA Form 6100-2** **EPA Form 6100-3** **EPA Form 6100-4**	---	**Loan Recipient** **Prime Contractor** **DBE Subcontractor**	See instructions below and on Forms

SIX GOOD FAITH EFFORTS—www.epa.gov	
PURPOSE	The Good Faith Efforts are required methods employed by all EPA financial assistance agreement recipients to ensure that all disadvantaged business enterprises (DBEs) have the opportunity to compete for procurements funded by EPA financial assistance dollars.
Definitions	
EFFORT 1	Ensure DBEs are made aware of contracting opportunities to the fullest extent practicable through outreach and recruitment activities. For Indian Tribal, State and Local and Government recipients, this will include placing DBEs on solicitation lists and soliciting them whenever they are potential sources.
EFFORT 2	Make information on forthcoming opportunities available to DBEs and arrange time frames for contracts and establish delivery schedules, where the requirements permit, in a way that encourages and facilitates participation by DBEs in the competitive process. This includes, whenever possible, posting solicitations for bids or proposals for a minimum of 30 calendar days before the bid or proposal closing date.
EFFORT 3	Consider in the contracting process whether firms competing for large contracts could subcontract with DBEs. For Indian Tribal, State and local Government recipients, this will include dividing total requirements when economically feasible into smaller tasks or quantities to permit maximum participation by DBEs in the competitive process.
EFFORT 4	Encourage contracting with a consortium of DBEs when a contract is too large for one of these firms to handle individually.
EFFORT 5	Use the services and assistance of the Small Business Administration (SBA) and the Minority Business Development Agency of the Department of Commerce.
EFFORT 6	If the **Prime Contractor** awards subcontracts, require the **Prime Contractor** to take the steps in the Good Faith Efforts 1 through 5 (above) and in the General Contract Administration Provisions (above).

Disadvantaged Business Enterprise (DBE) Requirements
for
State Revolving Fund Loans Awarded after May 27, 2008

GUIDANCE DOCUMENT

DBE FORMS FOR SRF LOANS AWARDED AFTER MAY 27, 2008—www.epa.gov				
Form	**Requirement**	**Provided By:**	**Completed By:**	**Submitted To:**
List of certified **DBE** contractors, subcontractors, supplies vendors, equipment vendors, and service providers	Keep list with project files/information for duration of project	**SRF Loan Program**	---	---
Loan Recipient's Requirements regarding DBEs	Include this information sheet in the Information for Bidders section of bid documents	**SRF Loan Program**	---	To be included in the contract specifications book
Bidder's Requirements regarding DBEs	Include this information sheet in the Information for Bidders section of bid documents	**SRF Loan Program**	---	To be included in the contract specifications book
Loan Recipient's Certification and Summary of **DBE** Participation	To be completed and submitted with the Authority-to-Award/ Bid Package. The SRF Loan Program must be notified of any changes, additions, or deletions to the contract during construction.	**SRF Loan Program**	**Loan Recipient**	**SRF Loan Program**
Advertisement for Bids and **Publisher's Affidavit**	**DBE** solicitation information must be included in the actual advertisement for bids. A Publisher's Affidavit (signed, original, notarized certification of publication) denoting the actual published date of the advertisement will be submitted to the SRF Loan Program as part of the Authority-to-Award/Bid Package documents.	An example advertise-ment with appropriate **DBE** language is supplied to the Loan Recipient by the **SRF Loan Program**	**Loan Recipient**	A copy of the actual advertisement and a Publisher's Affidavit will be submitted to the **SRF Loan Program** as part of the Authority-to-Award/Bid Package documents
10 Certified Letters and **Return Receipts** to potential certified DBE subcontractors, supplies vendors, service providers, and/or equipment vendors	These certified letters and copies of the corresponding return mail receipts are submitted with the completed **Loan Recipient's DBE Participation and Certification Summary Form.**	**Prime Contractor and/or Loan Recipient**	**Loan Recipient**	SRF Loan Program as part of the Authority-to-Award/Bid Package documents
Good Faith Letter	If **no DBE** participation is obtained for the contract, the "Good Faith" letter must be written.	Form letter provided by the **SRF Loan Program**	**Loan Recipient**	**SRF Loan Program**

Disadvantaged Business Enterprise (DBE) Requirements
for
State Revolving Fund Loans Awarded after May 27, 2008

GUIDANCE DOCUMENT

DBE FORMS FOR SRF LOANS AWARDED AFTER MAY 27, 2008—www.epa.gov				
Form	**Requirement**	**Provided By:**	**Completed By:**	**Submitted To:**
Prime Contractor's Notice Letter for EPA Form 6100-2	The **Prime Contractor** must submit the Notice Letter to verify that Form 6100-2 was supplied to all **DBE Subcontractors** participating in the contract.	**SRF Loan Program**	**Prime Contractor**	**Loan Recipient** for inclusion in the Authority-to-Award / Bid / Proposal package
EPA Form **6100-2**	**Loan Recipient** required to have **Prime Contractors** provide form to **DBE Subcontractors** This form gives a **DBE Subcontractor** the opportunity to describe the work the **DBE Subcontractor** received from the **Prime Contractor**, how much the **DBE Subcontractor** was paid, and any other concerns the **DBE Subcontractor** might have.	**Loan Recipient** **Prime Contractors**	**DBE Subcontractors**	**EPA DBE Coordinator** at the conclusion of **DBE Subcontractor** participation in the project (Address on Form)
EPA Form **6100-3**	**Loan Recipient** required to have **Prime Contractors** provide form to **DBE Subcontractors** This form captures an intended **Subcontractor's** description of work to be performed for the **Prime Contractor** and the price of the work submitted to the **Prime Contractor**.	**Loan Recipient**	**Prime Contractors** **DBE Subcontractors**	**Loan Recipient** for inclusion in the Authority-to-Award / Bid / Proposal package
EPA Form **6100-4**	**Loan Recipient** required to have **Prime Contractors** complete the form This form captures the **Prime Contractor's** intended use of an identified **DBE Subcontractor** and the estimated dollar amount of the subcontract.	**Loan Recipient**	**Prime Contractors**	**Loan Recipient** for inclusion in the Authority-to-Award / Bid / Proposal package

STATE REVOLVING FUND LOAN PROGRAM

Loan Recipient's Requirements for Solicitation and Documentation
of
Disadvantaged Business Enterprises (DBE) Participation
on State Revolving Fund (SRF) Projects

A goal-oriented system has been established to promote **Disadvantaged Business Enterprises (DBE)** participation by providing construction services, professional services, supplies, and/or equipment on SRF Loan-funded water and wastewater projects. It is the Loan Recipient's responsibility to ensure that Bidders make a good faith effort during the bidding phase to solicit for subcontractor participation by **DBE** subcontractors, service professionals, suppliers, and/or equipment vendors on all SRF-funded projects.

DEFINITIONS

DBE - Minority Business Enterprise (MBE): A qualified socially and economically disadvantaged minority-owned business certified by any State or Federal agency, such as the Tennessee Department of Transportation, U.S. EPA's Office of Small and Disadvantaged Business Utilization, or the U.S. Small Business Administration.

DBE - Women's Business Enterprise (WBE): A qualified independent business at least 51% owned by a woman or women and certified by any State or Federal agency such as the Tennessee Department of Transportation, U.S. EPA's Office of Small and Disadvantaged Business Utilization, or the U.S. Small Business Administration.

Fair-Share Goals: The MBE fair-share goal is 2.6% for construction and 5.2% for supplies, services, and equipment. The WBE fair share goal is 2.6% for construction and 5.2% for supplies, services, and equipment.

INSTRUCTIONS TO LOAN RECIPIENTS

Pre-Bid Requirements

Loan Recipients must include the SRF Loan Program's "Bidder's Requirements for Solicitation and Documentation of **DBE** Participation on SRF-Funded Projects" information sheet in the Information for Bidders section of bid documents. Loan Recipients must also ensure that Bidders take the following affirmative steps that constitute a good-faith effort to secure **DBE** participation:

- Include certified **DBEs** on solicitation lists whenever they are potential sources,
- Divide construction contracts into subcontracts, when economically feasible, to encourage maximum participation by **DBEs**,
- Establish delivery schedules, where requirements of the work permit, that encourage participation by **DBEs**,
- Use the services and assistance of the Office of Minority Business Enterprises of the U.S. Department of Commerce, or the U.S. EPA's Office of Small and Disadvantaged Business Utilization. For assistance or information, Bidders may be referred to:

Tennessee Department of Transportation
Small Business Development
505 Deaderick Street, Suite 1800
Nashville, TN 37243-0347
(615) 741-3681
http://www.tdot.state.tn.us/construction/DBE%20list/dbe_list.pdf

Mr. W. Clinton Smith, District Director
U.S. Small Business Administration
50 Vantage Way, Suite 201
Nashville, TN 37228
(615) 736-5881
http://pro-net.sba.gov/

Ms. Jeanette L. Brown, Director
U.S. Environmental Protection Agency
Office of Small and Disadvantaged Business Utilization
1200 Pennsylvania Avenue, N.W. (1230A)
Washington, D.C. 20460
(202) 564-4100 http://www.epa.gov/osdbu/

POST-BID REQUIREMENTS

Whether or not DBE participation was obtained, the Loan Recipient must complete the **"Loan Recipient's Certification and Summary"** form for every contract detailing whether or not **DBE** participation of subcontractors, professional service providers, suppliers, and/or equipment vendors was obtained. The **"Loan Recipient's Certification and Summary"** form must be submitted to the Administrative Section of the SRF Loan Program prior to the award of any construction contract(s) along with the newspaper **advertisement**, a **Publisher's Affidavit**, and **return receipts** and copies of the **certified letters** that were mailed to a minimum of 10 qualified **DBEs**.

STATE REVOLVING FUND LOAN PROGRAM

Loan Recipient's Requirements for Solicitation and Documentation
of
Disadvantaged Business Enterprises (DBE) Participation
on State Revolving Fund (SRF) Projects

If DBE participation was obtained, the **"Loan Recipient's Certification and Summary"** form must clearly indicate whether **DBE** participation was obtained from either a subcontractor, professional service provider, supplier, and/or equipment vendor participation; identify the **DBE** firm(s) to be used; and certify that the **DBE** firm(s) is a certified **DBE**. In addition to the **"Loan Recipient's Certification and Summary"** form, the Loan Recipient must include in the submittal to the SRF Loan Program, copies of the **Prime Contractor's Notice Letter for EPA Form 6100-2**, **EPA Form 6100-3**, and **EPA Form 6100-4**.

If no DBE participation was obtained, the Loan Recipient must submit a separate letter documenting that a "**good-faith effort**" was made to secure **DBE** participation. This letter is submitted along with the above-mentioned **"Loan Recipient's Certification and Summary"** form, newspaper **advertisement**, **Publisher's Affidavit**, **return receipts,** and copies of the **certified letters.** The SRF Loan Program provides a template to the Loan Recipient for this letter.

This documentation is the only form of documentation that will be accepted by the SRF Loan Program. Failure to provide the required documentation may result in a delay of the SRF Loan Program's approval of the Authority-to-Award/Bid Package, thereby delaying the award of the construction contract(s).

The Loan Recipient should direct all inquiries regarding the SRF Loan Program's requirements for **DBE** solicitation and documentation to Andrea Fenwick at (615) 532-0771, andrea.w.fenwick@tn.gov, or the following address:

Andrea Fenwick, Manager
Administrative and Financial Section
Tennessee State Revolving Fund Loan Program
WRS - Tennessee Tower, 12th Floor
312 Rosa L. Parks Avenue
Nashville, TN 37243

STATE REVOLVING FUND LOAN PROGRAM

Loan Recipient's Certification and Summary
of
Disadvantaged Business Enterprises (DBE) Participation

SRF Loan Recipient: _____ SRF Loan No. _____

INSTRUCTIONS TO SRF LOAN RECIPIENTS

The SRF Loan Recipient's Authorized Representative must clearly indicate the Contractor's **Disadvantaged Business Enterprises (DBE)** participation results by placing a check in the appropriate box below. The remainder of the form must be completed if **DBE (Minority Business Enterprise-MBE or Women's Business Enterprise –WBE)** participation was obtained. The form must be signed and dated and returned to Andrea Fenwick of the Administrative Section of the SRF Loan Program.

The **completed Form** must be accompanied by **copies of the certified letters** sent from the selected Bidder to a minimum of 10 qualified DBE potential subcontractors, supplies vendor, services provider, and/or equipment vendors, and **copies of the corresponding return mail receipts**.

The SRF Loan Program must be notified of any changes, additions, or deletions to the contract during construction.

☐ **No, Disadvantaged Business Enterprises (DBE) participation was not obtained for this SRF-funded project.** I certify that a good-faith effort was made to solicit **DBE** participation in accordance with the four affirmative steps outlined in the SRF Loan Program's Requirements for Solicitation and Documentation of **DBE** Participation on SRF-Funded Projects. A letter documenting that a good–faith effort was made to secure **DBE** participation has been provided to the SRF Loan Program.

OR

☐ **Yes, Disadvantaged Business Enterprises (DBE) participation was obtained for this SRF-funded project.** I certify that the **DBE** firms participating in this SRF-funded project are qualified in accordance with the SRF Loan Program's Requirements for Solicitation and Documentation of **DBE** Participation on SRF-Funded Projects. Below is a listing of firms to be utilized and the amounts of their respective participation.

1. **DBE type (circle one): Subcontractor, Supplies Vendor, Service Provider, Equipment Vendor**
DBE Name: _____
Address: _____
Subcontract Amount: $ _____ **MBE** ___ **WBE** ___ **% of Contract $:** _____ **%**

2. **DBE type (circle one): Subcontractor, Supplies Vendor, Service Provider, Equipment Vendor**
DBE Name: _____
Address: _____
Subcontract Amount: $ _____ **MBE** ___ **WBE** ___ **% of Contract $:** _____ **%**

3. **DBE type (circle one): Subcontractor, Supplies Vendor, Service Provider, Equipment Vendor**
DBE Name: _____
Address: _____
Subcontract Amount: $ _____ **MBE** ___ **WBE** ___ **% of Contract $:** _____ **%**

4. **DBE type (circle one): Subcontractor, Supplies Vendor, Service Provider, Equipment Vendor**
DBE Name: _____
Address: _____
Subcontract Amount: $ _____ **MBE** ___ **WBE** ___ **% of Contract $:** _____ **%**

PARTICIPATION SUMMARY

Total SRF Loan Amount: $ _____ **Total Construction Contract Amount: $** _____

Total MBE Participation: $ _____ **Total WBE Participation: $** _____

_____ _____
Signature and Title of SRF Loan Recipient's Authorized Representative Date

STATE REVOLVING FUND LOAN PROGRAM

Bidder's Requirements for Solicitation and Documentation of Disadvantaged Business Enterprises (DBE) Participation

A goal-oriented system has been established to promote **Disadvantaged Business Enterprises (DBE)** participation by providing construction services, professional services, supplies, and/or equipment on SRF Loan-funded water and wastewater projects. It is the Bidder's responsibility to make a good faith effort to secure participation by **DBE** subcontractors, professional service providers, suppliers, and/or equipment vendors.

DEFINITIONS

DBE - Minority Business Enterprise (MBE): A qualified socially and economically disadvantaged minority-owned business certified by any State or Federal agency, such as the Tennessee Department of Transportation, U.S. EPA's Office of Small and Disadvantaged Business Utilization, or the U.S. Small Business Administration.

DBE - Women's Business Enterprise (WBE): A qualified independent business at least 51% owned by a woman or women and certified by any State or Federal agency such as the Tennessee Department of Transportation, U.S. EPA's Office of Small and Disadvantaged Business Utilization, or the U.S. Small Business Administration.

Fair-Share Goals: The MBE fair-share goal is 2.6% for construction and 5.2% for supplies, services, and equipment. The WBE fair share goal is 2.6% for construction and 5.2% for supplies, services, and equipment.

INSTRUCTIONS TO BIDDERS

Pre-Bid Requirements

All Bidders must send letters by certified mail with return receipt requested to a minimum of 10 certified **DBE** subcontractors, professional service providers, suppliers, and/or equipment vendors to solicit their subcontract participation in the work. Lists of certified **DBE** firms may be obtained from various State and Federal agencies, including the following:

Tennessee Department of Transportation
Small Business Development
505 Deaderick Street, Suite 1800
Nashville, TN 37243-0347
(615) 741-3681
http://www.tdot.state.tn.us/dbedirectinternet/Vendor.aspx

Mr. W. Clinton Smith, District Director
U.S. Small Business Administration
50 Vantage Way, Suite 201
Nashville, TN 37228
(615) 736-5881
http://pro-net.sba.gov/

U.S. Environmental Protection Agency
Office of Small and Disadvantaged Business Utilization
1200 Pennsylvania Avenue, N.W. (1230A)
Washington, D.C. 20460
(202) 564-4100
http://www.epa.gov/osdbu/

Post-Bid Requirements

Whether or not DBE participation was obtained, the successful Bidder (Prime Contractor) must maintain supporting documents such as certification lists, solicitation documents, letters of intent, contracts, etc., for the duration of the project.

If DBE participation was obtained, the apparent successful Bidder must identify to the Loan Recipient all **DBE** firms to be utilized on the contract and the respective **DBE** type--subcontractors, supplies vendors, service providers, and/or equipment vendors (see "Loan Recipient's Certification and Summary" form)**.** Copies of the State's or Federal agency's **DBE** certification list(s) identifying that the **DBE** firms are certified minority or women's business enterprises must be provided to the Loan Recipient. In addition, copies of the **Prime Contractor's Notice Letter for EPA Form 6100-2**, **EPA Form 6100-3** (to be co-completed by the Prime Contractor and each DBE subcontractor**)**, and **EPA Form 6100-4** must also be provided to the Loan Recipient prior to tentative loan award. The Prime Contractor must provide **EPA Form 6100-2** to each **DBE** utilized on the contract.

If no DBE participation was obtained by the apparent successful Bidder, it remains the responsibility of the Prime Contractor to provide documentation to the Loan Recipient, prior to contract award, that a good faith effort was made to obtain **DBE** participation. Copies of the **certified letters** sent to a minimum of 10 qualified **DBE** potential subcontractors, supplies vendors, service providers, and/or equipment vendors and the corresponding **return mail receipts** are the only documentation of a good-faith effort that will be acceptable to the Loan Recipient.

*Failure to provide the required certified letters, return receipts, State or Federal agency **DBE** certification list(s), **Prime Contractor's Notice Letter for EPA Form 6100-2**, **EPA Form 6100-3**, and **EPA Form 6100-4** to the Loan Recipient may delay the contract award until the required documentation has been provided to and accepted by the Loan Recipient.*

STATE REVOLVING FUND LOAN PROGRAM

Contractor Receipt Letter – Form 6100-2

(Please Insert on Contractor Letterhead)

(Date)

Dr. Bagher Sami, Manager
Administrative and Financial Sections
State Revolving Fund Loan Program
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 12th Floor
Nashville, TN 37243

RE: Receipt and Distribution of EPA Form 6100-2
Disadvantaged Business Enterprise (DBE) Participation
(City/County/UD/Authority) (??? County), Tennessee
Loan No. SRF/CWA/CGA/DWF/DWA/DGA 20??-???
(Contract Name and/or Number)

Dear Dr. Sami:

This letter is to inform you the EPA Form 6100-2 was received from the (City/County/UD/Authority) and was then given to all DBE Subcontractors as required who are going to provide either construction, services, supplies, or equipment for this project.

If you have any questions concerning this notification, please contact us at (Phone No., e-mail, etc.).

Sincerely,

(Contractors Authorized Representative)
(Title)

cc: (Consulting Engineer for the contract)
(City/County/UD/Authority's Authorized Representative)

United States Environmental Protection Agency

OMB Control No: 2090-0030
Approved: 8/13/2013
Approval Expires: 8/31/2015

Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Participation Form

An EPA Financial Assistance Agreement Recipient must require its prime contractors to provide this form to its DBE subcontractors. This form gives a DBE[1] subcontractor[2] the opportunity to describe work received and/or report any concerns regarding the EPA-funded project (e.g., in areas such as termination by prime contractor, late payments, etc.). The DBE subcontractor can, as an option, complete and submit this form to the EPA DBE Coordinator at any time during the project period of performance.

Subcontractor Name	Project Name	
Bid/ Proposal No.	Assistance Agreement ID No. (if known)	Point of Contact
Address		
Telephone No.	Email Address	
Prime Contractor Name	Issuing/Funding Entity:	

Contract Item Number	Description of Work Received from the Prime Contractor Involving Construction, Services , Equipment or Supplies	Amount Received by Prime Contractor

[1] A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.205 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.

[2] Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an EPA award of financial assistance.

United States Environmental Protection Agency

OMB Control No: 2090-0030
Approved: 8/13/2013
Approval Expires: 8/31/2015

Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Participation Form

Please use the space below to report any concerns regarding the above EPA-funded project:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Subcontractor Signature	Print Name
Title	**Date**

The public reporting and recordkeeping burden for this collection of information is estimated to average three (3) hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.

United States Environmental Protection Agency

OMB Control No: 2090-0030
Approved: 8/13/2013
Approval Expires: 8/31/2015

Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Performance Form

This form is intended to capture the DBE[1] subcontractor's[2] description of work to be performed and the price of the work submitted to the prime contractor. An EPA Financial Assistance Agreement Recipient must require its prime contractor to have its DBE subcontractors complete this form and include all completed forms in the prime contractors bid or proposal package.

Subcontractor Name	Project Name	
Bid/ Proposal No.	Assistance Agreement ID No. (if known)	Point of Contact
Address		
Telephone No.	Email Address	
Prime Contractor Name	Issuing/Funding Entity:	

Contract Item Number	Description of Work Submitted to the Prime Contractor Involving Construction, Services , Equipment or Supplies	Price of Work Submitted to the Prime Contractor

DBE Certified By: ___ DOT ___ SBA ___ Other: _____	Meets/ exceeds EPA certification standards? ___ YES ___ NO ___ Unknown

[1] A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.205 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.

[2] Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an EPA award of financial assistance.

United States Environmental Protection Agency

OMB Control No: 2090-0030
Approved: 8/13/2013
Approval Expires: 8/31/2015

Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Performance Form

I certify under penalty of perjury that the forgoing statements are true and correct. Signing this form does not signify a commitment to utilize the subcontractors above. I am aware of that in the event of a replacement of a subcontractor, I will adhere to the replacement requirements set forth in 40 CFR Part 33 Section 33.302 (c).

Prime Contractor Signature	Print Name
Title	**Date**

Subcontractor Signature	Print Name
Title	**Date**

The public reporting and recordkeeping burden for this collection of information is estimated to average three (3) hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.

United States Environmental Protection Agency

OMB Control No: 2090-0030
Approved: 8/13/2013
Approval Expires: 8/31/2015

Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Utilization Form

This form is intended to capture the prime contractor's actual and/or anticipated use of identified certified DBE[1] subcontractors[2] and the estimated dollar amount of each subcontract. An EPA Financial Assistance Agreement Recipient must require its prime contractors to complete this form and include it in the bid or proposal package. Prime contractors should also maintain a copy of this form on file.

Prime Contractor Name		Project Name
Bid/ Proposal No.	Assistance Agreement ID No. (if known)	Point of Contact
Address		
Telephone No.		Email Address
Issuing/Funding Entity:		

I have identified potential DBE certified subcontractors	___ YES	___ NO
If yes, please complete the table below. If no, please explain:		

Subcontractor Name/ Company Name	**Company Address/ Phone/ Email**	**Est. Dollar Amt**	**Currently DBE Certified?**

Continue on back if needed

[1] A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.205 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.

[2] Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an EPA award of financial assistance.

United States Environmental Protection Agency

OMB Control No: 2090-0030
Approved: 8/13/2013
Approval Expires: 8/31/2015

Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Utilization Form

I certify under penalty of perjury that the forgoing statements are true and correct. Signing this form does not signify a commitment to utilize the subcontractors above. I am aware of that in the event of a replacement of a subcontractor, I will adhere to the replacement requirements set forth in 40 CFR Part 33 Section 33.302 (c).

Prime Contractor Signature	Print Name
Title	**Date**

The public reporting and recordkeeping burden for this collection of information is estimated to average three (3) hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.

Certified Disadvantaged Business Enterprises (DBE) List

Using Governor's Diversity Business Office and State DOT and CCR DBE Directories to Find Certified WBEs and MBEs

Here are the links:

https://tn.diversitysoftware.com/FrontEnd/VendorSearchPublic.asp?TN=tn&XID=1215

www.osdbu.dot.gov/DBEProgram/StateDOTDBESites.cfm

CCR can be used to search for SBA SDBs. Since the SBA SDB certification is considered acceptable under the EPA DBE Program, firms found using the following search criteria can count toward EPA MBE/WBE fair share objectives.

Access the CCR search page at www.bpn.gov/CCRSearch/Search.aspx

http://www.epa.gov/osbp/dbe_team.htm

Appendix 5: Sample Certifications

The following information is provided as a sample letter of **step** certification for AIS compliance. Documentation must be provided on company letterhead.

Date

Company Name

Company Address

City, State Zip

Subject: American Iron and Steel Step Certification for Project (XXXXXXXXXX)

I, (company representative), certify that the (melting, bending, coating, galvanizing, cutting, etc.) process for (manufacturing or fabricating) the following products and/or materials shipped or provided for the subject project is in full compliance with the American Iron and Steel requirement as mandated in EPA's State Revolving Fund Programs.

Item, Products and/or Materials:

1. Xxxx
2. Xxxx
3. Xxxx

Such process took place at the following location:

_____

If any of the above compliance statements change while providing material to this project we will immediately notify the prime contractor and the engineer.

Signed by company representative

The following information is provided as a sample letter of certification for AIS compliance. Documentation must be provided on company letterhead.

Date

Company Name

Company Address

City, State Zip

Subject: American Iron and Steel Certification for Project (XXXXXXXXXX)

I, (company representative), certify that the following products and/or materials shipped/provided to the subject project are in full compliance with the American Iron and Steel requirement as mandated in EPA's State Revolving Fund Programs.

Item, Products and/or Materials:

1. Xxxx
2. Xxxx
3. Xxxx

Such process took place at the following location:

_____

If any of the above compliance statements change while providing material to this project we will immediately notify the prime contractor and the engineer.

Signed by company representative

Appendix 4: Sample Construction Contract Language

ALL CONTRACTS MUST HAVE A CLAUSE REQUIRING COMPLIANCE WITH THE AIS REQUIREMENT. THIS IS AN EXAMPLE OF WHAT COULD BE INCLUDED IN ALL CONTRACTS IN PROJECTS THAT USE SRF FUNDS. EPA MAKES NO CLAIMS REGARDING THE LEGALITY OF THIS CLAUSE WITH RESPECT TO STATE OR LOCAL LAW:

The Contractor acknowledges to and for the benefit of the City of _____ ("Purchaser") and the _____ (the "State") that it understands the goods and services under this Agreement are being funded with monies made available by the Clean Water State Revolving Fund and/or Drinking Water State Revolving Fund that have statutory requirements commonly known as "American Iron and Steel;" that requires all of the iron and steel products used in the project to be produced in the United States ("American Iron and Steel Requirement") including iron and steel products provided by the Contactor pursuant to this Agreement. The Contractor hereby represents and warrants to and for the benefit of the Purchaser and the State that (a) the Contractor has reviewed and understands the American Iron and Steel Requirement, (b) all of the iron and steel products used in the project will be and/or have been produced in the United States in a manner that complies with the American Iron and Steel Requirement, unless a waiver of the requirement is approved, and (c) the Contractor will provide any further verified information, certification or assurance of compliance with this paragraph, or information necessary to support a waiver of the American Iron and Steel Requirement, as may be requested by the Purchaser or the State. Notwithstanding any other provision of this Agreement, any failure to comply with this paragraph by the Contractor shall permit the Purchaser or State to recover as damages against the Contractor any loss, expense, or cost (including without limitation attorney's fees) incurred by the Purchaser or State resulting from any such failure (including without limitation any impairment or loss of funding, whether in whole or in part, from the State or any damages owed to the State by the Purchaser). While the Contractor has no direct contractual privity with the State, as a lender to the Purchaser for the funding of its project, the Purchaser and the Contractor agree that the State is a third-party beneficiary and neither this paragraph (nor any other provision of this Agreement necessary to give this paragraph force or effect) shall be amended or waived without the prior written consent of the State.

Appendix 1: Information Checklist for Waiver Request

The purpose of this checklist is to help ensure that all appropriate and necessary information is submitted to EPA. EPA recommends that States review this checklist carefully and provide all appropriate information to EPA. This checklist is for informational purposes only and does not need to be included as part of a waiver application.

Items	✓	Notes
General • Waiver request includes the following information: — Description of the foreign and domestic construction materials — Unit of measure — Quantity — Price — Time of delivery or availability — Location of the construction project — Name and address of the proposed supplier — A detailed justification for the use of foreign construction materials • Waiver request was submitted according to the instructions in the memorandum • Assistance recipient made a good faith effort to solicit bids for domestic iron and steel products, as demonstrated by language in requests for proposals, contracts, and communications with the prime contractor		
Cost Waiver Requests • Waiver request includes the following information: — Comparison of overall cost of project with domestic iron and steel products to overall cost of project with foreign iron and steel products — Relevant excerpts from the bid documents used by the contractors to complete the comparison — Supporting documentation indicating that the contractor made a reasonable survey of the market, such as a description of the process for identifying suppliers and a list of contacted suppliers		
Availability Waiver Requests • Waiver request includes the following supporting documentation necessary to demonstrate the availability, quantity, and/or quality of the materials for which the waiver is requested: — Supplier information or pricing information from a reasonable number of domestic suppliers indicating availability/delivery date for construction materials — Documentation of the assistance recipient's efforts to find available domestic sources, such as a description of the process for identifying suppliers and a list of contacted suppliers. — Project schedule — Relevant excerpts from project plans, specifications, and permits indicating the required quantity and quality of construction materials • Waiver request includes a statement from the prime contractor and/or supplier confirming the non-availability of the domestic construction materials for which the waiver is sought • Has the State received other waiver requests for the materials described in this waiver request, for comparable projects?		

Implementation

The Act states:

Sec. 436. (a)(1) None of the funds made available by a State water pollution control revolving fund as authorized by title VI of the Federal Water Pollution Control Act (33 U.S.C. 1381 et seq.) or made available by a drinking water treatment revolving loan fund as authorized by section 1452 of the Safe Drinking Water Act (42 U.S.C. 300j–12) shall be used for a project for the construction, alteration, maintenance, or repair of a public water system or treatment works unless all of the iron and steel products used in the project are produced in the United States.

(2) In this section, the term ''iron and steel products'' means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials.

(b) Subsection (a) shall not apply in any case or category of cases in which the Administrator of the Environmental Protection Agency (in this section referred to as the ''Administrator'') finds that—

(1) applying subsection (a) would be inconsistent with the public interest;

(2) iron and steel products are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality; or

(3) inclusion of iron and steel products produced in the United States will increase the cost of the overall project by more than 25 percent.

(c) If the Administrator receives a request for a waiver under this section, the Administrator shall make available to the public on an informal basis a copy of the request and information available to the Administrator concerning the request, and shall allow for informal public input on the request for at least 15 days prior to making a finding based on the request. The Administrator shall make the request and accompanying information available by electronic means, including on the official public Internet Web site of the Environmental Protection Agency.

(d) This section shall be applied in a manner consistent with United States obligations under international agreements.

(e) The Administrator may retain up to 0.25 percent of the funds appropriated in this Act for the Clean and Drinking Water State Revolving Funds for carrying out

the provisions described in subsection (a)(1) for management and oversight of the requirements of this section.

(f) This section does not apply with respect to a project if a State agency approves the engineering plans and specifications for the project, in that agency's capacity to approve such plans and specifications prior to a project requesting bids, prior to the date of the enactment of this Act.

The following questions and answers provide guidance for implementing and complying with the AIS requirements:

Project Coverage

1) What classes of projects are covered by the AIS requirement?

All treatment works projects funded by a CWSRF assistance agreement, and all public water system projects funded by a DWSRF assistance agreement, from the date of enactment through the end of Federal Fiscal Year 2014, are covered. The AIS requirements apply to the entirety of the project, no matter when construction begins or ends. Additionally, the AIS requirements apply to all parts of the project, no matter the source of funding.

2) Does the AIS requirement apply to nonpoint source projects or national estuary projects?

No. Congress did not include an AIS requirement for nonpoint source and national estuary projects unless the project can also be classified as a 'treatment works' as defined by section 212 of the Clean Water Act.

3) Are any projects for the construction, alteration, maintenance, or repair of a public water system or treatment works excluded from the AIS requirement?

Any project, whether a treatment works project or a public water system project, for which engineering plans and specifications were approved by the responsible state agency prior to January 17, 2014, is excluded from the AIS requirements.

4) What if the project does not have approved engineering plans and specifications but has signed an assistance agreement with a CWSRF or DWSRF program prior to January 17, 2014?

The AIS requirements do not apply to any project for which an assistance agreement was signed prior to January 17, 2014.

5) What if the project does not have approved engineering plans and specifications, but bids were advertised prior to January 17, 2014 and an assistance agreement was signed after January 17, 2014?

If the project does not require approved engineering plans and specifications, the bid advertisement date will count in lieu of the approval date for purposes of the exemption in section 436(f).

6) What if the assistance agreement that was signed prior to January 17, 2014, only funded a part of the overall project, where the remainder of the project will be funded later with another SRF loan?

If the original assistance agreement funded any construction of the project, the date of the original assistance agreement counts for purposes of the exemption. If the original assistance agreement was only for planning and design, the date of that assistance agreement will count for purposes of the exemption only if there is a written commitment or expectation on the part of the assistance recipient to fund the remainder of the project with SRF funds.

7) What if the assistance agreement that was signed prior to January 17, 2014, funded the first phase of a multi-phase project, where the remaining phases will be funded by SRF assistance in the future?

In such a case, the phases of the project will be considered a single project if all construction necessary to complete the building or work, regardless of the number of contracts or assistance agreements involved, are closely related in purpose, time and place. However, there are many situations in which major construction activities are clearly undertaken in phases that are distinct in purpose, time, or place. In the case of distinct phases, projects with engineering plans and specifications approval or assistance agreements signed prior to January 17, 2014 would be excluded from AIS requirements while those approved/signed on January 17, 2014, or later would be covered by the AIS requirements.

8) What if a project has split funding from a non-SRF source?

Many States intend to fund projects with "split" funding, from the SRF program and from State or other programs. Based on the Act language in section 436, which requires that American iron and steel products be used in any project for the construction, alteration, maintenance, or repair of a public water system or treatment works receiving SRF funding between and including January 17, 2014 and September 30, 2014, any project that is funded in whole or in part with such funds must comply with the AIS requirement. A "project" consists of all construction necessary to complete the building or work regardless of the number of contracts or assistance agreements involved so long as all contracts and assistance agreements awarded are closely related in purpose, time and place. This precludes the intentional splitting of SRF projects into separate and smaller contracts or assistance agreements to avoid AIS coverage on some portion of a larger

project, particularly where the activities are integrally and proximately related to the whole. However, there are many situations in which major construction activities are clearly undertaken in separate phases that are distinct in purpose, time, or place, in which case, separate contracts or assistance agreement for SRF and State or other funding would carry separate requirements.

9) What about refinancing?

If a project began construction, financed from a non-SRF source, prior to January 17, 2014, but is refinanced through an SRF assistance agreement executed on or after January 17, 2014 and prior to October 1, 2014, AIS requirements will apply to all construction that occurs on or after January 17, 2014, through completion of construction, unless, as is likely, engineering plans and specifications were approved by a responsible state agency prior to January 17, 2014. There is no retroactive application of the AIS requirements where a refinancing occurs for a project that has completed construction prior to January 17, 2014.

10) Do the AIS requirements apply to any other EPA programs, besides the SRF program, such as the Tribal Set-aside grants or grants to the Territories and DC?

No, the AIS requirement only applies to funds made available by a State water pollution control revolving fund as authorized by title VI of the Federal Water Pollution Control Act (33 U.S.C. 1381 et seq.) or made available by a drinking water treatment revolving loan fund as authorized by section 1452 of the Safe Drinking Water Act (42 U.S.C. 300j–12)

Covered Iron and Steel Products

11) What is an iron or steel product?

For purposes of the CWSRF and DWSRF projects that must comply with the AIS requirement, an iron or steel product is one of the following made primarily of iron or steel that is permanently incorporated into the public water system or treatment works:

Lined or unlined pipes or fittings;
Manhole Covers;
Municipal Castings (defined in more detail below);
Hydrants;
Tanks;
Flanges;
Pipe clamps and restraints;
Valves;
Structural steel (defined in more detail below);
Reinforced precast concrete; and
Construction materials (defined in more detail below).

12) What does the term 'primarily iron or steel' mean?

'Primarily iron or steel' places constraints on the list of products above. For one of the listed products to be considered subject to the AIS requirements, it must be made of greater than 50% iron or steel, measured by cost. The cost should be based on the material costs.

13) Can you provide an example of how to perform a cost determination?

For example, the iron portion of a fire hydrant would likely be the bonnet, body and shoe, and the cost then would include the pouring and casting to create those components. The other material costs would include non-iron and steel internal workings of the fire hydrant (i.e., stem, coupling, valve, seals, etc). However, the assembly of the internal workings into the hydrant body would not be included in this cost calculation. If one of the listed products is not made primarily of iron or steel, United States (US) provenance is not required. An exception to this definition is reinforced precast concrete, which is addressed in a later question.

14) If a product is composed of more than 50% iron or steel, but is not listed in the above list of items, must the item be produced in the US? Alternatively, must the iron or steel in such a product be produced in the US?

The answer to both question is no. Only items on the above list must be produced in the US. Additionally, the iron or steel in a non-listed item can be sourced from outside the US.

15) What is the definition of steel?

Steel means an alloy that includes at least 50 percent iron, between .02 and 2 percent carbon, and may include other elements. Metallic elements such as chromium, nickel, molybdenum, manganese, and silicon may be added during the melting of steel for the purpose of enhancing properties such as corrosion resistance, hardness, or strength. The definition of steel covers carbon steel, alloy steel, stainless steel, tool steel and other specialty steels.

16) What does 'produced in the United States' mean?

Production in the United States of the iron or steel products used in the project requires that all manufacturing processes, including application of coatings, must take place in the United States, with the exception of metallurgical processes involving refinement of steel additives. All manufacturing processes includes processes such as melting, refining, forming, rolling, drawing, finishing, fabricating and coating. Further, if a domestic iron and steel product is taken out of the US for any part of the manufacturing process, it becomes foreign source material. However, raw materials such as iron ore, limestone and iron and steel scrap are not covered by the AIS requirement, and the

material(s), if any, being applied as a coating are similarly not covered. Non-iron or steel components of an iron and steel product may come from non-US sources. For example, for products such as valves and hydrants, the individual non-iron and steel components do not have to be of domestic origin.

17) Are the raw materials used in the production of iron or steel required to come from US sources?

No. Raw materials, such as iron ore, limestone, scrap iron, and scrap steel, can come from non-US sources.

18) If an above listed item is primarily made of iron or steel, but is only at the construction site temporarily, must such an item be produced in the US?

No. Only the above listed products made primarily of iron or steel, permanently incorporated into the project must be produced in the US. For example trench boxes, scaffolding or equipment, which are removed from the project site upon completion of the project, are not required to be made of U.S. Iron or Steel.

19) What is the definition of 'municipal castings'?

Municipal castings are cast iron or steel infrastructure products that are melted and cast. They typically provide access, protection, or housing for components incorporated into utility owned drinking water, storm water, wastewater, and surface infrastructure. They are typically made of grey or ductile iron, or steel. Examples of municipal castings are:

Access Hatches;
Ballast Screen;
Benches (Iron or Steel);
Bollards;
Cast Bases;
Cast Iron Hinged Hatches, Square and Rectangular;
Cast Iron Riser Rings;
Catch Basin Inlet;
Cleanout/Monument Boxes;
Construction Covers and Frames;
Curb and Corner Guards;
Curb Openings;
Detectable Warning Plates;
Downspout Shoes (Boot, Inlet);
Drainage Grates, Frames and Curb Inlets;
Inlets;
Junction Boxes;
Lampposts;
Manhole Covers, Rings and Frames, Risers;

Meter Boxes;
Service Boxes;
Steel Hinged Hatches, Square and Rectangular;
Steel Riser Rings;
Trash receptacles;
Tree Grates;
Tree Guards;
Trench Grates; and
Valve Boxes, Covers and Risers.

20) What is 'structural steel'?

Structural steel is rolled flanged shapes, having at least one dimension of their cross-section three inches or greater, which are used in the construction of bridges, buildings, ships, railroad rolling stock, and for numerous other constructional purposes. Such shapes are designated as wide-flange shapes, standard I-beams, channels, angles, tees and zees. Other shapes include H-piles, sheet piling, tie plates, cross ties, and those for other special purposes.

21) What is a 'construction material' for purposes of the AIS requirement?

Construction materials are those articles, materials, or supplies made primarily of iron and steel, that are permanently incorporated into the project, not including mechanical and/or electrical components, equipment and systems. Some of these products may overlap with what is also considered "structural steel". This includes, but is not limited to, the following products: wire rod, bar, angles, concrete reinforcing bar, wire, wire cloth, wire rope and cables, tubing, framing, joists, trusses, fasteners (i.e., nuts and bolts), welding rods, decking, grating, railings, stairs, access ramps, fire escapes, ladders, wall panels, dome structures, roofing, ductwork, surface drains, cable hanging systems, manhole steps, fencing and fence tubing, guardrails, doors, and stationary screens.

22) What is not considered a 'construction material' for purposes of the AIS requirement?

Mechanical and electrical components, equipment and systems are not considered construction materials. Mechanical equipment is typically that which has motorized parts and/or is powered by a motor. Electrical equipment is typically any machine powered by electricity and includes components that are part of the electrical distribution system.

The following examples (including their appurtenances necessary for their intended use and operation) are NOT considered construction materials: pumps, motors, gear reducers, drives (including variable frequency drives (VFDs)), electric/pneumatic/manual accessories used to operate valves (such as electric valve actuators), mixers, gates, motorized screens (such as traveling screens), blowers/aeration equipment, compressors, meters, sensors, controls and switches, supervisory control and

data acquisition (SCADA), membrane bioreactor systems, membrane filtration systems, filters, clarifiers and clarifier mechanisms, rakes, grinders, disinfection systems, presses (including belt presses), conveyors, cranes, HVAC (excluding ductwork), water heaters, heat exchangers, generators, cabinetry and housings (such as electrical boxes/enclosures), lighting fixtures, electrical conduit, emergency life systems, metal office furniture, shelving, laboratory equipment, analytical instrumentation, and dewatering equipment.

23) If the iron or steel is produced in the US, may other steps in the manufacturing process take place outside of the US, such as assembly?

No. Production in the US of the iron or steel used in a listed product requires that all manufacturing processes must take place in the United States, except metallurgical processes involving refinement of steel additives.

24) What processes must occur in the US to be compliant with the AIS requirement for reinforced precast concrete?

While reinforced precast concrete may not be at least 50% iron or steel, in this particular case, the reinforcing bar and wire must be produced in the US and meet the same standards as for any other iron or steel product. Additionally, the casting of the concrete product must take place in the US. The cement and other raw materials used in concrete production are not required to be of domestic origin.

If the reinforced concrete is cast at the construction site, the reinforcing bar and wire are considered to be a construction material and must be produced in the US.

Compliance

25) How should an assistance recipient document compliance with the AIS requirement?

In order to ensure compliance with the AIS requirement, specific AIS contract language must be included in each contract, starting with the assistance agreement, all the way down to the purchase agreements. Sample language for assistance agreements and contracts can be found in Appendix 3 and 4.

EPA recommends the use of a step certification process, similar to one used by the Federal Highway Administration. The step certification process is a method to ensure that producers adhere to the AIS requirement and assistance recipients can verify that products comply with the AIS requirement. The process also establishes accountability and better enables States to take enforcement actions against violators.

Step certification creates a paper trail which documents the location of the manufacturing process involved with the production of steel and iron materials. A step certification is a process under which each handler (supplier, fabricator, manufacturer,

processor, etc) of the iron and steel products certifies that their step in the process was domestically performed. Each time a step in the manufacturing process takes place, the manufacturer delivers its work along with a certification of its origin. A certification can be quite simple. Typically, it includes the name of the manufacturer, the location of the manufacturing facility where the product or process took place (not its headquarters), a description of the product or item being delivered, and a signature by a manufacturer's responsible party. Attached, as Appendix 5, are sample certifications. These certifications should be collected and maintained by assistance recipients.

Alternatively, the final manufacturer that delivers the iron or steel product to the worksite, vendor, or contractor, may provide a certification asserting that all manufacturing processes occurred in the US. While this type of certification may be acceptable, it may not provide the same degree of assurance. Additional documentation may be needed if the certification is lacking important information. Step certification is the best practice.

26) How should a State ensure assistance recipients are complying with the AIS requirement?

In order to ensure compliance with the AIS requirement, States SRF programs must include specific AIS contract language in the assistance agreement. Sample language for assistance agreements can be found in Appendix 3.

States should also, as a best practice, conduct site visits of projects during construction and review documentation demonstrating proof of compliance which the assistance recipient has gathered.

27) What happens if a State or EPA finds a non-compliant iron and/or steel product permanently incorporated in the project?

If a potentially non-compliant product is identified, the State should notify the assistance recipient of the apparent unauthorized use of the non-domestic component, including a proposed corrective action, and should be given the opportunity to reply. If unauthorized use is confirmed, the State can take one or more of the following actions: request a waiver where appropriate; require the removal of the non-domestic item; or withhold payment for all or part of the project. Only EPA can issue waivers to authorize the use of a non-domestic item. EPA may use remedies available to it under the Clean Water Act, the Safe Drinking Water Act, and 40 CFR part 31 grant regulations, in the event of a violation of a grant term and condition.

It is recommended that the State work collaboratively with EPA to determine the appropriate corrective action, especially in cases where the State is the one who identifies the item in noncompliance or there is a disagreement with the assistance recipient.

If fraud, waste, abuse, or any violation of the law is suspected, the Office of Inspector General (OIG) should be contacted immediately. The OIG can be reached at 1-

888-546-8740 or OIG_Hotline@epa.gov. More information can be found at this website: http://www.epa.gov/oig/hotline.htm.

28) How do international trade agreements affect the implementation of the AIS requirements?

The AIS provision applies in a manner consistent with United States obligations under international agreements. Typically, these obligations only apply to direct procurement by the entities that are signatories to such agreements. In general, SRF assistance recipients are not signatories to such agreements, so these agreements have no impact on this AIS provision. In the few instances where such an agreement applies to a municipality, that municipality is under the obligation to determine its applicability and requirements and document the actions taken to comply for the State.

Waiver Process

The statute permits EPA to issue waivers for a case or category of cases where EPA finds (1) that applying these requirements would be inconsistent with the public interest; (2) iron and steel products are not produced in the US in sufficient and reasonably available quantities and of a satisfactory quality; or (3) inclusion of iron and steel products produced in the US will increase the cost of the overall project by more than 25 percent.

In order to implement the AIS requirements, EPA has developed an approach to allow for effective and efficient implementation of the waiver process to allow projects to proceed in a timely manner. The framework described below will allow States, on behalf of the assistance recipients, to apply for waivers of the AIS requirement directly to EPA Headquarters. Only waiver requests received from states will be considered. Pursuant to the Act, EPA has the responsibility to make findings as to the issuance of waivers to the AIS requirements.

Definitions

The following terms are critical to the interpretation and implementation of the AIS requirements and apply to the process described in this memorandum:

Reasonably Available Quantity: The quantity of iron or steel products is available or will be available at the time needed and place needed, and in the proper form or specification as specified in the project plans and design.

Satisfactory Quality: The quality of iron or steel products, as specified in the project plans and designs.

Assistance Recipient: A borrower or grantee that receives funding from a State CWSRF or DWSRF program.

Step-By-Step Waiver Process

Application by Assistance Recipient

Each local entity that receives SRF water infrastructure financial assistance is required by section 436 of the Act to use American made iron and steel products in the construction of its project. However, the recipient may request a waiver. Until a waiver is granted by EPA, the AIS requirement stands, except as noted above with respect to municipalities covered by international agreements.

The waiver process begins with the SRF assistance recipient. In order to fulfill the AIS requirement, the assistance recipient must in good faith design the project (where applicable) and solicit bids for construction with American made iron and steel products. It is essential that the assistance recipient include the AIS terms in any request for proposals or solicitations for bids, and in all contracts (see Appendix 3 for sample construction contract language). The assistance recipient may receive a waiver at any point before, during, or after the bid process, if one or more of three conditions is met:

1. Applying the American Iron and Steel requirements of the Act would be inconsistent with the public interest;
2. Iron and steel products are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality; or
3. Inclusion of iron and steel products produced in the United States will increase the cost of the overall project by more than 25 percent.

Proper and sufficient documentation must be provided by the assistance recipient. A checklist detailing the types of information required for a waiver to be processed is attached as Appendix 1.

Additionally, it is strongly encouraged that assistance recipients hold pre-bid conferences with potential bidders. A pre-bid conference can help to identify iron and steel products needed to complete the project as described in the plans and specifications that may not be available from domestic sources. It may also identify the need to seek a waiver prior to bid, and can help inform the recipient on compliance options.

In order to apply for a project waiver, the assistance recipient should email the request in the form of a Word document (.doc) to the State SRF program. It is strongly recommended that the State designate a single person for all AIS communications. The State SRF designee will review the application for the waiver and determine whether the necessary information has been included. Once the waiver application is complete, the State designee will forward the application to either of two email addresses. For CWSRF waiver requests, please send the application to: cwsrfwaiver@epa.gov. For DWSRF waiver requests, please send the application to: dwsrfwaiver@epa.gov.

Evaluation by EPA

After receiving an application for waiver of the AIS requirements, EPA Headquarters will publish the request on its website for 15 days and receive informal comment. EPA Headquarters will then use the checklist in Appendix 2 to determine whether the application properly and adequately documents and justifies the statutory basis cited for the waiver – that it is quantitatively and qualitatively sufficient – and to determine whether or not to grant the waiver.

In the event that EPA finds that adequate documentation and justification has been submitted, the Administrator may grant a waiver to the assistance recipient. EPA will notify the State designee that a waiver request has been approved or denied as soon as such a decision has been made. Granting such a waiver is a three-step process:

1. Posting – After receiving an application for a waiver, EPA is required to publish the application and all material submitted with the application on EPA's website for 15 days. During that period, the public will have the opportunity to review the request and provide informal comment to EPA. The website can be found at: http://water.epa.gov/grants_funding/aisrequirement.cfm

2. Evaluation – After receiving an application for waiver of the AIS requirements, EPA Headquarters will use the checklist in Appendix 2 to determine whether the application properly and adequately documents and justifies the statutory basis cited for the waiver – that it is quantitatively and qualitatively sufficient – and to determine whether or not to grant the waiver.

3. Signature of waiver approval by the Administrator or another agency official with delegated authority – As soon as the waiver is signed and dated, EPA will notify the State SRF program, and post the signed waiver on our website. The assistance recipient should keep a copy of the signed waiver in its project files.

Public Interest Waivers

EPA has the authority to issue public interest waivers. Evaluation of a public interest waiver request may be more complicated than that of other waiver requests so they may take more time than other waiver requests for a decision to be made. An example of a public interest waiver that might be issued could be for a community that has standardized on a particular type or manufacturer of a valve because of its performance to meet their specifications. Switching to an alternative valve may require staff to be trained on the new equipment and additional spare parts would need to be purchased and stocked, existing valves may need to be unnecessarily replaced, and portions of the system may need to be redesigned. Therefore, requiring the community to install an alternative valve would be inconsistent with public interest.

EPA also has the authority to issue a public interest waiver that covers categories of products that might apply to all projects.

EPA reserves the right to issue national waivers that may apply to particular classes of assistance recipients, particular classes of projects, or particular categories of iron or steel products. EPA may develop national or (US geographic) regional categorical waivers through the identification of similar circumstances in the detailed justifications presented to EPA in a waiver request or requests. EPA may issue a national waiver based on policy decisions regarding the public's interest or a determination that a particular item is not produced domestically in reasonably available quantities or of a sufficient quality. In such cases, EPA may determine it is necessary to issue a national waiver.

If you have any questions concerning the contents of this memorandum, you may contact us, or have your staff contact Jordan Dorfman, Attorney-Advisor, State Revolving Fund Branch, Municipal Support Division, at dorfman.jordan@epa.gov or (202) 564-0614 or Kiri Anderer, Environmental Engineer, Infrastructure Branch, Drinking Water Protection Division, at anderer.kirsten@epa.gov or (202) 564-3134.

Attachments

EMPLOYEE RIGHTS
UNDER THE DAVIS-BACON ACT

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

THE UNITED STATES DEPARTMENT OF LABOR WAGE AND HOUR DIVISION

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

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

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

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

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

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

For additional information:

1-866-4-USWAGE

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

U.S. Wage and Hour Division

WWW.WAGEHOUR.DOL.GOV

U.S. Department of Labor | Employment Standards Administration | Wage and Hour Division

WH 1321(Revised April 2009)

DERECHOS DEL EMPLEADO
BAJO LA LEY DAVIS-BACON

PARA OBREROS Y MECÁNICOS EMPLEADOS EN PROYECTOS DE CONSTRUCCIÓN FEDERAL O CON ASISTENCIA FEDERAL

LA SECCIÓN DE HORAS Y SUELDOS DEL DEPARTAMENTO DE TRABAJO DE EEUU

SALARIOS PREVALECIENTES
No se le puede pagar menos de la tasa de pago indicada en la Decisión de Salarios Davis-Bacon fijada con este Aviso para el trabajo que Ud. desempeña.

SOBRETIEMPO
Se le ha de pagar no menos de tiempo y medio de su tasa básica de pago por todas las horas trabajadas en exceso de 40 en una semana laboral. Existen pocas excepciones.

CUMPLIMIENTO
Se pueden retener pagos por contratos para asegurarse que los obreros reciban los salarios y el pago de sobretiempo debidos, y se podría aplicar daños y perjuicios si no se cumple con las exigencias del pago de sobretiempo. Las cláusulas contractuales de Davis-Bacon permiten la terminación y exclusión de contratistas para efectuar futuros contratos federales hasta tres años. El contratista que falsifique los registros certificados de las nóminas de pago o induzca devoluciones de salarios puede ser sujeto a procesamiento civil o criminal, multas y/o encarcelamiento.

APRENDICES
Las tasas de aprendices sólo se aplican a aprendices correctamente inscritos bajo programas federales o estatales aprobados.

PAGO APROPIADO
Si Ud. no recibe el pago apropiado, o precisa de información adicional sobre los salarios aplicables, póngase en contacto con el Contratista Oficial que aparece abajo:

o póngase en contacto con la Sección de Horas y Sueldos del Departamento de Trabajo de EEUU.

Para obtener información adicional:

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

WWW.WAGEHOUR.DOL.GOV

U.S. Department of Labor | Employment Standards Administration | Wage and Hour Division

WH 1321 SPA (Revised April 2009)

"General Decision Number: TN20210119 01/01/2021

Superseded General Decision Number: TN20200119

State: Tennessee

Construction Type: Heavy
Including Water and Sewer Line Construction

County: Franklin County in Tennessee.

HEAVY CONSTRUCTION PROJECTS (including sewer/water construction).

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.95 for calendar year 2021 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.95 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2021. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/01/2021

* ENGI0917-021 05/01/2017

	Rates	Fringes
Operating Engineers:		
Bulldozer and Crane	$ 28.26	10.10

SUTN2009-118 12/02/2009

	Rates	Fringes
ELECTRICIAN	$ 20.06	0.00
LABORER: Common or General	$ 9.18	0.50

LABORER: Flagger.....$ 10.50 0.00

LABORER: Pipelayer.....$ 9.96 0.30

OPERATOR:
Backhoe/Excavator/Trackhoe.....$ 11.91 0.78

TRUCK DRIVER: Dump Truck.....$ 11.68 0.70

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

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

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

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

Union Rate Identifiers

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

most current negotiated rate, which in this example is July 1, 2014.

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

Survey Rate Identifiers

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

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

Union Average Rate Identifiers

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

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

WAGE DETERMINATION APPEALS PROCESS

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

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

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

and 3.) should be followed.

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

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

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

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

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

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

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

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

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END OF GENERAL DECISION
"

STATE REVOLVING FUND LOAN PROGRAM

Bidder's Requirements

Davis-Bacon Act Wage Determination

The Loan Recipient must ensure the bidder is in compliance with the Davis-Bacon Act as outlined below. Additionally, ten (10) days prior to the scheduled bid opening date, the wage rates need to be checked to ensure they have not changed.

The Davis-Bacon Act as amended, requires that each contract over $2,000 to which the United States or the District of Columbia is a party for the construction, alteration, or repair of public buildings or public works shall contain a clause setting forth the minimum wages to be paid to various classes of laborers and mechanics employed under the contract. Under the provisions of the Act, contractors or their subcontractors are to pay workers employed directly upon the site of the work no less than the locally prevailing wages and fringe benefits paid on projects of a similar character. The Davis-Bacon Act directs the Secretary of Labor to determine such local prevailing wage rates.

The **wage determination** (including any additional **classifications** and **wage rates** conformed) **and** a Davis-Bacon poster (WH-1321) **must be posted on the work site at all times** by the contractor and its subcontractors in a prominent and accessible place where it can be easily seen. The WH-1321 poster **may be obtained at no charge** from offices of the Wage and Hour Division.

With each **pay estimate** submitted, the contractors **must submit** a certification stating that workers have been paid the current prevailing wage rates for each classification according to the Davis-Bacon wage rate schedule currently in effect for this project.

Wage Determinations

A "wage determination" is the listing of wage rates and fringe benefit rates for each classification of laborers and mechanics which the Administrator of the Wage and Hour Division of the U.S. Department of Labor has determined to be prevailing in a given area for a particular type of construction (e.g., building, heavy, highway, or residential).

Extensions of Wage Determinations

When a general wage determination has not been awarded within 90 days after bid opening, the head of the contracting/assisting agency may request an extension of the 90 day period from the Wage and Hour Administrator. When, due to unavoidable circumstances, a project wage determination expires before award but after bid opening, the head of the contracting/assisting agency may request an extension of the expiration date of the project wage determination in the bid specifications instead of issuing a new wage determination.

Extension requests should be supported by a written finding including a brief statement of the factual support, that extension of the expiration date of the determination is necessary and proper in the public interest to prevent injustice or undue hardship or to avoid serious impairment in the conduct of Government business.

The Administrator of the Wage and Hour Division of the U.S. Department of Labor will either grant or deny the request for an extension after consideration of all the circumstances, including an examination to determine if the previously issued rates remain prevailing. If a request for the extension of a project wage determination is denied, a new wage determination will be issued to replace an expired project wage determination.

Additional information concerning the Davis-Bacon Act and current wage rate determinations can be obtained at the following sites: www.gpo.gov/davisbacon/referencemat.html and www.wdol.gov/ .

Wage Rate Requirements Under FY 2010 Appropriations

3. Contract and Subcontract provisions.

(a) The Recipient shall insure that the subrecipient(s) shall insert in full in any contract in excess of $2,000 which is entered into for the actual construction, alteration and/or repair, including painting and decorating, of a treatment work under the CWSRF or a construction project under the DWSRF financed in whole or in part from Federal funds or in accordance with guarantees of a Federal agency or financed from funds obtained by pledge of any contract of a Federal agency to make a loan, grant or annual contribution (except where a different meaning is expressly indicated), and which is subject to the labor standards provisions of any of the acts listed in § 5.1 or the FY 2010 appropriation , the following clauses:

(1) Minimum wages.

(i) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a)(1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in § 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a)(1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

Subrecipients may obtain wage determinations from the U.S. Department of Labor’s web site, www.dol.gov.

(ii)(A) The subrecipient(s), on behalf of EPA, shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The State award official shall approve a request for an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the subrecipient(s) agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), documentation of the action taken and the request, including the local wage determination shall be sent by the subrecipient (s) to the State award official. The State award official will transmit the request, to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210 and to the EPA DB Regional Coordinator concurrently. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification request within 30 days of receipt and so advise the State award official or will notify the State award official within the 30-day period that additional time is necessary.

(C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the subrecipient(s) do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the award official shall refer the request and the local wage determination, including the views of all interested parties and the recommendation of the State award official, to the Administrator for determination. The request shall be sent to the EPA DB Regional Coordinator concurrently. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt of the request and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(ii)(B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the

contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

(2) Withholding. The subrecipient(s), shall upon written request of the EPA Award Official or an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the (Agency) may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

(3) Payrolls and basic records.

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

(ii)(A) The contractor shall submit weekly, for each week in which any contract work is performed, a copy of all payrolls to the subrecipient, that is, the entity that receives the sub-grant or loan from the State capitalization grant recipient. Such documentation shall be available on request of the State recipient or EPA. As to each payroll copy received, the subrecipient shall provide written confirmation in a form satisfactory to the State indicating whether or not the project is in compliance with the requirements of 29 CFR 5.5(a)(1) based on the most recent payroll copies for the specified week. The payrolls shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on the weekly payrolls. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at http://www.dol.gov/esa/whd/forms/wh347instr.htm or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the subrecipient(s) for transmission to the State or EPA if requested by EPA , the State, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the subrecipient(s).

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

(1) That the payroll for the payroll period contains the information required to be provided under § 5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under § 5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or

indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

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

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (a)(3)(ii)(B) of this section.

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

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

(4) Apprentices and trainees--

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the

apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency

recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

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

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

(6) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the EPA determines may by appropriate, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for

the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

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

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

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

(10) Certification of eligibility.

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

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

4. **Contract Provision for Contracts in Excess of $100,000.**

(a) Contract Work Hours and Safety Standards Act. The subrecipient shall insert the following clauses set forth in paragraphs (a)(1), (2), (3), and (4) of this section in full in any contract in an amount in excess of $100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by Item 3, above or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

(1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such

laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

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

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

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

(b) In addition to the clauses contained in Item 3, above, in any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in 29 CFR 5.1, the Subrecipient shall insert a clause requiring that the contractor or subcontractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three years from the completion of the contract for all laborers and mechanics, including guards and watchmen, working on the contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. Further, the Subrecipient shall insert in any such contract a clause providing hat the records to be maintained under this paragraph shall be made available by the contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the (write the name of agency) and the Department of Labor, and the contractor or subcontractor will permit such representatives to interview employees during working hours on the job.

STATE REVOLVING FUND LOAN PROGRAM

Loan Recipient's Requirements

Davis-Bacon Act Wage Determination

The Loan Recipient must ensure the bidder is in compliance with the Davis-Bacon Act as outlined below. Additionally, ten (10) days prior to the scheduled bid opening date, the wage rates need to be checked to ensure they have not changed.

The Davis-Bacon Act as amended, requires that each contract over $2,000 to which the United States or the District of Columbia is a party for the construction, alteration, or repair of public buildings or public works shall contain a clause setting forth the minimum wages to be paid to various classes of laborers and mechanics employed under the contract. Under the provisions of the Act, contractors or their subcontractors are to pay workers employed directly upon the site of the work no less than the locally prevailing wages and fringe benefits paid on projects of a similar character. The Davis-Bacon Act directs the Secretary of Labor to determine such local prevailing wage rates.

The specifications must incorporate a clause stating that the current Davis-Bacon wage rate is required **(**with the Davis-Bacon links and information).

The Bid Advertisement **must include** a clause that the **Davis-Bacon wage rates** are a requirement. (Refer to the ADVERTISEMENT FOR BIDS EXAMPLE – DBE, ARRA)

If modifications to the existing **wage rates** occur **ten (10) days** prior to the Bid Opening Date, the Loan Recipient **must** incorporate the proper **wage rates** into the plans and specifications by Addendum. All Bidders **must** be informed that this addendum **must** be incorporated into the plans and specifications that they have received.

However, if these modifications occur **less than ten (10) days** prior to the Bid Opening Date, these modifications **shall be effective unless** the agency **finds** that there is not a reasonable time still available before the Bid Opening to notify bidders of the modifications. (A report of this **finding** shall be inserted in the contract file.)

The **wage determination** (including any additional **classifications** and **wage rates** conformed) **and** a Davis-Bacon poster (WH-1321) **must be posted on the work site at all times** by the contractor and its subcontractors in a prominent and accessible place where it can be easily seen. The WH-1321 poster **may be obtained at no charge** from offices of the Wage and Hour Division.

With each **pay estimate** submitted, the contractors **must** certify that workers have been paid the current prevailing wage rates for each classification according to the Davis-Bacon wage rate schedule currently in effect for this project.

The loan recipients **must keep a file** in which all documentation **must be filed** for the current classifications and wage rates (under the Davis-Bacon Act) for the construction of their projects. This file must be kept for three (3) years after the project is completed and **will** be subject to audit by the State of Tennessee and the Environmental Protection Agency (EPA).

Wage Determinations

A "wage determination" is the listing of wage rates and fringe benefit rates for each classification of laborers and mechanics which the Administrator of the Wage and Hour Division of the U.S. Department of Labor has determined to be prevailing in a given area for a particular type of construction (e.g., building, heavy, highway, or residential).

Extensions of Wage Determinations

When a general wage determination has not been awarded within 90 days after bid opening, the head of the contracting/assisting agency may request an extension of the 90 day period from the Wage and Hour Administrator. When, due to unavoidable circumstances, a project wage determination expires before award but after bid opening, the head of the contracting/assisting agency may request an extension of the expiration date of the project wage determination in the bid specifications instead of issuing a new wage determination.

Extension requests should be supported by a written finding including a brief statement of the factual support, that extension of the expiration date of the determination is necessary and proper in the public interest to prevent injustice or undue hardship or to avoid serious impairment in the conduct of Government business.

The Administrator of the Wage and Hour Division of the U.S. Department of Labor will either grant or deny the request for an extension after consideration of all the circumstances, including an examination to determine if the previously issued rates remain prevailing. If a request for the extension of a project wage determination is denied, a new wage determination will be issued to replace an expired project wage determination.

Additional information concerning the Davis-Bacon Act and current wage rate determinations can be obtained at the following sites: www.gpo.gov/davisbacon/referencemat.html and www.wdol.gov/ .

Wage Rate Requirements Under FY 2010 Appropriations

3. Contract and Subcontract provisions.

(a) The Recipient shall insure that the subrecipient(s) shall insert in full in any contract in excess of $2,000 which is entered into for the actual construction, alteration and/or repair, including painting and decorating, of a treatment work under the CWSRF or a construction project under the DWSRF financed in whole or in part from Federal funds or in accordance with guarantees of a Federal agency or financed from funds obtained by pledge of any contract of a Federal agency to make a loan, grant or annual contribution (except where a different meaning is expressly indicated), and which is subject to the labor standards provisions of any of the acts listed in § 5.1 or the FY 2010 appropriation , the following clauses:

(1) Minimum wages.

(i) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a)(1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in §

5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a)(1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

Subrecipients may obtain wage determinations from the U.S. Department of Labor's web site, www.dol.gov.

(ii)(A) The subrecipient(s), on behalf of EPA, shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The State award official shall approve a request for an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the subrecipient(s) agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), documentation of the action taken and the request, including the local wage determination shall be sent by the subrecipient (s) to the State award official. The State award official will transmit the request, to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210 and to the EPA DB Regional Coordinator concurrently. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification request within 30 days of receipt and so advise the State award official or will notify the State award official within the 30-day period that additional time is necessary.

(C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the subrecipient(s) do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the award official shall refer the request and the local wage determination, including the views of all interested parties and the recommendation of the State award official, to the Administrator for determination. The request shall be sent to the EPA DB Regional Coordinator concurrently. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt of the request and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(ii)(B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the

contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

(2) Withholding. The subrecipient(s), shall upon written request of the EPA Award Official or an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the (Agency) may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

(3) Payrolls and basic records.

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

(ii)(A) The contractor shall submit weekly, for each week in which any contract work is performed, a copy of all payrolls to the subrecipient, that is, the entity that receives the sub-grant or loan from the State capitalization grant recipient. Such documentation shall be available on request of the State recipient or EPA. As to each payroll copy received, the subrecipient shall provide written confirmation in a form satisfactory to the State indicating whether or not the project is in compliance with the requirements of 29 CFR 5.5(a)(1) based on the most recent payroll copies for the specified week. The payrolls shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on the weekly payrolls. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g.,

the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at http://www.dol.gov/esa/whd/forms/wh347instr.htm or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the subrecipient(s) for transmission to the State or EPA if requested by EPA , the State, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the subrecipient(s).

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

(1) That the payroll for the payroll period contains the information required to be provided under § 5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under § 5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

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

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

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (a)(3)(ii)(B) of this section.

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

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

(4) Apprentices and trainees--

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or

with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the

apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

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

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

(6) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the EPA determines may by appropriate, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for

the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

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

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

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

(10) Certification of eligibility.

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

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

4. **Contract Provision for Contracts in Excess of $100,000.**

(a) Contract Work Hours and Safety Standards Act. The subrecipient shall insert the following clauses set forth in paragraphs (a)(1), (2), (3), and (4) of this section in full in any contract in an amount in excess of $100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by Item 3, above or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

(1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such

laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

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

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

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

(b) In addition to the clauses contained in Item 3, above, in any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in 29 CFR 5.1, the Subrecipient shall insert a clause requiring that the contractor or subcontractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three years from the completion of the contract for all laborers and mechanics, including guards and watchmen, working on the contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. Further, the Subrecipient shall insert in any such contract a clause providing hat the records to be maintained under this paragraph shall be made available by the contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the (write the name of agency) and the Department of Labor, and the contractor or subcontractor will permit such representatives to interview employees during working hours on the job.

STATE REVOLVING FUND LOAN PROGRAM

Loan Recipient's and Contractor's Guidance

FY2010 and After

Tracking and Reporting

For tracking and reporting purposes, the **Loan Recipient** is responsible for the following:

- Ensuring that the Contractor is in compliance with the Davis Bacon provisions of ARRA
- The loan recipients **must keep a file** in which all documentation **must be stored** for the current classifications and wage rates (under the Davis-Bacon Act) for the construction of their projects. This file must be kept for three (3) years after the project is completed and **will** be subject to audit by the State of Tennessee and the Environmental Protection Agency (EPA).
- Any additional tracking and reporting requirements from EPA

For tracking and reporting purposes, the **Contractor** is responsible for the following:

- Achieving and maintaining compliance with the Davis Bacon provisions of ARRA
- Submitting with each **pay estimate** a certification stating that workers have been paid the current prevailing wage rates for each classification according to the Davis-Bacon wage rate schedule currently in effect for this project
- Any additional tracking and reporting requirements from EPA

Please contact Andrea Fenwick, Administrative Section Manager for the SRF Loan Program, at 615-532-0771 or andrea.w.fenwick@tn.gov to obtain details.

NOTICE

THIS ENTITY IS A RECIPIENT OF STATE AND FEDERAL FUNDS. IF YOU HAVE KNOWLEDGE OF ANY ACTIVITY WHICH YOU CONSIDER TO BE ILLEGAL, IMPROPER, OR WASTEFUL, PLEASE CALL THE STATE COMPTROLLER'S TOLL-FREE HOTLINE:

1-800-232-5454

CLEAN WATER STATE REVOLVING FUND

IDENTIFICATION SIGN

All plans and specifications for each project approved shall contain provisions for requiring the general contractor to provide identification signs. The signs shall conform to the following basic features:

1. The following diagram shall be used as a design:

CLEAN WATER FOR TENNESSEE

DEPARTMENT OF ENVIRONMENT AND CONSERVATION

GOVERNOR
BILL LEE

COMMISSIONER
DAVID SALYERS

CITY OF

MAYOR

STATE REVOLVING FUND PROJECT

CWSRF LOAN: $ _____

PRINCIPAL FORGIVENESS: $ _____

2. The sign shall be a 4'0" X 8'0" sheet of exterior grade plywood and shall be built so as to remain erected during the entire construction phase of the project.

3. The background of both sides shall be white. The lettering shall be black and shall be large enough to take advantage of the full size of the plywood. The stars shall be white set on a blue field and surrounded by a white ring placed inside a state map in red with a stripe of white and blue on the right side. The sign shall be bordered by a one-inch blue stripe.

Revised: MARCH 11, 2019

EDA DOCUMENTS

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FORM **CD-512**
(REV 12-04)

U.S. DEPARTMENT OF COMMERCE

CERTIFICATION REGARDING LOBBYING
LOWER TIER COVERED TRANSACTIONS

Applicants should review the instructions for certification included in the regulations before completing this form. Signature on this form provides for compliance with certification requirements under 15 CFR Part 28, "New Restrictions on Lobbying."

LOBBYING

As required by Section 1352, Title 31 of the U.S. Code, and implemented at 15 CFR Part 28, for persons entering into a grant, cooperative agreement or contract over $100,000 or a loan or loan guarantee over $150,000 as defined at 15 CFR Part 28, Sections 28.105 and 28.110, the applicant certifies that to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure occurring on or before October 23, 1996, and of not less than $11,000 and not more than $110,000 for each such failure occurring after October 23, 1996.

Statement for Loan Guarantees and Loan Insurance

The undersigned states, to the best of his or her knowledge and belief, that:

In any funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this commitment providing for the United States to insure or guarantee a loan, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

Submission of this statement is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required statement shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure occurring on or before October 23, 1996, and of not less than $11,000 and not more than $110,000 for each such failure occurring after October 23, 1996.

As the duly authorized representative of the applicant, I hereby certify that the applicant will comply with the above applicable certification.

NAME OF APPLICANT	AWARD NUMBER AND/OR PROJECT NAME
PRINTED NAME AND TITLE OF AUTHORIZED REPRESENTATIVE	
SIGNATURE	DATE

Back

OMB Number: 0610-0096
Expiration Date: 11/30/2021

U. S. DEPARTMENT OF COMMERCE
ECONOMIC DEVELOPMENT ADMINISTRATION

EDA CONTRACTING PROVISIONS
FOR CONSTRUCTION PROJECTS

These EDA Contracting Provisions for Construction Projects (EDA Contracting Provisions) are intended for use by recipients receiving federal assistance from the U. S. Department of Commerce - Economic Development Administration (EDA). They contain provisions specific to EDA and other federal provisions not normally found in non-federal contract documents. The requirements contained herein must be incorporated into all construction contracts and subcontracts funded wholly or in part with federal assistance from EDA.

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1. DEFINITIONS

Agreement – The written instrument that is evidence of the agreement between the Owner and the Contractor overseeing the Work.

Architect/Engineer **-** The person or other entity engaged by the Recipient to perform architectural, engineering, design, and other services related to the work as provided for in the contract.

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

Contract Documents – Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents.

Contractor – The individual or entity with whom the Owner has entered into the Agreement.

Drawings or Plans – That part of the Contract Documents prepared or approved by the Architect/Engineer that graphically shows the scope, extent, and character of the Work to be performed by the Contractor.

EDA - The United States of America acting through the Economic Development Administration of the U.S. Department of Commerce or any other person designated to act on its behalf. EDA has agreed to provide financial assistance to the Owner, which includes assistance in financing the Work to be performed under this Contract. Notwithstanding EDA's role, nothing in this Contract shall be construed to create any contractual relationship between the Contractor and EDA.

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

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

Recipient – A non-Federal entity receiving a Federal financial assistance award directly from EDA to carry out an activity under an EDA program, including any EDA-approved successor to the entity.

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.

Subcontractor – An individual or entity having direct contract with the Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.

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.

2. APPLICABILITY

The Project to which the construction work covered by this Contract pertains is being assisted by the United States of America through federal assistance provided by the U.S. Department of Commerce - Economic Development Administration (EDA). Neither EDA, nor any of its departments, entities, or employees is a party to this Contract. The following EDA Contracting Provisions are included in this Contract and all subcontracts or related instruments pursuant to the provisions applicable to such federal assistance from EDA.

3. FEDERALLY REQUIRED CONTRACT PROVISIONS

(a) All contracts in excess of the simplified acquisition threshold - currently fixed at $150,000 (*see* 41 U.S.C. §§ 134 and 1908) must address administrative, contractual, or legal remedies in instances where contractors violate or breach contract terms, and provide for such sanctions and penalties as may be appropriate.

(b) All contracts in excess of $10,000 must address termination for cause and for convenience by the Recipient including the manner by which it will be effected and the basis for settlement.

(c) All construction contracts awarded in excess of $10,000 by recipients of federal assistance and their contractors or subcontractors shall contain a provision requiring compliance with Executive Order 11246 of September 24, 1965, *Equal Employment Opportunity*, as amended by Executive Order 11375 of October 13, 1967, and Department of Labor implementing regulations at 41 C.F.R. part 60.

(d) All prime construction contracts in excess of $2,000 awarded by Recipients must include a provision for compliance with the Davis-Bacon Act (40 U.S.C. §§ 3141-3148) as supplemented by Department of Labor regulations at 29 C.F.R. part 5. The contracts must also include a provision for compliance with the Copeland "Anti-Kickback" Act (18 U.S.C. § 874 and 40 U.S.C. § 3145) as supplemented by Department of Labor regulations at 29 C.F.R. part 3.

(e) All contracts awarded by the Recipient in excess of $100,000 that involve the employment of mechanics or laborers must include a provision for compliance with 40 U.S.C. §§ 3702 and 3704 (the Contract Work Hours and Safety Standards Act) as supplemented by Department of Labor regulations at 29 C.F.R. part 5.

(f) All contracts must include EDA requirements and regulations that involve a requirement on the contractor or sub-contractor to report information to EDA, the Recipient or any other federal agency.

(g) All contracts must include EDA requirements and regulations pertaining to patent rights with respect to any discovery or invention which arises or is developed in the course of or under such contract.

(h) All contracts must include EDA requirements and regulations pertaining to copyrights and rights in data.

(i) All contracts and subgrants in excess of $150,000 must contain a provision that requires compliance with all applicable standards, orders, or requirements issued under the Clean Air Act (42 U.S.C. § 7401 *et seq.*) and the Federal Water Pollution Control Act (Clean Water Act) (33 U.S.C. § 1251 *et seq.*), and Executive Order 11738, *Providing for Administration of the Clean Air Act and the Federal Water Pollution Control Act With Respect to Federal Contracts, Grants, or Loans*.

(j) Contracts must contain mandatory standards and policies relating to energy efficiency which are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act (42 U.S.C.§ 6201).

(k) Contracts must contain a provision ensuring that contracts are not to be made to parties on the government wide Excluded Parties List System in the System for Award Management (SAM), in accordance with the OMB guidelines at 2 C.F.R. part 180.

(l) Contracts must contain a provision ensure compliance with the Byrd Anti-Lobbying Amendment (31 U.S.C. § 1352) under which contractors that apply or bid for an award of $100,000 or more must file the required certification. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant or any other award covered by 31 U.S.C. § 1352. Each tier must also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Such disclosures are forwarded from tier to tier up to the non-Federal award.

(m) If the Recipient is a state agency or agency of a political subdivision of a state, any contract awarded must contain a provision ensuring compliance with section 6002 of the Solid Waste Disposal Act (42 U.S.C. § 6962), as amended by the Resource Conservation and Recovery Act related to the procurement of recovered materials.

4. REQUIRED PROVISIONS DEEMED INSERTED

Each and every provision of law and clause required by law to be inserted in this contract shall be deemed to be inserted herein and the contract shall be read and enforced as though it were included herein, and 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 of correction.

5. INSPECTION BY EDA REPRESENTATIVES

The authorized representatives and agents of EDA shall be permitted to inspect all work, materials, payrolls, personnel records, invoices of materials, and other relevant data and records.

6. EXAMINATION AND RETENTION OF CONTRACTOR'S RECORDS

(a) The Owner, EDA, or the Comptroller General of the United States, or any of their duly authorized representatives shall, generally until three years after final payment under this contract, have access to and the right to examine any of the Contractor's directly pertinent books, documents, papers, or other records involving transactions related to this contract for the purpose of making audit, examination, excerpts, and transcriptions.

(b) The Contractor agrees to include in first-tier subcontracts under this contract a clause substantially the same as paragraph (a) above. "Subcontract," as used in this clause, excludes purchase orders that do not exceed $10,000.

(c) The periods of access and examination in paragraphs (a) and (b) above for records relating to (1) appeals under the disputes clause of this contract, (2) litigation or settlement of claims arising from the performance of this contract, or (3) costs and expenses of this contract to which the Owner, EDA, or Comptroller General or any of their duly authorized representatives has taken exception shall continue until disposition of such appeals, litigation, claims, or exceptions.

7. CONSTRUCTION SCHEDULE AND PERIODIC ESTIMATES

Immediately after execution and delivery of the contract, and before the first partial payment is made, the Contractor shall deliver to the Owner an estimated construction progress schedule in a form satisfactory to the Owner, showing the proposed dates of commencement and completion of each of the various subdivisions of work required under the Contract Documents and the anticipated amount of each monthly payment that will become due to the Contractor in accordance with the progress schedule. The Contractor also shall furnish the Owner (a) a detailed estimate giving a complete breakdown of the contract price and (b) periodic itemized estimates of work done for the purpose of making partial payments thereon. The costs employed in making up any of these schedules will be used only to determine the basis of partial payments and will not be considered as fixing a basis for additions to or deductions from the contract price.

8. CONTRACTOR'S TITLE TO MATERIAL

No materials, supplies, or equipment for the work shall be purchased by the Contractor or by any subcontractor that is subject to any chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller. The Contractor warrants and guarantees that he/she has good title to all work, materials, and equipment used by him/her in the Work, free and clear of all liens, claims, or encumbrances.

9. INSPECTION AND TESTING OF MATERIALS

All materials and equipment used in the completion of the Work shall be subject to adequate inspection and testing in accordance with accepted standards. The laboratory or inspection agency shall be selected by the Owner. Materials of construction, particularly those upon which the strength and durability of any structure may depend, shall be subject to inspection and testing to establish conformance with specifications and suitability for intended uses.

10. "OR EQUAL" CLAUSE

Whenever a material, article, or piece of equipment is identified in the Contract Documents by reference to manufacturers' or vendors' names, trade names, catalogue numbers, etc., it is intended merely to establish a standard. Any material, article, or equipment of other manufacturers and vendors that will perform adequately the duties imposed by the general design will be considered equally acceptable provided the material, article, or equipment so proposed is, in the opinion of the Architect/Engineer, of equal substance and function. However, such substitution material, article, or equipment shall not be purchased or installed by the Contractor without the Architect/Engineer's written approval.

11. 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 that 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 Architect/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 the Owner in the Contract Documents.

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

12. CLAIMS FOR EXTRA COSTS

No claims for extra work or cost shall be allowed unless the same was done in pursuance of a written order from the Architect/Engineer approved by the Owner.

13. CONTRACTORS AND SUBCONTRACTORS INSURANCE

(a) The Contractor shall not commence work under this Contract until the Contractor has obtained all insurance reasonably required by the Owner, nor shall the Contractor allow any subcontractor to commence work on his/her subcontract until the insurance required of the subcontractor has been so obtained and approved.

(b) Types of insurance normally required are:

(1) Workers' Compensation
(2) Contractor's Public Liability and Property Damage
(3) Contractor's Vehicle Liability
(4) Subcontractors' Public Liability, Property Damage and Vehicle Liability
(5) Builder's Risk (Fire and Extended Coverage)

(c) **Scope of Insurance and Special Hazards:** The insurance obtained, which is described above, shall provide adequate protection for the Contractor and his/her subcontractors, respectively, against damage claims that may arise from operations under this contract, whether such operations be by the insured or by anyone directly or indirectly employed by him/her and also against any of the special hazards that may be encountered in the performance of this Contract.

(d) **Proof of Carriage of Insurance:** The Contractor shall furnish the Owner with certificates showing the type, amount, class of operations covered, effective dates, and dates of expiration of applicable insurance policies.

14. CONTRACT SECURITY BONDS

(a) If the amount of this Contract exceeds $150,000, the Contractor shall furnish a performance bond in an amount at least equal to one hundred percent (100%) of the Contract price as security for the faithful performance of this Contract and also a payment bond in an amount equal to one hundred percent (100%) of the Contract price or in a penal sum not less than that prescribed by State, Territorial, or local law, as security for the payment of all persons performing labor on the Work under this Contract and furnishing materials in connection with this Contract. The performance bond and the payment bond may be in one or in separate instruments in accordance with local law. Before final acceptance, each bond must be approved by EDA. If the amount of this Contract does not exceed $150,000, the Owner shall specify the amount of the payment and performance bonds.

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

authority to act. Surety companies executing the bonds must also be authorized to transact business in the state where the Work is located.

15. **LABOR STANDARDS - DAVIS-BACON AND RELATED ACTS**
(as required by section 602 of PWEDA)

(a) **Minimum Wages**

(1) All laborers and mechanics employed or working upon the site of the Work in the construction or development of the Project will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act at 29 C.F.R. part 3, the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at the time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor, which is attached hereto and made a part hereof, regardless of any contractual relationship that may be alleged to exist between the Contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 C.F.R. § 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 C.F.R. § 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein, provided that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates determined under 29 C.F.R. § 5.5(a)(1)(ii) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

(2) (i) Any class of laborers or mechanics to be employed under the Contract, but not listed in the wage determination, shall be classified in conformance with the wage determination. EDA shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(A) The work to be performed by the classification requested is not performed by a classification in the wage determination;

(B) The classification is utilized in the area by the construction industry; and

(C) The proposed wage rate, including any bona fide fringe benefits, bears a

reasonable relationship to the wage rates contained in the wage determination.

(ii) If the Contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and EDA or its designee agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by EDA or its designee to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210.

(iii) In the event the Contractor, the laborers or mechanics to be employed in the classification or their representatives, and EDA or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), EDA or its designee shall refer the questions, including the views of all interested parties and the recommendation of EDA or its designee, to the Administrator for determination.

(iv) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(2)(ii) or (iii) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(3) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the Contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(4) If the Contractor does not make payments to a trustee or other third person, the Contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, provided, that the Secretary of Labor has found, upon the written request of the Contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

(b) **Withholding**

EDA or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the Contractor under this Contract or any other federal contract with the same prime Contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees and helpers, employed by the Contractor or any subcontractor the full amount of wages required by the Contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee or helper employed or working on the site of the Work in the construction or development of the Project, all or part of the wages required by the Contract, EDA or its designee may, after written notice to the Contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations

have ceased. EDA or its designee may, after written notice to the Contractor, disburse such amounts withheld for and on account of the Contractor or subcontractor to the respective employees to whom they are due. The Comptroller General shall make such disbursements in the case of direct Davis-Bacon Act contracts.

(c) **Payrolls and basic records**

(1) Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the Work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the Work in the construction or development of the Project. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 C.F.R. § 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the Contractor shall maintain records which show that the commitment to provide such benefits is enforceable, the plan or program is financially responsible, and the plan or program has been communicated in writing to the laborers or mechanics affected, and provide records that show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(2) (i) For each week in which Contract work is performed, the Contractor shall submit a copy of all payrolls to the Owner for transmission to EDA or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 C.F.R. part 5.5(a)(3)(i). This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose. It may be purchased from the Superintendent of Documents (Federal Stock Number 029-005-00014-1), U.S. Government Printing Office, Washington, D.C. 20402; or downloaded from the U.S. Department of Labor's website at https://www.dol.gov/whd/forms/wh347.pdf. The prime Contractor is responsible for the submission of copies of payrolls by all subcontractors

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

(A) That the payroll for the payroll period contains the information required to be maintained under 29 C.F.R. § 5.5(a)(3)(i) and that such information is correct and complete;

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

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

(iii) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 15(c)(2)(ii) of this section.

(iv) The falsification of any of the above certifications may subject the Contractor or subcontractor to civil or criminal prosecution under section 1001 of Title 18 and section 3729 of Title 31 of the U.S. Code.

(3) The Contractor or subcontractor shall make the records required under paragraph 15(c)(1) of this section available for inspection, copying, or transcription by authorized representatives of EDA or its designee or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the Contractor or subcontractor fails to submit the required records or to make them available, EDA or its designee may, after written notice to the Contractor or Owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 C.F.R. § 5.12.

(d) **Apprentices and Trainees**.

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

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

(2) **Trainees**. Except as provided in 29 C.F.R. § 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program that has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman's hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the Contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(3) **Equal employment opportunity**. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity

requirements of Executive Order 11246, *Equal Employment Opportunity*, as amended, and 29 C.F.R. part 30.

(e) **Compliance with Copeland Anti-Kickback Act Requirements**. The Contractor shall comply with the Copeland Anti-Kickback Act (18 U.S.C. § 874 and 40 U.S.C. § 3145) as supplemented by Department of Labor regulations (29 C.F.R. part 3, "Contractors and Subcontractors on Public Buildings or Public Works Financed in Whole or in Part by Loans or Grants of the United States"). The Act provides that the Contractor and any subcontractors shall be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public work, to give up any part of the compensation to which they are otherwise entitled. The Owner shall report all suspected or reported violations to EDA.

(f) **Subcontracts**. The Contractor and any subcontractors will insert in any subcontracts the clauses contained in 29 C.F.R. §§ 5.5(a)(1) through (10) and such other clauses as EDA or its designee may require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime Contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 C.F.R. § 5.5.

(g) **Contract termination; debarment**. The breach of the contract clauses in 29 C.F.R. § 5.5 may be grounds for termination of the contract, and for debarment as a Contractor and a subcontractor as provided in 29 C.F.R. § 5.12.

(h) **Compliance with Davis-Bacon and Related Act Requirements**. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 C.F.R. parts 1, 3, and 5 are herein incorporated by reference in this contract.

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

(j) **Certification of Eligibility**.

(1)By entering into this Contract, the Contractor certifies that neither it nor any person or firm that has an interest in the Contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 C.F.R. § 5.12(a)(1).

(2) No part of this Contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 C.F.R. § 5.12(a)(1).

(3) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. § 1001.

16. LABOR STANDARDS - CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.

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

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

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

(d) **Subcontracts**. The Contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraphs (a) through (c) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime Contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (a) through (c) of this section.

17. EQUAL EMPLOYMENT OPPORTUNITY

(a) The Recipient hereby agrees that it will incorporate or cause to be incorporated into any contract for construction work, or modification thereof, as defined in the regulations of the Secretary of Labor at 41 C.F.R. chapter 60, which is paid for in whole or in part with funds obtained from EDA, the following equal opportunity clause:

During the performance of this contract, the Contractor agrees as follows:

(1) The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action shall include, but not be limited to the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training including apprenticeship. The Contractor agrees to post in conspicuous places available to employees and applicants for employment notices to be provided setting forth the provisions of this nondiscrimination clause.

(2) The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.

(3) The contractor will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with the contractor's legal duty to furnish information.

(4) The Contractor will send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers representatives of the Contractor's commitments hereunder, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(5) The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965 and of the rules, regulations, and relevant orders of the Secretary of Labor.

(6) The Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to its books, records, and accounts by EDA and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(7) In the event of the Contractor's noncompliance with the nondiscrimination clauses of

this Contract or with any of the said rules, regulations, or orders, this Contract may be canceled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further Government contracts or federally-assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation or order of the Secretary of Labor, or as otherwise provided by law.

(8) The Contractor will include the portion of the sentence immediately preceding paragraph 17(a)(1) and the provisions of paragraphs 17(a)(1) through (8) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as EDA or the Secretary of Labor may direct as a means of enforcing such provisions, including sanctions for noncompliance. Provided, however, that in the event the Contractor becomes involved in or is threatened with litigation with a subcontractor or vendor as a result of such direction by EDA or the Secretary of Labor, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

(9) The Recipient further agrees that it will be bound by the above equal opportunity clause with respect to its own employment practices when it participates in federally-assisted construction work. Provided, however, that if the Recipient so participating is a State or local government, the above equal opportunity clause is not applicable to any agency, instrumentality, or subdivision of such government that does not participate in work on or under the Contract.

(10)The Recipient agrees that it will assist and cooperate actively with EDA and the Secretary of Labor in obtaining the compliance of contractors and subcontractors with the equal opportunity clause and the rules, regulations, and relevant orders of the Secretary of Labor, that it will furnish EDA and the Secretary of Labor such information as they may require for the supervision of such compliance, and that it will otherwise assist EDA in the discharge of the EDA's primary responsibility for securing compliance.

(11) The Recipient further agrees that it will refrain from entering into any contract or contract modification subject to Executive Order 11246 of September 24, 1965, with a Contractor debarred from, or who has not demonstrated eligibility for, Government contracts and federally assisted construction contracts pursuant to the Executive Order and will carry out such sanctions and penalties for violation of the equal opportunity clause as may be imposed upon contractors and subcontractors by EDA or the Secretary of Labor pursuant to Part II, Subpart D of the Executive Order. In addition, the Recipient agrees that if it fails or refuses to comply with these undertakings, EDA may take any or all of the following actions: Cancel, terminate, or suspend in whole or in part this EDA financial assistance; refrain from extending any further assistance to the applicant under the program with respect to which the failure or refund occurred until satisfactory assurance of future compliance has been received from such applicant; and refer the case

to the Department of Justice for appropriate legal proceedings.

(b) Exemptions to Above Equal Opportunity Clause (41 C.F.R. chapter 60):

(1) Contracts and subcontracts not exceeding $10,000 (other than Government bills of lading, and other than contracts and subcontracts with depositories of Federal funds in any amount and with financial institutions which are issuing and paying agents for U.S. savings bonds and savings notes) are exempt. The amount of the Contract, rather than the amount of the federal financial assistance, shall govern in determining the applicability of this exemption.

(2) Except in the case of subcontractors for the performance of construction work at the site of construction, the clause shall not be required to be inserted in subcontracts below the second tier.

(3) Contracts and subcontracts not exceeding $10,000 for standard commercial supplies or raw materials are exempt.

18. **CONTRACTING WITH SMALL, MINORITY AND WOMEN'S BUSINESSES**

(a) If the Contractor intends to let any subcontracts for a portion of the work, the Contractor shall take affirmative steps to assure that small, minority and women's businesses are used when possible as sources of supplies, equipment, construction, and services.

(b) Affirmative steps shall consist of:

(1) Placing qualified small and minority businesses and women's business enterprises on solicitation lists;

(2) Ensuring that small and minority businesses and women's business enterprises are solicited whenever they are potential sources;

(3) Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by small and minority businesses and women's business enterprises;

(4) Establishing delivery schedules, where the requirements of the contract permit, which encourage participation by small and minority businesses and women's business enterprises;

(5) Using the services and assistance of the U.S. Small Business Administration, the Minority Business Development Agency of the U.S. Department of Commerce, and State and local governmental small business agencies;

(6) Requiring each party to a subcontract to take the affirmative steps of this section; and

(7) The Contractor is encouraged to procure goods and services from labor surplus area firms.

19. **HEALTH, SAFETY, AND ACCIDENT PREVENTION**

(a) In performing this contract, the Contractor shall:

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

(2) Protect the lives, health, and safety of other persons;

(3) Prevent damage to property, materials, supplies, and equipment; and

(4) Avoid work interruptions.

(b) For these purposes, the Contractor shall:

(1) Comply with regulations and standards issued by the Secretary of Labor at 29 C.F.R. part 1926. Failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act (40 U.S.C. §§ 3701 – 3708); and

(2) Include the terms of this clause in every subcontract so that such terms will be binding on each subcontractor.

(c) The Contractor shall maintain an accurate record of exposure data on all accidents incident to work performed under this Contract resulting in death, traumatic injury, occupational disease, or damage to property, materials, supplies, or equipment, and shall report this data in the manner prescribed by 29 C.F.R. part 1904.

(d) The Owner shall notify the Contractor of any noncompliance with these requirements and of the corrective action required. This notice, when delivered to the Contractor or the Contractor's representative at the site of the Work, shall be deemed sufficient notice of the noncompliance and corrective action required. After receiving the notice, the Contractor shall immediately take corrective action. If the Contractor fails or refuses to take corrective action promptly, the Owner may issue an order stopping all or part of the Work until satisfactory corrective action has been taken. The Contractor shall not base any claim or request for equitable adjustment for additional time or money on any stop order issued under these circumstances.

(e) The Contractor shall be responsible for its subcontractors' compliance with the provisions of this clause. The Contractor shall take such action with respect to any subcontract as EDA, or the Secretary of Labor shall direct as a means of enforcing such provisions.

20. CONFLICT OF INTEREST AND OTHER PROHIBITED INTERESTS

(a) No official of the Owner who is authorized in such capacity and on behalf of the Owner to negotiate, make, accept, or approve, or to take part in negotiating, making, accepting, or approving any architectural, engineering, inspection, construction or material supply contract or any subcontract in connection with the construction of the Project, shall become directly or indirectly interested personally in this Contract or in any part hereof.

(b) No officer, employee, architect, attorney, engineer, or inspector of or for the Owner who is authorized in such capacity and on behalf of the Owner to exercise any legislative, executive, supervisory or other similar functions in connection with the construction of the Project, shall become directly or indirectly interested personally in this Contract or in any part thereof, any material supply contract, subcontract, insurance contract, or any other contract pertaining to the Project.

(c) The Contractor may not knowingly contract with a supplier or manufacturer if the individual or entity who prepared the Contract Documents has a corporate or financial affiliation with the supplier or manufacturer.

(d) The Owner's officers, employees, or agents shall not engage in the award or administration of this Contract if a conflict of interest, real or apparent, may be involved. Such a conflict may arise when: (i) the employee, officer or agent; (ii) any member of their immediate family; (iii) their partner or (iv) an organization that employs, or is about to employ, any of the above, has a financial interest in the Contractor. The Owner's officers, employees, or agents shall neither solicit nor accept gratuities, favors, or anything of monetary value from the Contractor or subcontractors.

(e) If the Owner finds after a notice and hearing that the Contractor, or any of the Contractor's agents or representatives, offered or gave gratuities (in the form of entertainment, gifts, or otherwise) to any official, employee, or agent of the Owner or EDA in an attempt to secure this Contract or favorable treatment in awarding, amending, or making any determinations related to the performance of this Contract, the Owner may, by written notice to the Contractor, terminate this Contract. The Owner may also pursue other rights and remedies that the law or this Contract provides. However, the existence of the facts on which the Owner bases such findings shall be an issue and may be reviewed in proceedings under the dispute resolution provisions of this Contract.

(f) In the event this Contract is terminated as provided in paragraph (e) of this section, the Owner may pursue the same remedies against the Contractor as it could pursue in the event of a breach of this Contract by the Contractor. As a penalty, in addition to any other damages to which it may be entitled by law, the Owner may pursue exemplary damages in an amount (as determined by the Owner) which shall not be less than three nor more than ten times the costs the Contractor incurs in providing any such gratuities to any such officer or employee.

21. RESTRICTIONS ON LOBBYING

(a) This Contract, or subcontract is subject to 31 U.S.C. § 1352, regarding lobbying restrictions. The section is explained in the common rule, 15 C.F.R. part 28 (55 FR 6736-6748, February 26, 1990). Each bidder under this Contract or subcontract is generally prohibited from using federal funds for lobbying the Executive or Legislative Branches of the Federal Government in connection with this EDA Award.

(b) **Contract Clause Threshold**: This Contract Clause regarding lobbying must be included in each bid for a contract or subcontract exceeding $100,000 of federal funds at any tier under the EDA Award.

(c) **Certification and Disclosure**: Each bidder of a contract or subcontract exceeding $100,000 of federal funds at any tier under the federal Award must file Form CD-512, *Certification Regarding Lobbying – Lower Tier Covered Transactions*, and, if applicable, Standard Form-LLL, *Disclosure of Lobbying Activities*, regarding the use of any nonfederal funds for lobbying. Certifications shall be retained by the Contractor or subcontractor at the next higher tier. All disclosure forms, however, shall be forwarded from tier to tier until received by the Recipient of the EDA Award, who shall forward all disclosure forms to EDA.

(d) **Continuing Disclosure Requirement**: Each Contractor or subcontractor that is subject to the Certification and Disclosure provision of this Contract Clause is required to file a disclosure form at the end of each calendar quarter in which there occurs any event that requires disclosure or that materially affects the accuracy of the information contained in any disclosure form previously filed by such person. Disclosure forms shall be forwarded from tier to tier until received by the Recipient of the EDA Award, who shall forward all disclosure forms to EDA.

(e) **Indian Tribes, Tribal Organizations, or Other Indian Organizations**: Indian tribes, tribal organizations, or any other Indian organizations, including Alaskan Native organizations, are excluded from the above lobbying restrictions and reporting requirements, but only with respect to expenditures that are by such tribes or organizations for lobbying activities permitted by other federal law. An Indian tribe or organization that is seeking an exclusion from Certification and Disclosure requirements must provide EDA with the citation of the provision or provisions of federal law upon which it relies to conduct lobbying activities that would otherwise be subject to the prohibitions in and to the Certification and Disclosure requirements of 31 U.S.C. § 1352, preferably through an attorney's opinion. Note, also, that a non-Indian subrecipient, contractor, or subcontractor under an award to an Indian tribe, for example, is subject to the restrictions and reporting requirements.

22. HISTORICAL AND ARCHAEOLOGICAL DATA PRESERVATION

The Contractor agrees to facilitate the preservation and enhancement of structures and objects of historical, architectural or archaeological significance and when such items are found and/or unearthed during the course of project construction. Any excavation by the Contractor that uncovers an historical or archaeological artifact shall be immediately reported to the Owner and a representative of EDA. Construction shall be temporarily halted pending the notification process and further directions issued by EDA after consultation with the State Historic

Preservation Officer (SHPO) for recovery of the items. *See* the National Historic Preservation Act of 1966 (54 U.S.C. § 300101 *et seq.*, formerly at 16 U.S.C. § 470 *et seq.*) and Executive Order No. 11593 of May 31, 1971.

23. **CLEAN AIR AND WATER**

Applicable to Contracts in Excess of $150,000

(a) **Definition**. "Facility" means any building, plant, installation, structure, mine, vessel, or other floating craft, location, or site of operations, owned, leased, or supervised by the Contractor or any subcontractor, used in the performance of the Contract or any subcontract. When a location or site of operations includes more than one building, plant, installation, or structure, the entire location or site shall be deemed a facility except when the Administrator, or a designee, of the United States Environmental Protection Agency (EPA) determines that independent facilities are collocated in one geographical area.

(b) In compliance with regulations issued by the EPA, 2 C.F.R. part 1532, pursuant to the Clean Air Act, as amended (42 U.S.C. § 7401 *et seq*.); the Federal Water Pollution Control Act, as amended (33 U.S.C. § 1251 *et seq*.); and Executive Order 11738, the Contractor agrees to:

(1) Not utilize any facility in the performance of this contract or any subcontract which is listed on the Excluded Parties List System, part of the System for Award Management (SAM), pursuant to 2 C.F.R. part 1532 for the duration of time that the facility remains on the list;

(2) Promptly notify the Owner if a facility the Contractor intends to use in the performance of this contract is on the Excluded Parties List System or the Contractor knows that it has been recommended to be placed on the List;

(3) Comply with all requirements of the Clean Air Act and the Federal Water Pollution Control Act, including the requirements of section 114 of the Clean Air Act and section 308 of the Federal Water Pollution Control Act, and all applicable clean air and clean water standards; and

(4) Include or cause to be included the provisions of this clause in every subcontract and take such action as EDA may direct as a means of enforcing such provisions.

24. **USE OF LEAD-BASED PAINTS ON RESIDENTIAL STRUCTURES**

(a) If the work under this Contract involves construction or rehabilitation of residential structures over $5,000, the Contractor shall comply with the Lead-based Paint Poisoning Prevention Act (42 U.S.C. § 4831). The Contractor shall assure that paint or other surface coatings used in a residential property does not contain lead equal to or in excess of 1.0 milligram per square centimeter or 0.5 percent by weight or 5,000 parts per million (ppm) by weight. For purposes of this section, "residential property" means a dwelling unit, common areas, building exterior surfaces, and any surrounding land, including outbuildings, fences and play equipment affixed to the land, belonging to an owner and available for use by residents, but not

including land used for agricultural, commercial, industrial or other non-residential purposes, and not including paint on the pavement of parking lots, garages, or roadways.

(b) As a condition to receiving assistance under PWEDA, recipients shall assure that the restriction against the use of lead-based paint is included in all contracts and subcontracts involving the use of federal funds.

25. ENERGY EFFICIENCY

The Contractor shall comply with all standards and policies relating to energy efficiency which are contained in the energy conservation plan issued in compliance with the Energy Policy and Conservation Act (42 U.S.C. § 6201) for the State in which the Work under the Contract is performed.

26. ENVIRONMENTAL REQUIREMENTS

When constructing a Project involving trenching and/or other related earth excavations, the Contractor shall comply with the following environmental constraints:

(1) **Wetlands**. When disposing of excess, spoil, or other construction materials on public or private property, the Contractor shall not fill in or otherwise convert wetlands.

(2) **Floodplains**. When disposing of excess, spoil, or other construction materials on public or private property, the Contractor shall not fill in or otherwise convert 100 year floodplain areas delineated on the latest Federal Emergency Management Agency (FEMA) Floodplain Maps, or other appropriate maps, i.e., alluvial soils on Natural Resource Conservation Service (NRCS) Soil Survey Maps.

(3) **Endangered Species**. The Contractor shall comply with the Endangered Species Act, which provides for the protection of endangered and/or threatened species and critical habitat. Should any evidence of the presence of endangered and/or threatened species or their critical habitat be brought to the attention of the Contractor, the Contractor will immediately report this evidence to the Owner and a representative of EDA. Construction shall be temporarily halted pending the notification process and further directions issued by EDA after consultation with the U.S. Fish and Wildlife Service.

27. DEBARMENT, SUSPENSION, INELIGIBILITY, AND VOLUNTARY EXCLUSIONS

As required by Executive Orders 12549 and 12689, *Debarment and Suspension*, 2 C.F.R. Part 180 and implemented by the Department of Commerce at 2 C.F.R. part 1326, for prospective participants in lower tier covered transactions (except subcontracts for goods or services under the $25,000 small purchase threshold unless the subrecipient will have a critical influence on or substantive control over the award), the Contractor agrees that:

(1) By entering into this Contract, the Contractor and subcontractors certify, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared

ineligible, or voluntarily excluded from participation in this Contract by any federal department or agency.

(2) Where the Contractor or subcontractors are unable to certify to any of the statements in this certification, the Contractor or subcontractors shall attach an explanation to this bid.

See also 2 C.F.R. part 180 and 2 C.F.R. § 200.342.

28. **EDA PROJECT SIGN**

The Contractor shall supply, erect, and maintain in good condition a Project sign according to the specifications provided by EDA. To the extent practical, the sign should be a free standing sign. Project signs shall not be located on public highway rights-of-way. Location and height of signs will be coordinated with the local agency responsible for highway or street safety in the Project area, if any possibility exists for obstructing vehicular traffic line of sight. Whenever the EDA site sign specifications conflict with State law or local ordinances, the EDA Regional Director will permit such conflicting specifications to be modified so as to comply with State law or local ordinance.

29. **BUY AMERICA**

To the greatest extent practicable, contractors are encouraged to purchase American-made equipment and products with funding provided under EDA financial assistance awards.

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OMB Number: 0610-0096
Expiration Date: 11/30/2021

ECONOMIC DEVELOPMENT ADMINISTRATION

CHANGE ORDER FORM

EDA Award Number:_____Date: _____

Recipient: _____

Co-Recipient(s): _____

Recipient's Authorized Representative: _____
Name & Phone Number

Construction Contract No.	Contractor Name	Change Order No.

The Change Order will provide for the following:

Change Order Justification (Include cost analysis, if not unit cost in bid proposal or schedule of values):

	TOTAL	EDA Funded Amount	* Non-EDA Funded Amount
Original Contract Amount	$	$	$
Current Contract Amount adjusted by previous Change Orders	$	$	$
☐ (increase) ☐ (decrease) the Contract Amount by:	$	$	$
The original, scheduled date of completion is/was:			
The new Contract Amount including this Change Order will be:	$	$	$
☐ (increase) ☐ (decrease) the schedule by:	calendar days	calendar days	calendar days
The estimated date for completion of all work is:	(Date)	(Date)	(Date)

** Construction components not part of the EDA Grant Project and do not include EDA funds nor local match funds.*

Prepared By (Signature) **Date**

Prepared By (Typed or Written Name & Title)

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NOTICE OF REQUIREMENTS FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER 11246 AND 41 CFR PART 60-4)

The following Notice shall be included in, and shall be a part of all solicitations for offers and bids on all Federal and federally assisted construction contracts or subcontracts in excess of $10,000.

The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.

The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

Timetables	Goals for minority participation for each trade	Goals for female participation for each trade
	12 %	6.9%

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the contractor also is subject to the goals for both its federally involved and non federally involved construction.
The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade and the contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order, and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction subcontract in excess of $10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address and telephone number of the subcontractor; employer identification number of the subcontractor; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the subcontract is to be performed.
As used in this Notice, and in the contract resulting from this solicitation, the "covered area" is:

State of Tennessee

County of Franklin

City of Huntland

Back

OMB Number: 0610-0096
Expiration Date: 11/30/2021

EDA PROJECT SIGN

The Contractor shall supply, erect, and maintain in good condition a project sign according to the specifications set forth below:

EDA SITE SIGN SPECIFICATIONS

Size: 4' x 8' x ¾"

Materials: Exterior grade/MDO plywood (APA rating A-B)

Supports: 4" x 4" x 12' posts with 2" x 4" cross branching

Erection: Posts shall be set a minimum of three feet deep in concrete footings that are at least 12" in diameter.

Paint: Outdoor enamel

Colors: Jet Black, Blue (PMS300), and Gold (PMS7406). Specifically, on white background the following will be placed:

The U. S. Department of Commerce seal in blue, black, and gold;

"EDA" in blue;

"U. S. DEPARTMENT OF COMMERCE ECONOMIC DEVELOPMENT

ADMINISTRATION" in black;

"In partnership with" in blue;

(Actual name of the) "EDA Grant Recipient" in black;

Lettering: Specific fonts are named below; positioning will be as shown on the attached illustration.

"U. S. DEPARTMENT OF COMMERCE ECONOMIC DEVELOPMENT ADMINISTRATION" use Bank Gothic Medium - BANK GOTHIC MED

"In partnership with" use Univers™ 55 Oblique - *Univers 55*

(Name of) "EDA Grant Recipient" use Univers™ Extra Black 85 **Univers 85**

Project signs will not be erected on public highway rights-of-way. If any possibility exists for obstruction to traffic line of sight, the location and height of the sign will be coordinated with the agency responsible for highway or street safety in the area.

The EDA Regional Director may permit modifications to these specifications if they conflict with state law or local ordinances.

OMB Number: 0610-0096
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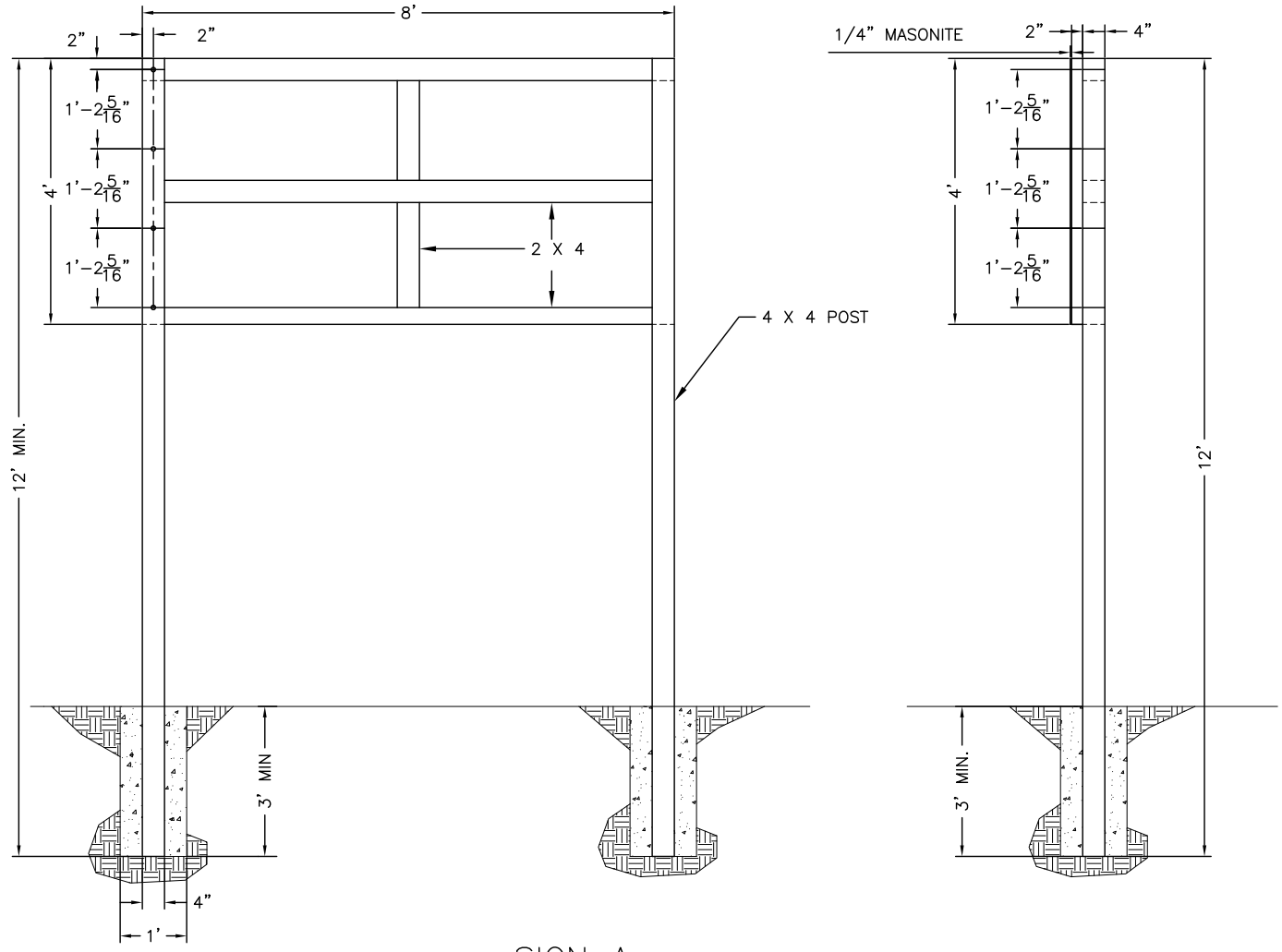

SIGN A
MASONITE SIGN

SCALE: 3/8" = 1'

PROJECT - SIGN A
ECONOMIC DEVELOPMENT ADMINISTRATION

OMB Number: 0610-0096
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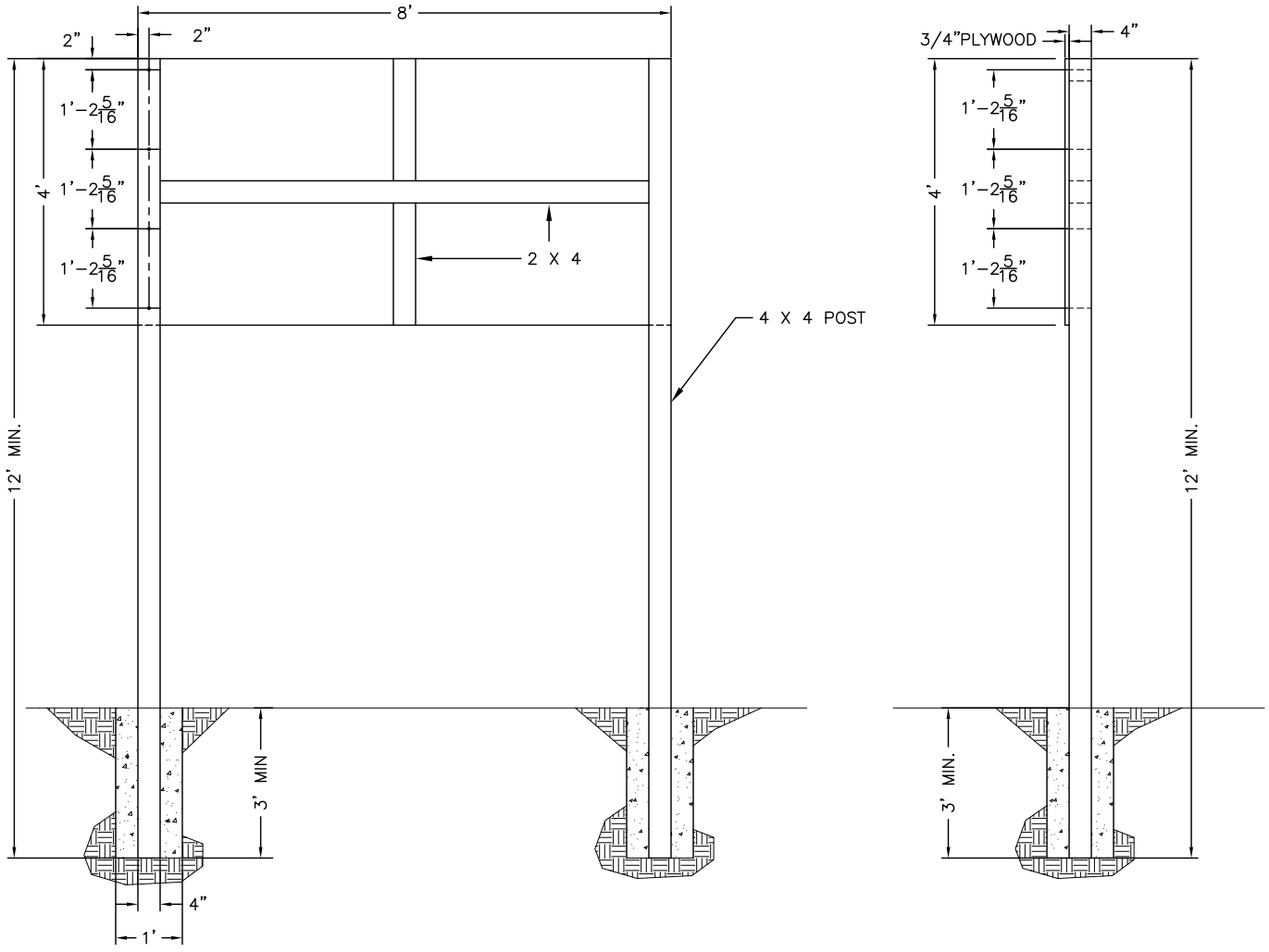

SIGN B
PLYWOOD SIGN
SCALE: 3/8" = 1'

PROJECT - SIGN B
ECONOMIC DEVELOPMENT ADMINISTRATION

EDA

U.S. Department of Commerce Economic Development Administration

In partnership with

<EDA Grant Recipient Name>

2.25”
13.5”
1.75”
1.75”
EDA
10”
Black
Blue= PMS300
Gold= PMS7406
2.0”
1.5”
4.0”
3.0”
3.0”
3.75”
15.0”
U.S. DEPARTMENT OF COMMERCE ECONOMIC DEVELOPMENT ADMINISTRATION
48”
In partnership with
<EDA Grant Recipient Name>
96"

TN ECD DOCUMENTS

ACKNOWLEDGEMENT REGARDING BIDDER SAM REGISTRATION

Pursuant to 2 CFR Parts 183 and 215 and the requirement of the U.S. Department of Housing and Urban Development (HUD), contractors procured directly by grantees, sub-grantees, and/or sub-recipients of HUD funds, including CDBG are required to have an active registration in the System of Award Management (SAM). This document shall be completed and submitted as part of the bid proposal.

1. By submitting this proposal, the prospective bidder certifies that it has an active registration is SAM that is not set to expire within the next 90 days.

2. By submitting this proposal, the prospective bidder certifies neither it, its principals nor affiliates, is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

3. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that an erroneous certification was rendered, in addition to other remedies available to the Federal Government, the Department or agency with which this transaction originated may pursue available remedies.

4. Further, the prospective bidder shall provide immediate written notice to the person to which this proposal is submitted if at any time the Participant learns that this certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

5. By submitting this proposal, it is agreed that should the proposed covered transaction be entered into, the prospective bidder will not knowingly enter into any lower-tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction unless authorized by the agency with which this transaction originated.

6. It is further agreed that by submitting this proposal, the prospective bidder will include Certification of Subcontractor Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion without modification, in all lower-tier covered transactions and in all solicitations for lower-tier covered transactions.

Provide the following information as detailed in the prospective bidder's SAM registration:

Entity Name: _____

Address: _____

City: _____ State: _____ Zip: _____

SAM Entity ID: _____ Expiration Date: _____

Active Exclusions: ☐ Yes ☐ No

CERTIFICATION OF BIDDER REGARDING EQUAL EMPLOYMENT OPPORTUNITY

This certification is required pursuant to Executive Order 11246 (30 F. R. 12319-25). 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 previous 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/Firm: _____

Address: _____

City: _____ State _____ Zip _____

1. Bidder has participated in a previous contract or subcontract subject to the Equal Opportunity Clause. ☐ Yes ☐ No
2. Compliance reports were required to be filed in connection with such contract or subcontract. ☐ Yes ☐ No
3. Bidder has filed all compliance reports due under applicable instructions, including SF-100. ☐ Yes ☐ No ☐ None Req.
   .
4. Have you ever been or are you being considered for sanction due to violation of Executive Order 11246, as amended? ☐ Yes ☐ No

Bidder Name: _____ Title: _____

Signature: _____ Date: _____

CERTIFICATION OF BIDDER REGARDING USE OF FEMALE/MINORITY SUBCONTRACTORS

This certification is required for the contractor to demonstrate that when subcontractors are to be used on this project, an attempt will be made to utilize female/minority owned firms.

Documentation must be on file to show who has been contacted.

Certification by Bidder

Bidder/Firm: _____

Address: _____

City: _____ State _____ Zip _____

I, _____, certify that every attempt was made to utilize female/minority contractors on this project.

Bidder Name: _____ Title: _____

Signature: _____ Date: _____

CERTIFICATION OF SUBCONTRACTOR REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND EXCLUSION

Pursuant to 2 CFR Parts 183, 215, and 2424, and the requirement of the U.S. Department of Housing and Urban Development (HUD), subcontractors for projects that are funded in whole or in part by HUD funds must provide information concerning the entity's debarment, suspension, ineligibility or exclusion status. This document shall be completed and provided to the prime contractor.

1. By signing and submitting this proposal, the prospective lower-tier participant certifies that neither it, its principals nor affiliates, is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency. Further, the Participant provides the certification set out below:

2. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that an erroneous certification was rendered, in addition to other remedies available to the Federal Government, the Department or agency with which this transaction originated may pursue available remedies.

3. Further, the Participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the Participant learns that this certification was erroneous when submitted or has become erroneousby reason of changed circumstances.

4. By submitting this document, it is agreed that should the proposed covered transaction be entered into, the Participant will not knowingly enter into any lower-tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction unless authorized by the agency with which this transaction originated.

The subcontracting entity may satisfy the requirement of this document via one of the two options below:

Option 1: SAM.gov Active Registration

Entity Name: _____

Address: _____

City: _____ State: _____ Zip: _____

SAM Entity ID: _____ Expiration Date: _____

Active Exclusions: ☐ Yes ☐ No

Option 2: Signed Certification

Entity Name: _____

Address: _____

City: _____ State: _____ Zip: _____

Entity Representative: _____ Title: _____

Signature: _____

CERTIFICATION OF BIDDER REGARDING SECTION 3 AND SEGREGATED FACILITIES

NAME OF PRIME CONTRACTOR: _____

PROJECT NUMBER: _____

The undersigned hereby certifies that

- Section 3 provisions are included in the Contract.

- If contract equals or exceeds $200,000, the contractor will comply with all Section 3 requirements detailed in the CDBG Manual, including:
  - reporting total labor hours worked,
  - reporting total labor hours worked by Section 3 workers,
  - reporting total labor hours worked by Targeted Section 3 workers,
  - Providing documentation of Section 3 worker status as required for all workers for the project under the covered contract.

- No segregated facilities will be maintained as required by Title VI of the Civil Rights Act of 1964.

_____
Name & Title of Signer (Print or Type)

_____ _____
Signature Date

DRUG-FREE WORKPLACE AFFIDAVIT

STATE OF _____

COUNTY OF _____

The undersigned, principal officer of _____, an employer of five (5) or more employees contracting with _____ government to provide construction services, hereby states under oath as follows:

1. The undersigned is a principal officer of _____ (hereinafter referred to as the "Company"), and is duly authorized to execute this Affidavit on behalf of the Company.

2. The Company submits this Affidavit pursuant to T.C.A. § 50-9-113, which requires each employer with no less than five (5) employees receiving pay who contracts with the state or any local government to provide construction services to submit an affidavit stating that such employer has a drug-free workplace program that complies with Title 50, Chapter 9, of the Tennessee Code Annotated.

3. The Company is in compliance with T.C.A. § 50-9-113.

Further affiant saith not.

_____
Principal Officer

STATE OF _____

COUNTY OF _____

Before me personally appeared _____, with whom I am personally acquainted (or proved to me on the basis of satisfactory evidence), and who acknowledged that such person executed the foregoing affidavit for the purposes therein contained.

Witness my hand and seal at office this _____ day of _____, 20___.

_____
Notary Public

My commission expires: _____

CERTIFICATION BY PROPOSED SUBCONTRACTOR REGARDING EQUAL EMPLOYMENT OPPORTUNITY

NAME OF PRIME CONTRACTOR: _____

PROJECT NUMBER: _____

This certification is required pursuant to Executive Order 11246 (30 F. R. 12319-25). 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 previous 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 subcontractor has not filed a compliance report due under applicable instructions, such subcontractor shall be required to submit a compliance report before the owner approves the subcontract or permits work to begin under the subcontract.

SUBCONTRACTOR'S CERTIFICATION

Subcontractor Name: _____

Address: _____

City: _____ State _____ Zip _____

1. Bidder has participated in a previous contract or subcontract subject to the Equal Opportunity Clause. ☐ Yes ☐ No
2. Compliance reports were required to be filed in connection with such contract or subcontract. ☐ Yes ☐ No
3. Bidder has filed all compliance reports due under applicable instructions, including SF-100. ☐ Yes ☐ No ☐ None Req.
   .
4. Have you ever been or are you being considered for sanction due to violation of Executive Order 11246, as amended? ☐ Yes ☐ No

Name: _____ Title: _____

Signature: _____ Date: _____

CERTIFICATION OF PROPOSED SUBCONTRACTOR REGARDING SECTION 3 AND SEGREGATED FACILITIES

NAME OF SUBCONTRACTOR: _____

PROJECT NUMBER: _____

The undersigned hereby certifies that

- Section 3 provisions are included in the Contract.
- If contract equals or exceeds $200,000, the contractor will comply with all Section 3 requirements detailed in the CDBG Manual, including:
    - reporting total labor hours worked,
    - reporting total labor hours worked by Section 3 workers,
    - reporting total labor hours worked by Targeted Section 3 workers,
    - Providing documentation of Section 3 worker status as required for all workers for the project under the covered contract.

- No segregated facilities will be maintained as required by Title VI of the Civil Rights Act of 1964.
-

_____
Name & Title of Signer (Print or Type)

_____ _____
Signature Date

STATEMENT OF COMPLIANCE CERTIFICATE ILLEGAL IMMIGRANT

EACH CONTRACTOR BIDDING SHALL FILL IN AND SIGN THE FOLLOWING

Bidder Name: _____

Address: _____

City: _____ State _____ Zip _____

This is to certify that _____ have fully complied with all the requirements of T.C.A. § 12-3-309, stating:

(1) No state governmental entity shall contract to acquire goods or services from any person who knowingly utilizes the services of illegal immigrants in the performance of a contract for goods or services entered into with a state governmental entity;

(2) No person may contract to supply goods or services to a state governmental entity if that person knowingly utilizes the services of illegal immigrants in the performance of a contract to supply goods or services entered into with the state or a state entity.

All Bidders for construction services on this project shall be required to submit an affidavit (by executing this compliance document) as part of their bid, that attests that such Bidder shall comply with requirements of T.C.A. § 12-3-309.

Name: _____ Title: _____

Signature: _____ Date: _____

IRAN DIVESTMENT ACT

In compliance with the Iran Divestment Act (State of Tennessee 2016, Public Chapter No. 817), which became effective on July 1, 2016, certification is required of all bidders on contracts over $1,000.

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party hereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief that each bidder is not on the list created pursuant to T.C.A. § 12-12-106.

I affirm, under the penalties of perjury, this statement to be true and correct.

_____ _____

Date Signature of Bidder

_____ _____

Company

A bid shall not be considered for award nor shall award be made where the foregoing certification has been complied with; provided, however, that if in any case the bidder cannot make the foregoing certification, the bidder shall so state and shall furnish with the bid a signed statement which sets forth in detail the reasons therefor. The **City/County of** _____ may award a bid to a bidder who cannot make the certification, on case-by-case basis, if:

1. The investment activities in Iran were made before July 1, 2016, the investment activities in Iran have not been expanded or reviewed on or after July 1, 2016, and the person has adopted, publicized, and is implementing a formal plan to cease the investment activities in Iran and to refrain from engaging in any new investments in Iran; or
2. The **City/County of** _____makes a determination that the goods or services are necessary for the **City/County of** _____to perform its functions and that, absent such an exemption, the political subdivision will be unable to obtain the goods or services for which the contract is offered. Such determination shall be made in writing and shall be a public document.

TN Department of General Services | Central Procurement Office

July 15, 2016

NOTICE

Tenn. Code Ann. § 12-12-106 requires the chief procurement officer to publish, using credible information freely available to the public, a list of persons it determines engage in investment activities in Iran, as described in § 12-12-105.

For these purposes, the State intends to use the attached list of "Entities Ineligible to Contract with the State of South Carolina or any Political Subdivision of the State per the Iran Divestment Act of 2014, S.C. Code Ann. §§ 11-57-10, et. seq."

While inclusion on this list would make a person ineligible to contract with the state of Tennessee, if a person ceases its engagement in investment activities in Iran, it may be removed from the list.

If you feel as though you have been erroneously included on this list please contact the Central Procurement Office at CPO.Website@tn.gov.

Tennessee Tower, 3rd Floor • 312 Rosa L. Parks Avenue • Nashville, TN 37243
615-741-1035 • Fax: 615-741-0684 • tn.gov/generalservices

List Date: July 7, 2017

1. Abadan Petrochemical Co.
2. Aban Offshore Ltd.
3. Anton Oilfield Services Group
4. Arak Petrochemical
5. Arvandan Oil & Gas
6. Behran Oil Co.
7. Bharat Petroleum Corporation Ltd.
8. China International United Petroleum & Chemical So., Ltd. (Unipec)
9. China National Offshore Oil Corp
10. China National Petroleum Corp (CNPC)
11. China National United Oil Corp.
12. China Petroleum & Chemical Corp.
13. Cosmo Energy Holdings Co. Limited
14. Daelim Industrial
15. Daewoo Engineering & Construction
16. Enel Spa
17. Eni Spa
18. Esfahan Oil Refining Co.
19. Essar Oil Ltd.
20. Fanavaran Petrochemical Co.
21. Farabi Petrochemical Co.
22. Formosa Petrochemical Corp.
23. Gazprom OAO
24. Gubre Fabrikalari T.A.S.
25. Hellenic Petroleum S.A.
26. Hindustan Petroleum Corp Ltd.
27. Hyundai Heavy Industries.
28. Idemitsu Kosan Co. Ltd.
29. Indian Oil Corporation Ltd.
30. Inpex Corporation
31. Japan Drilling Co., Ltd.
32. Japan Petroleum Exploration Co., Ltd.
33. JXTG Holdings, Inc.
34. Khark Petrochemical.
35. Koc Holding A.S.
36. Korea Gas Corp.
37. Linde AG.
38. Maire Tecnimont S.p.A.
39. Mangalore Refinery & Petrochemicals Ltd.
40. Marubeni Corporation
41. Mitsubishi Materials Corp.
42. Mitsui & Co. Ltd.
43. Naftiran Intratrade Company
44. National Iranian Oil Co.
45. National Iranian South Oil Co.
46. National Iranian Tanker Co.
47. National Shipping Co. of Saudi Arabia
48. North Drilling

49. Oil & Natural Gas Corporation Ltd.
50. Oil India Ltd.
51. Oil Industry Investment Co.
52. ONGC Videsh Ltd. (OVL)
53. Pardis Petrochemical Co.
54. Pars Oil Co.
55. Parsian Oil and Gas Development Co.
56. Petrochemical Industries Investment Co.
57. Petrochemical Transport Co.
58. PetroChina Co. Ltd.
59. PJSC Lukoil
60. Polskie Gornictwo Naftowe i Gazownictwo SA
61. Royal Dutch Shell Plc.
62. Sadid Pipe & Equipments Co.
63. Saras Raffinerie Sarde SPA
64. Sepehr Energy
65. Shiraz Petrochemical Co.
66. Showa Shell Sekiyu K K
67. Sinopec Group.
68. Sk Holdings Co. Ltd.
69. SK Innovation
70. Tabriz Oil Refining Company
71. Total S.A.
72. Toyo Engineering Corporation
73. Turkiye Petrol Rafinerileri AS
74. Zhuh
75. Ai Zhenrong Company

WAGE RATE DETERMINATION

Appropriate Wage Rates shall be inserted here.

AGREEMENT

THIS AGREEMENT, made this _____ day of _____, 20____, by and between _____, herein called "Owner", acting herein through its _____
_____, and
_____
STRIKE OUT INAPPLICABLE TERMS (a corporation) (a partnership) (an individual doing business as _____)
of _____, County of _____, and State of _____, hereinafter called "Contractor".
WITNESSETH: That for and in consideration of the payments and agreements hereinafter mentioned, to be made and performed by the OWNER, the CONTRACTOR hereby agrees with the OWNER to commence and complete the construction described as follows:
hereinafter called "the project", for the sum of _____

_____ Dollars ($_____) and all extra work in connection therewith, under the terms as stated in the General and Special Conditions of the Contract; and at this (its or their) own property cost and expense to furnish all the materials , supplies, machinery, equipment, tools, superintendence, labor, insurance, and other accessories and services necessary to complete the said project in accordance with the conditions and prices stated in the Proposal, the General Conditions, Supplemental General Conditions and Special Conditions of the Contract, the plans, which include all maps, plats, blue prints, and other drawings and printed or written explanatory matter thereof, the specifications and contract documents therefore as prepared by _____, herein entitled "the Architect/Engineer", and as enumerated in Paragraph 1 of the Supplemental General Conditions, all of which are made a part hereof and collectively evidence and constitute the contract.

The Contractor hereby agrees to commence work under this contract on or before a date to be specified in a written "Notice to Proceed" of the Owner and to fully complete the project within _____ consecutive calendar days thereafter. The Contractor further agrees to pay, as liquidated damages, the sum of $_____ for each consecutive calendar day thereafter as hereinafter provided in Paragraph 3 of the Supplemental General Conditions.

The OWNER agrees to pay the CONTRACTOR in current funds for the performance of the contract, subject to additions and deductions, as provided in the General Conditions of the Contract, and to make payments on account thereof as provided in Paragraph 3, "Payments to Contractor", of the Supplemental General Conditions.

IN WITNESS WHEREOF, the parties to these presents have executed this contract in six (6) counterparts, each of which shall be deemed an original, in the year and day first above mentioned.

(Seal)
ATTEST: _____ *(Owner)*

_____ By: _____
(Secretary)

_____ _____
(Witness) *(Title)*

(Seal)

_____
(Contractor)

_____ By: _____
(Secretary)

_____ _____
(Witness) *(Title)*

_____
(Address, City, State, and Zip Code)

BONDING AND INSURANCE

1. This Attachment sets forth bonding and insurance requirements for grants. No other bonding and insurance requirements shall be imposed other than those normally required by the grantee.

2. Except as otherwise required by law, a grant that requires the contracting (or subcontracting) for construction or facility improvements shall provide for the grantee to follow its own requirements relating to bid guarantees, performance bonds, and payment bonds unless the construction contract or subcontract exceeds $150,000 (See 2 CFR 200.88). For those contracts or subcontracts exceeding $150,000, the Federal agency may accept the bonding policy and requirements of the grantee provided the Federal agency has made a determination that the Government's interest is adequately protected. If such a determination has not been made, the minimum requirements shall be as follows:

   a. A bid guarantee from each bidder equivalent to five percent of the bid price. The "bid guarantee" shall consist of a firm commitment such as a bid bond, certified check, or other negotiable instrument accompanying a bid as assurance that the bidder will, upon acceptance of his bid, execute such contractual documents as may be required within the time specified.

   b. A performance bond on the part of the contractor for 100 percent of the contract price. A "performance bond" is one executed in connection with a contract to secure fulfillment of all the contractor's obligations under such contract.

   c. A payment bond on the part of the contractor for 100 percent of the contract price. A "payment bond" is one executed in connection with a contract to assure payment as required by law of all persons supplying labor and material in the execution of the work provided for in the contract.

3. Where the Federal Government guarantees or insures the repayment of money borrowed by the grantee, the Federal agency, at its discretion, may require adequate bonding and insurance if the bonding and insurance requirements of the grantee are not deemed adequate to protect the interest of the Federal Government.

4. Where bonds are required in the situations described above, the bonds shall be obtained from companies holding certificates of authority as acceptable sureties (31 CFR 223).

NOTE: AIA Document A311 is acceptable for use as Performance and Payment Bonds.

CERTIFICATE OF OWNER'S ATTORNEY

I, the undersigned, _____, the duly authorized and acting legal representative of _____ do hereby certify as follows:

I have examined the attached contract(s) and surety bonds and the manner of execution thereof, and I am of the opinion that each of the aforesaid agreements has been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority to execute said agreements on behalf of the respective parties named thereon; and that the foregoing agreements constitute valid and legally binding obligations upon the parties executing the same in accordance with terms, conditions and provisions thereof.

Date: _____ _____

Community Development Block Grant Program
GENERAL CONDITIONS

1. Contract and Contract Documents

The project to be constructed and pursuant to this contract will be financed with assistance from the Tennessee Community Development Block Grant Program and is subject to all applicable Federal laws and regulations.

The Plans, Specifications and Addenda, hereinafter enumerated in Paragraph 1 of the Supplemental General Conditions shall form part of this Contract and the provisions thereof shall be as binding upon the parties hereto as if they were herein fully set forth. The table of contents, titles, headings, running headlines and marginal notes contained herein and in said documents are solely to facilitate reference to various provisions of the Contract Documents and in no way affect, limit or cast light on the interpretation of the provisions to which they refer.

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GENERAL CONDITIONS

ARTICLE 1--DEFINITIONS

Wherever used in these General Conditions or in the other Contract

Documents the following terms have the meanings indicated which are applicable to both the singular and plural thereof:

1.1. *Addenda*--Written or graphic instruments issued prior to the opening of Bids which clarify, correct or change the Bidding Requirements or the Contract Documents.

1.2. *Agreement*--The written contract between OWNER and CONTRACTOR covering the Work to be performed; other Contract Documents are attached to the Agreement and made a part thereof as provided therein.

1.3. *Application for Payment*--The form accepted by ENGINEER which is to be used by CONTRACTOR in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

1.4. *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.

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

1.6. *Bidding Documents*--The advertisement or invitation to Bid, instructions to bidders, the Bid form, and the proposed Contract Documents (including all Addenda issued prior to receipt of Bids).

1.7. *Bidding Requirements*--The advertisement or invitation to Bid, instructions to bidders, and the Bid form.

1.8. *Bonds*--Performance and Payment bonds and other instruments of security.

1.9. *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.

1.10. *Contract Documents*--The Agreement, Addenda (which pertain to the Contract Documents). CONTRACTOR's Bid (including documentation accompanying the Bid and any post Bid documentation submitted prior to the Notice of Award) when attached as an exhibit to the Agreement, the Notice to Proceed, the Bonds, these General Conditions, the Supplementary Conditions, the Specifications and the Drawings as the same are more specifically identified in the Agreement, together with all Written Amendments, Change Orders, Work Change Directives, Field Orders and ENGINEER's written interpretations and classifications issued pursuant to paragraphs 3.5, 3.6.1, and 3.6.3 on or after the Effective Date of the Agreement. Shop Drawing submittals approved pursuant to paragraphs 6.26 and 6.27 and the reports and drawings referred to in paragraphs 4.2.1.1 and 4.2.2.2 are not Contract Documents.

1.11. *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 11.9.1 in the case of Unit Price Work).

1.12. *Contract Times*--The numbers of days or the dates stated in the Agreement: (i) to achieve Substantial Completion, and (ii) to complete the Work so that it is ready for final payment as evidenced by ENGINEER's written recommendation of final payment in accordance with paragraph 14.13.

1.13. *CONTRACTOR*--The person, firm or corporation with whom the OWNER has entered into the Agreement.

1.14. *defective*--An adjective which when modifying the word Work refers to Work that is unsatisfactory, faulty or deficient, in that it does not conform to the Contract Documents, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the Contract Documents, or 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 14.8 or 14.10).

1.15. *Drawings*--The drawings which show the scope, extent and character of the Work to be furnished and performed by CONTRACTOR and which have been prepared or approved by ENGINEER and are referred to in the Contract Documents. Shop drawings are not Drawings as so defined.

1.16. *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.

1.17. *ENGINEER*--The person, firm or corporation named as such in the Agreement.

1.18. *ENGINEER's Consultant*--A person, firm, or corporation having a contract with ENGINEER to furnish services as ENGINEER's independent professional associate or consultant with respect to the Project and who is identified as such in the Supplementary Conditions.

1.19. *Field Order*--A written order issued by ENGINEER which orders minor changes in the Work in accordance with paragraph 9.5 but which does not involve a change in the Contract Price or the Contract Times.

1.20. *General Requirements*--Sections of Division 1 of the Specifications.

1.21. *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.

1.22. *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.

1.23. *Liens*--Liens, charges, security interests or encumbrances upon real property or personal property.

1.24. *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.

1.25. *Notice of Award*--The written notice by OWNER to the apparent successful bidder stating that upon compliance by the apparent successful bidder with the conditions precedent enumerated therein, within the time specified, OWNER will sign and deliver the Agreement.

1.26. *Notice to Proceed*--A written notice given by OWNER to CONTRACTOR (with a copy to ENGINEER) fixing the date on which the Contract Times will commence to run and on which CONTRACTOR shall start to perform CONTRACTOR's obligations under the Contract Documents.

1.27. *OWNER*--The public body or authority, corporation, association, firm or person with whom CONTRACTOR has entered into the Agreement and for whom the Work is to be provided.

1.28. *Partial Utilization*--Use by OWNER of a substantially completed part of the Work for the purpose for which it is intended (or a related purpose) prior to Substantial Completion of all the Work.

1.29. *PCBs*--Polychlorinated biphenyls.

1.30. *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 Wastes and crude oils.

1.31. *Project*--The total construction of which the Work to be provided under the Contract Documents may be the whole, or a part as indicated elsewhere in the Contract Documents.

1.32. *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.

1.33. *Resident Project Representative*--The authorized representative of ENGINEER who may be assigned to the site or any part thereof.

1.34. *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.

1.35. *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.

1.36. *Specifications*--Those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards and workmanship as applied to the Work and certain administrative details applicable thereto.

1.37. *Subcontractor*--An individual, firm or corporation having a direct contract with CONTRACTOR or with any other Subcontractor for the performance of a part of the Work at the site.

1.38. *Substantial Completion*--The Work (or a specified part thereof) has progressed to the point where, in the opinion of ENGINEER as evidenced by ENGINEER's definitive certificate of Substantial Completion, it is sufficiently complete, in accordance with the Contract Documents, so that the Work (or specified part) can be utilized for the purposes for which it is intended; or if no such certificate is issued, when the Work is complete and ready for final payment as evidenced by ENGINEER's written recommendation of final payment in accordance with paragraph 14.13. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

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

1.40. *Supplier*--A manufacturer, fabricator, supplier, distributor, materialman or vendor having a direct contract with CONTRACTOR or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by CONTRACTOR or any Subcontractor.

1.41. *Underground Facilities*--All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels or other such facilities or attachments, and any encasements containing such facilities which have been installed underground to furnish any of the following services or materials: electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, sewage and drainage removal, traffic or other control systems or water.

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

1.43. *Work*--The entire completed construction or the various separately identifiable parts thereof required to be furnished under the Contract Documents. Work includes and is the result of performing or furnishing labor and furnishing and incorporating materials and equipment into the construction, and performing or furnishing services and furnishing documents, all as required by the Contract Documents.

1.44. *Work Change Directive*--A written directive 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 physical conditions under which the Work is to be performed as provided in paragraph 4.2 or 4.3 or to emergencies under paragraph 6.23. A Work Change Directive will not change the Contract Price or the Contract Times, but is evidence that the parties expect that the change directed 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 as provided in paragraph 10.2.

1.45. Written Amendment--A written amendment of the Contract Documents, signed by OWNER and CONTRACTOR on or after the Effective Date of the Agreement and normally dealing with the nonengineering or nontechnical rather than strictly construction-related aspects of the Contract Documents.

ARTICLE 2--PRELIMINARY MATTERS

Delivery of Bonds:

2.1. When CONTRACTOR delivers the executed Agreements to OWNER, CONTRACTOR shall also deliver to OWNER such Bonds

as CONTRACTOR may be required to furnish in accordance with paragraph 5.1.

Copies of Documents:

2.2. OWNER shall furnish to CONTRACTOR up to ten copies (unless otherwise specified in the Supplementary Conditions) of the Contract Documents as are reasonably necessary for the execution of the Work. Additional copies will be furnished, upon request, at the cost of reproduction.

Commencement of Contract Times; Notice to Proceed:

2.3. 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 thirty 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.

Starting the Work:

2.4. CONTRACTOR shall start to perform the Work on the date when the Contract Times commence to run, but no Work shall be done at the site prior to the date on which the Contract Times commence to run.

Before Starting Construction:

2.5. Before undertaking each part of the Work, CONTRACT-OR shall carefully study and compare the Contract Documents and check and verify pertinent figures shown thereon and all applicable field measurements. CONTRACTOR shall promptly report in writing to ENGINEER any conflict, error, ambiguity or discrepancy which CONTRACTOR may discover and shall obtain a written interpretation or clarification from ENGINEER before proceeding with any Work affected thereby; however, CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any conflict, error, ambiguity or discrepancy in the Contract Documents, unless CONTRACTOR knew or reasonably should have known thereof.

2.6. Within ten days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), CONTRACTOR shall submit to ENGINEER for review:

2.6.1. 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;

2.6.2. a preliminary schedule for Shop Drawing and Sample submittals which will list each required submittal and the times for submitting, reviewing and processing such submittal;

2.6.3. a preliminary schedule of values for all of the Work which will include quantities and prices of items aggregating the Contract Price and will subdivide the Work into component parts in sufficient detail to serve as the basis for progress payments during construction. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.7. 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 paragraphs 5.4, 5.6 and 5.7.

Preconstruction Conference:

2.8. Within twenty days after the Contract Times start to run, but before any Work at the site is started, a conference attended by 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 2.6, procedures for handling Shop Drawings and other submittals, processing Applications for Payment and maintaining required records.

Initially Acceptable Schedules:

2.9. Unless otherwise provided in the Contract Documents, at least ten 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 2.6. CONTRACTOR shall have an additional ten days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to CONTRACTOR until the schedules are submitted to and acceptable to ENGINEER as provided below. The progress schedule will be acceptable to ENGINEER as providing an orderly progression of the Work to completion within any specified Milestones and the Contract Times, but such acceptance will neither impose on ENGINEER responsibility for the sequencing, scheduling or progress of the Work nor interfere with or relieve CONTRACTOR from CONTRACTOR's full responsibility therefore. CONTRACTOR's schedule of Shop Drawing and Sample submissions will be acceptable to ENGINEER as providing a workable arrangement for reviewing and processing the required submittals. CONTRACTOR's schedule of values will be acceptable to ENGINEER as to form and substance.

ARTICLE 3--CONTRACT DOCUMENT: INTENT, AMENDING, REUSE

Intent:

3.1. The Contract Documents comprise the entire agreement between OWNER and CONTRACTOR concerning the Work. The Contract Documents are complementary; what is called for by one is as binding as if called for by all. The Contract Documents will be construed in accordance with the law of the place of the Project.

3.2. 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 Work, materials or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be furnished and performed whether or not specifically called for. When words or phrases which have a well-known technical or construction industry or trade meaning are used to describe Work, materials or equipment, such words or phrases shall be interpreted in accordance with that meaning. Clarifications and interpretations of the Contract Documents shall be issued by ENGINEER as provided in paragraph 9.4.

3.3. Reference to Standards and Specifications of Technical Societies; Reporting and Resolving Discrepancies:

3.3.1. Reference to standards, specifications, manuals or codes of any technical society, organization or association, or to the Laws or Regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest 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.

3.3.2. If, during the performance of the Work, CONTRACTOR discovers any conflict, error, ambiguity or discrepancy within the Contract Documents or between the Contract Documents and any provision of any such Law or Regulation applicable to the performance of the Work or of any such standard, specification, manual or code or of any instruction of any Supplier referred to in paragraph 6.5, CONTRACTOR shall report it to ENGINEER in writing at once, and, CONTRACTOR shall not proceed with the Work affected thereby (except in an emergency as authorized by paragraph 6.23) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in paragraph 3.5 or 3.6; provided, however, that CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any such conflict, error, ambiguity or discrepancy unless CONTRACTOR knew or reasonably should have known thereof.

3.3.3. Except as otherwise specifically stated in the Contract Documents or as may be provided by amendment or supplement thereto issued by one of the methods indicated in paragraph 3.5 or 3.6, 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:

3.3.3.1. the provisions of any such standard, specification, manual, code or instruction (whether or not specifically incorporated by reference in the Contract Documents); or

3.3.3.2. the provisions of any such 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).

No provision of any such standard, specification, manual, code or instruction shall be effective to change the duties and responsibilities of OWNER, CONTRACTOR or ENGINEER, or any of their subcontractors, consultants, agents, or employees from those set forth in the Contract Documents, nor shall it be effective to assign to OWNER, ENGINEER or any of ENGINEER's Consultants, agents or employees any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of paragraph 9.13 or any other provision of the Contract Documents.

3.4. Whenever in the Contract Documents the terms" as ordered," "as directed," "as required," "as allowed," "as approved" or terms of like effect or import are used, or the adjectives "reasonable," "suitable," "acceptable," "proper" or "satisfactory" or adjectives of like effect or import are used to describe a requirement, direction, review or judgment of ENGINEER as to the Work, it is intended that such requirement, direction, review or judgment will be solely to evaluate, in general, the completed Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective shall not be effective to assign to ENGINEER any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.13 or any other provision of the Contract Documents.

Amending and Supplementing Contract Documents:

3.5. The Contract Documents may be amended to provide for additions, deletions and revisions in the Work or to modify the terms and conditions thereof in one or more of the following ways:

3.5.1. a formal Written Amendment.

3.5.2. a Change Order (pursuant to paragraph 10.4), or

3.5.3. a Work Change Directive (pursuant to paragraph 10.1).

3.6. In addition, the requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, in one or more of the following ways:

3.6.1. a Field Order (pursuant to paragraph 9.5),

3.6.2. ENGINEER's approval of a Shop Drawing or Sample (pursuant to paragraphs 6.26 and 6.27), or

3.6.3. ENGINEER's written interpretation or clarification (pursuant to paragraph 9.4).

Reuse of Documents:

3.7. CONTRACTOR, and any Subcontractor or Supplier or other person or organization performing or furnishing any of the Work under a direct or indirect contract with OWNER (i) shall not have or acquire any title to or ownership rights in any of the Drawings, Specifications or other documents (or copies of any thereof) prepared by or bearing the seal of ENGINEER or ENGINEER's Consultant, and (ii) shall not reuse any of such Drawings, Specifications, other documents or copies on extensions of the Project or any other project without written consent of OWNER and ENGINEER and specific written verification or adaption by ENGINEER.

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

Availability of Lands:

4.1. OWNER shall furnish, as indicated in the Contract Documents, the lands upon which the Work is to be performed, rights-of-way and easements for access thereto, and such other lands which are designated for the use of CONTRACTOR. Upon reasonable written request, OWNER shall furnish CONTRACTOR with a correct 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 lien against such lands in accordance with applicable Laws and Regulations. OWNER shall identify any encumbrances or restrictions not of general application but

specifically related to use of lands so furnished with which CONTRACTOR will have to comply in performing the Work. Easements for permanent structures or permanent changes in existing facilities will be obtained and paid for by OWNER, unless otherwise provided in the Contract Documents. If CONTRACTOR and OWNER are unable to agree on entitlement to or the amount or extent of any adjustments in the Contract Price or the Contract Times as a result of any delay in OWNER's furnishing these lands, rights-of-way or easements, CONTRACTOR may make a claim therefore as provided in Articles 11 and 12. CONTRACTOR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.2. Subsurface and Physical Conditions:

4.2.1. *Reports and Drawings*: Reference is made to the Supplementary Conditions for identification of:

4.2.1.1. *Subsurface Conditions*: Those reports of explorations and tests of subsurface conditions at or contiguous to the site that have been utilized by ENGINEER in preparing the Contract Documents; and

4.2.1.2. *Physical Conditions*: Those drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the site (except Underground Facilities) that have been utilized by ENGINEER in preparing the Contract Documents.

4.2.2. *Limited Reliance by CONTRACTOR Authorized: Technical Data*: CONTRACTOR may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data." CONTRACTOR may not rely upon or make any claim against OWNER, ENGINEER or any of ENGINEER's Consultants with respect to:

4.2.2.1. 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

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

4.2.2.3. any CONTRACTOR interpretation of or conclusion drawn from any "technical data" or any such data, interpretations, opinions or information.

4.2.3. *Notice of Differing Subsurface or Physical Conditions*: If CONTRACTOR believes that any subsurface or physical condition at or contiguous to the site that is uncovered or revealed either:

4.2.3.1. is of such a nature as to establish that any "technical data" on which CONTRACTOR is entitled to rely as provided in paragraphs 4.2.1 and 4.2.2 is materially inaccurate, or

4.2.3.2. is of such a nature as to require a change in the Contract Documents, or

4.2.3.3. differs materially from that shown or indicated in the Contract Documents, or

4.2.3.4. 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 conditions affected thereby or performing any Work in connection therewith (except in an emergency as permitted by paragraph 6.23), notify OWNER and ENGINEER in writing about such condition. CONTRACTOR shall not further disturb such conditions or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

4.2.4. *ENGINEER's Review*: ENGINEER will promptly review the pertinent conditions, 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.

4.2.5. *Possible Contract Documents Change*: If ENGINEER concludes that a change in the Contract Documents is required as a result of a condition that meets one or more of the categories in paragraph 4.2.3., a Work Change Directive or a Change Order will be issued as provided in Article 10 to reflect and document the consequences of such change.

4.2.6. *Possible Price and Times Adjustments*: An equitable adjustment in the Contract Price or in the Contract Times, or both, will be allowed to the extent that the existence of such uncovered or revealed condition causes an increase or decrease in CONTRACTOR's cost of, or time required for performance of, the Work; subject, however, to the following:

4.2.6.1. such condition must meet any one or more of the categories described in paragraphs 4.2.3.1 through 4.2.3.4, inclusive;

4.2.6.2. a change in the Contract Documents pursuant to paragraph 4.2.5 will not be an automatic authorization of nor a condition precedent to entitlement to any such adjustment;

4.2.6.3. 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 9.10 and 11.9; and

4.2.6.4. CONTRACTOR shall not be entitled to any adjustment in the Contract Price or Times if;

4.2.6.4.1. CONTRACTOR knew of the existence of such conditions at the time CONTRACTOR made a final commitment to OWNER in respect of Contract Price and Contract Times by the submission of a bid or becoming bound under a negotiated contract; or

4.2.6.4.2. 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

4.2.6.4.3. CONTRACTOR failed to give the written notice within the time and as required by paragraph 4.2.3.

If OWNER and CONTRACTOR are unable to agree on entitlement to or as to the amount or length of any such equitable adjustment in the Contract Price or Contract Times, a claim may be made therefore as provided in Articles 11 and 12. However, OWNER, ENGINEER and ENGINEER's Consultants shall not be liable to CONTRACTOR for any claims, costs, losses or damages sustained by CONTRACTOR on or in connection with any other project or anticipated project.

4.3. Physical Conditions--Underground Facilitates:

4.3.1. *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 or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

4.3.1.1. OWNER and ENGINEER shall not be responsible for the accuracy or completeness of any such information or data; and

4.3.1.2. The cost of all of the following will be included in the Contract Price and CONTRACTOR shall have full responsibility for: (i) reviewing and checking all such information and data, (ii) locating all Underground Facilities shown or indicated in the Contract Documents, (iii) coordination of the Work with the owners of such Underground Facilities during construction, and (iv) the safety and protection of all such Underground Facilities as provided in paragraph 6.20 and repairing any damage thereto resulting from the Work.

4.3.2. *Not Shown or Indicated*: If an Underground Facility is uncovered or revealed at or contiguous to the site which was not shown or indicated 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 6.23), 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 of the Underground Facility. If ENGINEER concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued as provided in Article 10 to reflect and document such consequences. During such time, CONTRACTOR shall be responsible for the safety and protection of such Underground Facility as provided in paragraph 6.20. CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, to the extent that they are attributable to the existence of any Underground Facility that was not shown or indicated 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 the amount or length of any such adjustment in Contract Price or Contract Times, CONTRACTOR may make a claim therefore as provided in Articles 11 and 12. However, OWNER, ENGINEER and ENGINEER's Consultants shall not be liable to CONTRACTOR for any claims, costs, losses or damages incurred or sustained by CONTRACTOR on or in connection with any other project or anticipated project.

Reference Points:

4.4. 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 shall make no changes or relocations without the prior written approval of OWNER. CONTRACTOR shall report to ENGINEER whenever any reference point 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 by professionally qualified personnel.

4.5. Asbestos, PCBs, Petroleum, Hazardous Waste or Radioactive Material:

4.5.1. OWNER shall be responsible for any Asbestos, PCBs, Petroleum, Hazardous Waste or Radioactive Material 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 and which may present a substantial danger to persons or property exposed thereto in connection with the Work at the site. OWNER shall not be responsible for any such materials brought to the site by CONTRACTOR, Subcontractor, Suppliers or anyone else for whom CONTRACTOR is responsible.

4.5.2. CONTRACTOR shall immediately: (i) stop all Work in connection with such hazardous condition and in any area affected thereby (except in an emergency as required by paragraph 6.23), and (ii) notify OWNER and ENGINEER (and 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 hazardous condition or take corrective action, if any. CONTRACTOR shall not be required to resume Work in connection with such hazardous condition or in any such affected area until after OWNER has obtained any required permits related thereto and delivered to CONTRACTOR special written notice: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (ii) specifying any special conditions under which such Work may be resumed safely. If OWNER and CONTRACTOR cannot agree as to entitlement to or the amount or extent of an adjustment, if any, in Contract Price or Contract Times as a result of such Work stoppage or such special conditions under which Work is agreed by CONTRACTOR to be resumed, either party may make a claim therefore as provided in Articles 11 and 12.

4.5.3. If after receipt of such special 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 such portion of the Work that is in connection with such hazardous condition or in such affected area to be deleted from the Work. If OWNER and CONTRACTOR cannot agree as to entitlement to or the amount or extent of an adjustment, if any, in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a claim therefore as provided in Articles 11 and 12. OWNER may have such deleted portion of the Work performed by OWNER's own forces or others in accordance with Article 7.

4.5.4. To the fullest extent permitted by Laws and Regulations, OWNER shall indemnify and hold harmless CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants and the officers, directors, employees, agents, other consultants and subcontractors of each and any of them from and against all

claims, costs, losses and damages arising out of or resulting from such hazardous condition, provided that: (i) 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 there from, and (ii) nothing in this subparagraph 4.5.4 shall obligate OWNER to indemnify any person or entity from and against the consequences of that person's or entity's own negligence.

4.5.5. The provisions of paragraphs 4.2 and 4.3 are not intended to apply to Asbestos, PCBs, Petroleum, Hazardous Waste or Radioactive Material uncovered or revealed at the site.

ARTICLE 5--BONDS AND INSURANCE

Performance, Payment and Other Bonds:

5.1. 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 CONTRACTOR's obligations under the Contract Documents. These Bonds shall remain in effect at least until one year after the date when final payment becomes due, 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 Supplementary Conditions. All Bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff, Bureau of Government Financial Operations, U.S. Treasury Department. All Bonds signed by an agent must be accompanied by a certified copy of such agent's authority to act.

5.2. If the surety on any Bond furnished by CONTRACTOR is declared a 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 5.1, CONTRACTOR shall within ten days thereafter substitute another Bond and surety, both of which must be acceptable to OWNER.

5.3. Licensed Sureties and Insurers; Certificates of Insurance:

5.3.1. 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.

5.3.2. CONTRACTOR shall deliver to OWNER, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by OWNER or any other additional insured) which CONTRACTOR is required to purchase and maintain in accordance with paragraph 5.4. OWNER shall deliver to CONTRACTOR, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by CONTRACTOR or any other additional insured) which OWNER is required to purchase and maintain in accordance with paragraphs 5.6 and 5.7 hereof.

CONTRACTOR's Liability Insurance:

5.4. CONTRACTOR shall purchase and maintain such liability and other insurance as is appropriate for the Work being performed and furnished and as will provided protection from claims set forth below which may arise out of or result from CONTRACTOR's performance and furnishing of the Work and CONTRACTOR's other obligations under the Contract Documents, whether it is to be performed or furnished by CONTRACTOR, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform or furnish any of the Work, or by anyone for whose acts any of them may be liable:

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

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

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

5.4.4. claims for damages insured by customary personal injury liability coverage which are sustained: (i) by any person as a result of an offense directly or indirectly related to the employment of such person by CONTRACTOR , or (ii) by any other person for any other reason;

5.4.5. 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 there from; and

5.4.6. 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.

The policies of insurance so required by this paragraph 5.4 to be purchased and maintained shall:

5.4.7. with respect to insurance required by paragraphs 5.4.3. through 5.4.6 inclusive, include as additional insured (subject to any customary exclusion in respect of professional liability) OWNER, ENGINEER, ENGINEER's Consultants and any other persons or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insured, and include coverage for the respective officers and employees of all such additional insured;

5.4.8. include 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;

5.4.9. include completed operations insurance;

5.4.10. include contractual liability insurance covering CONTRACTOR's indemnity obligations under paragraphs 6.12, 6.16 and 6.31 through 6.33;

5.4.11. contain a provision or endorsement that the coverage afforded will not be cancelled, materially changed or renewal refused until at least thirty 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 5.3.2 will so provide);

5.4.12. 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 13.12; and

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

OWNER's Liability Insurance:

5.5. In addition to the insurance required to be provided by CONTRACTOR under paragraph 5.4, 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.

Property Insurance:

5.6. 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:

5.6.1. include the interests of OWNER, CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants and any other persons or entities identified in the Supplementary Conditions, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured;

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

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

5.6.4. 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; and

5.6.5. be maintained in effect until final payment is made unless otherwise agreed to in writing by OWNER, CONTRACTOR and ENGINEER with thirty days written notice to each other additional insured to whom a certificate of insurance has been issued.

5.7. OWNER shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of OWNER, CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants and any other persons or entities identified in the Supplementary Conditions, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured.

5.8. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained by OWNER in accordance with paragraphs 5.6 and 5.7 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least thirty days' prior written notice has been given to OWNER and CONTRACTOR and to each other additional insured to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with paragraph 5.11.

5.9. OWNER shall not be responsible for purchasing and maintaining any property insurance 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, Subcontractor 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.

5.10. If CONTRACTOR requests in writing that other special insurance be included in the property insurance policies provided under paragraphs 5.6 or 5.7, OWNER shall, if possible, include such insurance, and the cost thereof will be charged to CONTRACTOR by appropriate Change Order or Written Amendment. 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.

5.11. Waiver of Rights:

5.11.1. OWNER and CONTRACTOR intend that all policies purchased in accordance with paragraphs 5.6 and 5.7 will protect OWNER, CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants and all other persons or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds in such policies and will provide primary coverage for all losses and damages caused by the perils covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or additional insureds thereunder. OWNER and CONTRACTOR waive all rights against each other and their respective officers, directors, employees and agents for all losses and damages caused by, arising out of or resulting from any of the perils covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors, ENGINEER, ENGINEER's Consultants and all other persons or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds 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.

5.11.2. In addition, OWNER waives all rights against CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants and the officers, directors, employees and agents of any of them, for:

5.11.2.1. 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 peril, whether or not insured by OWNER; and

5.11.2.2. loss or damage to the completed Project or part thereof caused by, arising out of or resulting from fire or other insured peril covered by any property insurance maintained on the completed Project or part thereof by OWNER during partial utilization pursuant to paragraph 14.10, after substantial completion pursuant to paragraph 14.8 or after final payment pursuant to paragraph 14.13.

Any insurance policy maintained by OWNER covering any loss, damage or consequential loss referred to in this paragraph 5.11.2 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 any of CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants and the officers, directors, employees and agents of any of them.

Receipt and Application of Insurance Proceeds

5.12. Any insured loss under the policies of insurance required by paragraphs 5.6 and 5.7 will be adjusted with OWNER and made payable to OWNER as fiduciary for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause and of paragraph 5.13. 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 or Written Amendment.

5.13. 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 fifteen 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.

Acceptance of Bonds and Insurance; Option to Replace;

5.14. If either party (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 ten days after receipt of the certificates (or other evidence requested) required by paragraph 2.7. 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.

Partial Utilization--Property Insurance:

5.15. If OWNER finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work, such use or occupancy may be accomplished in accordance with paragraph 14.10; provided that no such use or occupancy shall commence before the insurers providing the property insurance 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 cancelled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6--CONTRACTOR'S RESPONSIBILITIES

Supervision and Superintendence:

6.1. 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, but CONTRACTOR shall not be responsible for the negligence of others 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. CONTRACTOR shall be responsible to see that the completed Work complies accurately with the Contract Documents.

6.2. CONTRACTOR shall keep on the Work at all times during its progress a competent resident superintendent, who shall not be replaced without written notice to OWNER and ENGINEER except under extraordinary circumstances. The superintendent will be CONTRACTOR's representative at the site and shall have authority to act on behalf of CONTRACTOR. All communications to the superintendent shall be as binding as if given to CONTRACTOR.

Labor, Materials and Equipment:

6.3. CONTRACTOR shall provide competent, suitably qualified personnel to survey, lay out and construct the Work as required by the Contract Documents. CONTRACTOR shall at all times maintain good discipline and order at the site. 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 indicated in the Contract Documents, all Work at the site shall be performed during regular working hours and CONTRACTOR will not permit overtime work or the performance of Work on Saturday, Sunday or any legal holiday without OWNER's written consent given after prior written notice to ENGINEER.

6.4. Unless otherwise specified in the General Requirements, CONTRACTOR shall furnish and assume full responsibility for all 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 furnishing, performance, testing, start-up and completion of the Work.

6.5. All materials and equipment shall be of good quality and new, except as otherwise provided in the Contract Documents. All warranties and guarantees specifically called for 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 kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with instructions of the applicable Supplier, except as otherwise provided in the Contract Documents.

Progress Schedule:

6.6. CONTRACTOR shall adhere to the progress schedule established in accordance with paragraph 2.9 as it may be adjusted from time to time as provided below:

6.6.1. CONTRACTOR shall submit to ENGINEER for acceptance (to the extent indicated in paragraph 2.9) proposed adjustments in the progress schedule that will not change the Contract Times (or Milestones). Such adjustments will conform generally to the progress schedule then in effect and additionally will comply with any provisions of the General Requirements applicable thereto.

6.6.2. Proposed adjustments in the progress schedule that will change the Contract Times (or Milestones) shall be submitted in accordance with the requirements of paragraph 12.1. Such adjustments may only be made by a Change Order or Written Amendment in accordance with Article 12.

6.7. Substitutes and "Or-Equal" Items:

6.7.1. 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 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 accepted by ENGINEER under the following circumstances:

6.7.1.1. *"Or-Equal"*: 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 acceptance of proposed substitute items.

6.7.1.2. *Substitute Items:* If in ENGINEER's sole discretion an item of material or equipment proposed by CONTRACTOR does not qualify as an "or-equal" item under subparagraph 6.7.1.1., it will be considered a proposed substitute item. CONTRACTOR shall submit sufficient information as provided below to allow ENGINEER to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefore. The procedure for review by the ENGINEER will include the following as supplemented in the General Requirements and as ENGINEER may decide is appropriate under the circumstances. Requests for review of proposed substitute items of material or equipment will not be accepted by ENGINEER from anyone other than CONTRACTOR. If CONTRACTOR wishes to furnish or use a substitute item of material or equipment, CONTRACTOR shall first make written application to ENGINEER for acceptance thereof, certifying that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, be similar in substance to that specified and be suited to the same use as that specified. The application will state the extent, if any, to which the evaluation and acceptance of the proposed substitute will prejudice CONTRACTOR's achievement of Substantial Completion on time, whether or not acceptance of the substitute for use 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 work on the Project) to adapt the design to the proposed substitute and whether or not incorporation or use of the substitute in connection with the Work is subject to payment of any license fee or royalty. All variations of the proposed substitute from that specified will be identified in the application and available maintenance, repair and replacement service will be indicated. The application will also contain an itemized estimate of all costs or credits that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other contractors affected by the resulting change, all of which will be considered by ENGINEER in evaluating the proposed substitute. ENGINEER may require CONTRACTOR to furnish additional data about the proposed substitute.

6.7.1.3. *CONTRACTOR's Expense:* All data to be provided by CONTRACTOR in support of any proposed "or-equal" or substitute item will be at CONTRACTOR's expense.

6.7.2. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence or procedure of construction is shown or indicated in and expressly required by the Contract Documents, CONTRACTOR may furnish or utilize a substitute means, method, technique, sequence or procedure of construction acceptable to 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 procedure for review by ENGINEER will be similar to that provided in subparagraph 6.7.1.2.

6.7.3. *Engineer's Evaluation:* ENGINEER will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to paragraphs 6.7.1.2 and 6.7.2. ENGINEER will be the sole judge of acceptability. No "or-equal" or substitute will be ordered, installed or utilized without ENGINEER's prior written acceptance which will be evidenced by either a Change Order or an approved Shop Drawing. OWNER may require CONTRACTOR to furnish at CONTRACTOR's expense a special performance guarantee or other surety with respect to any "or-equal" or substitute. ENGINEER will record time required by ENGINEER and ENGINEER's Consultants in

evaluating substitutes proposed or submitted by CONTRACTOR pursuant to paragraphs 6.7.1.2 and 6.7.2 and in making changes in the Contract Documents (or in the provisions of any other direct contract with OWNER for work on the Project) occasioned thereby. Whether or not ENGINEER accepts a substitute item so proposed or submitted by CONTRACTOR, CONTRACTOR shall reimburse OWNER for the charges of ENGINEER and ENGINEER's Consultants for evaluating each such proposed substitute item.

Concerning Subcontractors, Suppliers and Others:

6.8.1. CONTRACTOR shall not employ any Subcontractor, Supplier or other person or organization (including those acceptable to OWNER and ENGINEER as indicated in paragraph 6.8.2), whether initially or as a substitute, against whom OWNER or ENGINEER may have reasonable objection. CONTRACTOR shall not be required to employ any Subcontractor, Supplier or other person or organization to furnish or perform any of the Work against whom CONTRACTOR has reasonable objection.

6.8.2. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers or other persons or organization (including those who are to furnish the principal items of materials or equipment) to be submitted to OWNER in advance of the specified date prior to the Effective Date of the Agreement for acceptance by OWNER and ENGINEER, and if CONTRACTOR has submitted a list thereof in accordance with the Supplementary Conditions, OWNER's or ENGINEER'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 person or organization so identified may be removed on the basis of reasonable objection after due investigation, in which case CONTRACTOR shall submit an acceptable substitute, the Contract Price will be adjusted by the difference in the cost occasioned by such substitution and an appropriate Change Order will be issued or Written Amendment signed. No acceptance by OWNER or ENGINEER of any such Subcontractor, Supplier or other person or organization shall constitute a waiver of any right of OWNER or ENGINEER to reject *defective* Work.

6.9.1. CONTRACTOR shall be fully responsible to OWNER and ENGINEER for all acts and omissions of the Subcontractors, Suppliers and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with CONTRACTOR just as CONTRACTOR is responsible for CONTRACTOR's own acts and omissions. Nothing in the Contract Documents shall create for the benefit of any such Subcontractor, Supplier or other person or organization any contractual relationship between OWNER and ENGINEER and any such Subcontractor, Supplier or other person or organization, nor shall it 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 person or organization except as may otherwise be required by Laws and Regulations.

6.9.2. CONTRACTOR shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with CONTRACTOR. CONTRACTOR shall require all Subcontractors, Suppliers and such other persons and organizations performing or furnishing any of the Work to communicate with the ENGINEER through CONTRACTOR.

6.10. 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.

6.11. All Work performed for CONTRACTOR by a Subcontractor or Supplier will be pursuant to an appropriate agreement between CONTRACTOR and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of OWNER and ENGINEER. Whenever any such agreement is with a Subcontractor or Supplier who is listed as an additional insured on the property insurance provided in paragraph 5.6 or 5.7, 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, ENGINEER's Consultants and all other additional insureds for all losses and damages caused by, arising out of or resulting from any of the perils 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.

Patent Fees and Royalties:

6.12. 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. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultants and the officers, directors, employees, agents and other consultants of each and any of them from and against all claims, costs, losses and damages arising out of or resulting from 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.

Permits:

6.13. 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. CONTRACTOR shall pay all charges of utility owners for connections to the Work, and OWNER shall pay all charges of such utility owners for capital costs related thereto such as plant investment fees.

Laws and Regulations:

6.14.1. CONTRACTOR shall give all notices and comply with all Laws and Regulations applicable to furnishing and 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.

6.14.2. 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 caused by, arising out of or resulting there from; however, it shall not be CONTRACTOR's primary responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve CONTRACTOR or CONTRACTOR's obligations under paragraph 3.3.2.

Taxes:

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

Use of Premises:

6.16. CONTRACTOR shall confine construction equipment, the storage of materials and equipment and the operations of workers to the site and land and areas identified in and permitted by the Contract Documents and other land and areas permitted by Laws and Regulations, rights-of-way, permits and easements, and shall not unreasonably encumber the premises 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. 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. CONTRACTOR shall, to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultant and anyone directly or indirectly employed by any of them from and against all claims, costs, losses and damages arising out of or resulting from 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.

6.17. During the progress of the Work, CONTRACTOR shall keep the premises free from accumulations of waste materials, rubbish and other debris resulting from the Work. At the completion of the Work CONTRACTOR shall remove all waste materials, rubbish and debris from and about the premises as well as all tools, appliances, construction equipment and machinery and surplus materials. CONTRACTOR shall leave the site clean and ready for occupancy by OWNER at Substantial Completion of the Work. CONTRACTOR shall restore to original condition all property not designated for alteration by the Contract Documents.

6.18. 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.

Record Documents:

6.19. CONTRACTOR shall maintain in a safe place at the site one record copy of all Drawings, Specifications, Addenda, Written Amendments, Change Orders, Work Change Directives, Field Orders and written interpretations and clarifications (issued pursuant to paragraph 9.4) in good order and annotated to show all changes made during construction. These record documents together with all approved Samples and a counter part 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.

Safety and Protection:

6.20. CONTRACTOR shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. CONTRACTOR shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

6.20.1. all persons on the Work site or who may be affected by the Work;

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

6.20.3. 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.

CONTRACTOR shall comply with all applicable Laws and Regulations of any public body having jurisdiction for safety of persons or property or to protect them 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 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. All damage, injury or loss to any property referred to in paragraph 6.20.2 or 6.20.3 caused, directly or indirectly, in whole or in part, by CONTRACTOR, any Subcontractor, Supplier or any other person or organization directly or indirectly employed by any of them to perform or furnish 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 ENGINEER's Consultant 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 person or organization directly or indirectly employed by any of them). 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 14.13 that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

Safety Representative:

6.21. 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.

Hazard Communication Program:

6.22. 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.

Emergencies:

6.23. In emergencies affecting the safety or protection of persons or the Work or property at the site or adjacent thereto, CONTRACTOR, without special instruction or authorization from OWNER or ENGINEER, 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. 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 to document the consequences of such action.

6.24. ***Shop Drawings and Samples:***

6.24.1. CONTRACTOR shall submit Shop Drawings to ENGINEER for review and approval in accordance with the accepted schedule of Shop Drawings and Sample submittals (see paragraph 2.9). All submittals will be identified as ENGINEER may require and in the number of copies specified in the General Requirements. The 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 materials and equipment CONTRACTOR proposes to provide and to enable ENGINEER to review the information for the limited purposes required by paragraph 6.26.

6.24.2. CONTRACTOR shall also submit Samples to ENGINEER for review and approval in accordance with said accepted schedule of Shop Drawings and Sample submittals. Each Sample will be identified clearly as to material, Supplier, pertinent data such as catalog numbers and the use for which intended and otherwise as ENGINEER may require to enable ENGINEER to review the submittal for the limited purposes required by paragraph 6.26. The numbers of each Sample to be submitted will be as specified in the Specifications.

6.25. ***Submittal Procedures:***

6.25.1. Before submitting each Shop Drawing or Sample, CONTRACTOR shall have determined and verified:

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

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

6.25.1.3. all information relative to CONTRACTOR's sole responsibilities in respect of means, methods, techniques, sequences and procedures of construction and safety precautions and programs incident thereto.

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

6.25.2. Each submittal will bear a stamp or specific written indication that CONTRACTOR has satisfied CONTRACTOR's obligations under the Contract Documents with respect to CONTRACTOR's review and approval of that submittal.

6.25.3. At the time of each submission, CONTRACTOR shall give ENGINEER specific written notice of such variations, if any, that the Shop Drawings or Sample submitted may have from the requirements of the Contract Documents, such notice to be in a written communication separate from the submittal; and, in addition, shall cause a specific notation to be made on each Shop Drawing and Sample submitted to ENGINEER for review and approval of each such variation.

6.26. ENGINEER will review and approve Shop Drawings and Samples in accordance with the schedule of Shop Drawings and Sample submittals accepted by ENGINEER as required by paragraph 2.9. 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. ENGINEER's review and approval will not extend to means, methods, techniques, sequences or procedures of construction (except where 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. 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.

6.27. ENGINEER's review and approval of Shop Drawings or Samples shall not relieve CONTRACTOR from responsibility for any variation from the requirements of the Contract Documents unless CONTRACTOR has in writing called ENGINEER's attention to each such variation at the time of submission as required by paragraph 6.25.3 and ENGINEER has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample approval; nor will any approval by ENGINEER relieve CONTRACTOR from responsibility for complying with the requirements of paragraph 6.25.1.

6.28. Where a Shop Drawing or Sample is required by the Contract Documents or the schedule of Shop Drawings and Sample submissions accepted by ENGINEER as required by paragraph 2.9, 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.

Continuing the Work:

6.29. 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 15.5 or as OWNER and CONTRACTOR may otherwise agree in writing.

6.30. ***CONTRACTOR's General Warranty and Guarantee***

6.30.1. CONTRACTOR warrants and guarantees to OWNER, ENGINEER and ENGINEER's Consultants that all Work will be in accordance with the Contract Documents and will not be *defective*. CONTRACTOR's warranty and guarantee hereunder excludes defects or damage caused by:

6.30.1.1. abuse, modification or improper maintenance or operation by persons other than CONTRACTOR, Subcontractors or Suppliers; or

6.30.1.2. normal wear and tear under normal usage.

6.30.2. 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:

6.30.2.1. observations by ENGINEER;

6.30.2.2. recommendation of any progress or final payment by ENGINEER;

6.30.2.3. the issuance of a certificate of Substantial Completion or any payment by OWNER to CONTRACTOR under the Contract Documents;

6.30.2.4. use or occupancy of the Work or any part thereof by OWNER;

6.30.2.5. any acceptance by OWNER or any failure to do so;

6.30.2.6. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by ENGINEER pursuant to paragraph 14.13;

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

6.30.2.8. any correction of *defective* Work by OWNER.

Indemnification:

6.31. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultants and the officers, directors, employees, agents and other consultants 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) caused by, arising out of or resulting from the performance of the Work, provided that any such claim, cost, loss or damage: (i) 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 there from, and (ii) is caused in whole or in part by any negligent act or omission of CONTRACTOR, any Subcontractor, any Supplier, any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, regardless of whether or not caused in part by any negligence or omission of a person or entity indemnified hereunder or whether liability is imposed upon such indemnified party by Laws and Regulations regardless of the negligence of any such person or entity.

6.32. In any and all claims against OWNER or ENGINEER or any of their respective consultants, agents, officers, directors or employees by any employee (or the survivor or personal representative of such employee) of CONTRACTOR, any Subcontractor, any Supplier, any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under paragraph 6.31 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 person or organization under workers' compensation acts, disability benefit acts or other employee benefit acts.

6.33. The indemnification obligations of CONTRACTOR under paragraph 6.31 shall not extend to the liability of ENGINEER and ENGINEER's Consultants, officers, directors, employees or agents caused by the professional negligence errors or omissions of any of them.

Survival of Obligations:

6.34. All representatives, 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 and termination or completion of the Agreement.

ARTICLE 7--OTHER WORK

Related Work at Site:

7.1. OWNER may perform other work related to the Project at the site by OWNER's own forces, or let other direct contracts therefore which shall contain General Conditions similar to these, or have other work performed by utility owners. If the fact that such other work is to be performed was not noted in the Contract Documents, then: (i) written notice thereof will be given to CONTRACTOR prior to starting any such other work, and (ii) CONTRACTOR may make a claim therefore as provided in Articles 11 and 12 if CONTRACTOR believes that such performance will involve additional expense to CONTRACTOR or requires additional time and the parties are unable to agree as to the amount or extent thereof.

7.2. CONTRACTOR shall afford each other contractor who is a party to such a direct contract and each utility owner (and OWNER, if OWNER is performing the additional work with OWNER's employees) proper and safe access to the site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work and shall properly connect and coordinate the Work with theirs. Unless otherwise provided in the Contract Documents, CONTRACTOR shall do all cutting, fitting and patching of the Work that may be required to make its several parts come together properly and integrate with such other work. CONTRACTOR shall not endanger any work of others by cutting, excavating or otherwise altering their work and will only cut or alter their work with the written consent of ENGINEER and the others whose work will be affected. The duties and responsibilities of CONTRACTOR under this paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of CONTRACTOR in said direct contracts between OWNER and such utility owners and other contractors.

7.3. 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 so to report will constitute an acceptance of such other work as fit and proper for integration with CONTRACTOR's Work except for latent or nonapparent defects and deficiencies in such other work.

Coordination:

7.4. If OWNER contracts with others for the performance of other work on the Project at the site, the following will be set forth in Supplementary Conditions:

7.4.1. the person, firm or corporation who will have authority and responsibility for coordination of the activities among the various prime contractors will be identified;

7.4.2. the specific matters to be covered by such authority and responsibility will be itemized; and

7.4.3. the extent of such authority and responsibilities will be provided.

Unless otherwise provided in the Supplementary Conditions, OWNER shall have sole authority and responsibility in respect of such coordination.

ARTICLE 8--OWNER'S RESPONSIBILITIES

8.1. Except as otherwise provided in these General Conditions, OWNER shall issue all communications to CONTRACTOR through ENGINEER.

8.2. In case of termination of the employment of ENGINEER, OWNER shall appoint an engineer against whom CONTRACTOR makes no reasonable objection, whose status under the Contract Documents shall be that of the former ENGINEER.

8.3. OWNER shall furnish the data required of OWNER under the Contract Documents promptly and shall make payments to CONTRACTOR promptly when they are due as provided in paragraphs 14.4 and 14.13.

8.4. OWNER's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in paragraphs 4.1 and 4.4. Paragraph 4.2 refers to OWNER's identifying and making available to CONTRACTOR copies of reports of explorations and tests of subsurface conditions at the site and drawings of physical conditions in existing structures at or contiguous to the site that have been utilized by ENGINEER in preparing the Contract Documents.

8.5. OWNER's responsibilities in respect of purchasing and maintaining liability and property insurance are set forth in paragraphs 5.5 through 5.10.

8.6. OWNER is obligated to execute Change Orders as indicated in paragraph 10.4.

8.7. OWNER's responsibility in respect of certain inspections, tests and approvals is set forth in paragraph 13.4.

8.8. In connection with OWNER's right to stop Work or suspend Work, see paragraphs 13.10 and 15.1. Paragraph 15.2 deals with OWNER's right to terminate services of CONTRACTOR under certain circumstances.

8.9. 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 furnishing or performance of the Work. OWNER will not be responsible for CONTRACTOR's failure to perform or furnish the Work in accordance with the Contract Documents.

8.10. OWNER's responsibility in respect of undisclosed Asbestos, PCBs, Petroleum, Hazardous Waste or Radioactive Materials uncovered or revealed at the site is set forth in paragraph 4.5.

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

ARTICLE 9--ENGINEER'S STATUS DURING CONSTRUCTION

OWNER's Representative:

9.1. ENGINEER will be OWNER's representative during the construction period. The duties and responsibilities and the limitations of authority of ENGINEER as OWNER's representative during construction are set forth in the Contract Documents and shall not be extended without written consent of OWNER and ENGINEER.

Visits to Site:

9.2. 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 will endeavor for the benefit of OWNER to determine, in general, if the Work is proceeding in accordance with the Contract Documents. ENGINEER will not be required to make exhaustive or continuous on-site inspections 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 on-site observations, ENGINEER will keep OWNER informed of the progress of the Work and will endeavor to guard OWNER against *defective* Work. ENGINEER's visits and on-site observations are subject to all the limitations on ENGINEER's authority and responsibility set forth in paragraph 9.13, and particularly, but without limitation, during or as a result of ENGINEER's on-site 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 furnishing or performance of the Work.

Project Representative:

9.3. If OWNER and ENGINEER agree, ENGINEER will furnish a Resident Project Representative to assist ENGINEER in providing more continuous observation of the Work. The responsibilities and authority and limitations thereon of any such Resident Project Representative and assistants will be as provided in paragraph 9.13 and in the Supplementary Conditions. 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 person will be as provided in the Supplementary Conditions.

Clarifications and Interpretations:

9.4. ENGINEER will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents (in the form of Drawings or otherwise) as ENGINEER may determine necessary, which shall be consistent with the intent of and reasonably inferable from Contract Documents. Such written clarifications and interpretations will be binding on OWNER and CONTRACTOR. If OWNER or CONTRACTOR believes that a written clarification or interpretation justifies an adjustment in the Contract Price or the Contract Times and the parties are unable to agree to the amount or extent thereof, if any, OWNER or CONTRACTOR may make a written claim therefore as provided in Article 11 or Article 12.

Authorized Variations in Work:

9.5. 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 the Contract Times and the parties are unable to agree as to the amount or extent thereof, OWNER or CONTRACTOR may make a written claim therefore as provided in Article 11 or 12.

Rejecting Defective Work:

9.6. ENGINEER will have authority to disapprove or 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 13.9, whether or not the Work is fabricated, installed or completed.

Shop Drawings, Change Orders and Payments:

9.7. In connection with ENGINEER's authority as to Shop Drawings and Samples, see paragraphs 6.24 through 6.28 inclusive.

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

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

Determinations for Unit Price:

9.10. 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 upon OWNER and CONTRACTOR, unless, within ten days after the date of any such decision, either OWNER or CONTRACTOR delivers to the other and to ENGINEER written notice of intention to appeal from ENGINEER's decision and: (i) an appeal from ENGINEER's decision is taken within the time limits and in accordance with the procedures set forth in Exhibit GC-A, "Dispute Resolution Agreement," entered into between OWNER and CONTRACTOR pursuant to Article 16, or (ii) if no such Dispute Resolution Agreement has been entered into, a formal proceeding is instituted by the appealing party in a forum of competent jurisdiction to exercise such rights or remedies as the appealing party may have with respect to ENGINEER's decision, unless otherwise agreed in writing by OWNER and CONTRACTOR. Such appeal will not be subject to the procedures of paragraph 9.11.

Decisions on Disputes:

9.11. ENGINEER will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. Claims, disputes and other matters relating to the acceptability of the Work or the interpretation of the requirements of the Contract Documents pertaining to the performance and furnishing of the Work and Claims under Articles 11 and 12 in respect of changes in the Contract Price or Contract Times will be referred initially to ENGINEER in writing with a request for a formal decision in accordance with this paragraph. Written notice of each such claim, dispute or other matter will be delivered by the claimant to ENGINEER and the other party to the Agreement promptly (but in no event later than thirty days) after the start of the occurrence or event giving rise thereto, and written supporting data will be submitted to ENGINEER and the other party within sixty days after the start of such occurrence or event unless ENGINEER allows an additional period of time for the submission of additional or more accurate data in support of such claim, dispute or other matter. The opposing party shall submit any response to ENGINEER and the claimant within thirty days after receipt of the claimant's last submittal (unless ENGINEER allows additional time). ENGINEER will render a formal decision in writing within thirty days after receipt of the opposing party's submittal, if any, in accordance with this paragraph. ENGINEER's written decision on such claim, dispute or other matter will be final and binding upon OWNER and CONTRACTOR unless: (i) an appeal from ENGINEER's decision is taken within the time limits and in accordance with the procedures set forth in EXHIBIT GC-A, "Dispute Resolution Agreement," entered into between OWNER and CONTRACTOR pursuant to Article 16, or (ii) if no such Dispute Resolution Agreement has been entered into, a written notice of intention to appeal from ENGINEER's written decision is delivered by OWNER or CONTRACTOR to the other and to ENGINEER within thirty days after the date of such decision and a formal proceeding is instituted by the appealing party in a forum of competent jurisdiction to exercise such rights or remedies as the appealing party may have with respect to such claim, dispute or other matter in accordance with applicable Laws and Regulations within sixty days of the date of such decision, unless otherwise agreed in writing by OWNER and CONTRACTOR.

9.12. When functioning as interpreter and judge under paragraphs 9.10 and 9.11, 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. The rendering of a decision by ENGINEER pursuant to paragraphs 9.10 or

9.11 with respect to any such claim, dispute or other matter (except any which have been waived by the making or acceptance of final payment as provided in paragraph 14.16) will be a condition precedent to any exercise by OWNER or CONTRACTOR of such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any such claim, dispute or other matter pursuant to Article 16.

9.13. Limitations on ENGINEER's Authority and Responsibilities:

9.13.1. 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 owed by ENGINEER to CONTRACTOR, any Subcontractor, any Supplier, any other person or organization, or to any surety for or employee or agent of any of them.

9.13.2. 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 furnishing or performance of the Work. ENGINEER will not be responsible for CONTRACTOR's failure to perform or furnish the Work in accordance with the Contract Documents.

9.13.3. ENGINEER will not be responsible for the acts or omissions of CONTRACTOR or of any Subcontractor, any Supplier, or of any other person or organization performing or furnishing any of the Work.

9.13.4. ENGINEER's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds and certificates of inspection, tests and approvals and Other documentation required to be delivered by paragraph 14.12 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.

9.13.5. The limitations upon authority and responsibility set forth in this paragraph 9.13 shall also apply to ENGINEER's Consultants, Resident Project Representative and assistants.

ARTICLE 10--CHANGES IN THE WORK

10.1. Without invalidating the Agreement and without notice to any surety, OWNER may, at any time or from time to time, order additions, deletions or revisions in the Work. Such additions, deletions or revisions will be authorized by a Written Amendment, 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).

10.2. If OWNER and CONTRACTOR are unable to agree as to the extent, if any, of an adjustment in the Contract Price or an adjustment of the Contract Times that should be allowed as a result of a Work Change Directive, a claim may be made therefore as provided in Article 11 or Article 12.

10.3. 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 and supplemented as provided in paragraphs 3.5 and 3.6 except in the case of any emergency as provided in paragraph 6.23 or in the case of uncovering Work as provided in paragraph 13.9.

10.4. OWNER and CONTRACTOR shall execute appropriate Change Orders recommended by ENGINEER (or Written Amendments) covering:

10.4.1. changes in the Work which are (i) ordered by OWNER pursuant to paragraph 10.1, (ii) required because of acceptance of *defective* Work under paragraph 13.13 or correcting *defective* Work under paragraph 13.14, or (iii) agreed to by the parties;

10.4.2. changes in the Contract Price or Contract Times which are agreed to by the parties; and

10.4.3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by ENGINEER pursuant to paragraph 9.11;

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 6.29.

10.5. If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times) is required by the provisions of any Bond to be given to a surety, the giving of any such notice will be CONTRACTOR's responsibility, and the amount of each applicable Bond will be adjusted accordingly.

ARTICLE 11--CHANGE OF CONTRACT PRICE

11.1. The Contract Price constitutes the total compensation (subject to authorized adjustments) payable to CONTRACTOR for performing the Work. All duties, responsibilities and obligations assigned to or undertaken by CONTRACTOR shall be at CONTRACTOR's expense without change in the Contract Price.

11.2. The Contract Price may only be changed by a Change Order or by a Written Amendment. Any claim for an adjustment in the Contract Price shall be based on written notice delivered by the party making the claim to the other party and to ENGINEER promptly (but in no event later than thirty days) after the start of the occurrence or event giving rise to the claim and stating the general nature of the claim. Notice of the amount of the claim with supporting data shall be delivered within sixty days after the start of such occurrence or event (unless ENGINEER allows additional time for claimant to submit additional or more accurate data in support of the claim) and shall be accompanied by claimant's written statement that the adjustment claimed covers all known amounts to which the claimant is entitled as a result of said occurrence or event. All claims for adjustment in the Contract Price shall be determined by ENGINEER in accordance with paragraph 9.11 if OWNER and CONTRACTOR cannot otherwise

agree on the amount involved. No claim for an adjustment in the Contract Price will be valid if not submitted in accordance with this paragraph 11.2.

11.3. 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:

11.3.1. 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 paragraphs 11.9.1 through 11.9.3, inclusive);

11.3.2. 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 11.6.2);

11.3.3. 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 11.3.2, on the basis of the Cost of the Work (determined as provided in paragraphs 11.4 and 11.5) plus a CONTRACTOR's fee for overhead and profit (determined as provided in paragraph 11.6).

Cost of the Work:

11.4. The term Cost of the Work means the sum of all costs necessarily incurred and paid by Contractor in the proper performance of the Work. Except as otherwise may be agreed to in writing by OWNER, such costs shall be in amount no higher than those prevailing in the locality of the Project, shall include only the following items and shall not include any of the costs itemized in paragraph 11.5:

11.4.1. Payroll costs for employees in the direct employ of CONTRACTOR in the performance of the Work under schedules of job classifications agreed upon by OWNER and CONTRACTOR. Such employees shall include without limitation superintendents, foremen and other personnel employed full-time at the site. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits which shall include social security contributions, unemployment, excise and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work after regular working hours, on Saturday, Sunday or legal holidays, shall be included in the above to the extent authorized by OWNER.

11.4.2. 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.

11.4.3. Payments made by CONTRACTOR to the Subcontractors for Work performed or furnished 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 accepted. 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 paragraphs 11.4, 11.5, 11.6 and 11.7. All subcontracts shall be subject to the other provisions of the Contract Documents insofar as applicable.

11.4.4. 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.

11.4.5. Supplemental costs including the following:

11.4.5.1. The proportion of necessary transportation, travel and subsistence expenses of CONTRACTOR's employees incurred in discharge of duties connected with the Work.

11.4.5.2. 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.

11.4.5.3. 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, installation, dismantling and removal thereof--all 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.

11.4.5.4. Sales, consumer, use or similar taxes related to the Work, and for which CONTRACTOR is liable, imposed by Laws and Regulations.

11.4.5.5. 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.

11.4.5.6. 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 and furnishing of the Work (except losses and damages within the deductible amounts of property insurance established by OWNER in accordance with paragraph 5.9), provided they 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. If, however, any such loss or damage requires reconstruction and CONTRACTOR is

placed in charge thereof, CONTRACTOR shall be paid for services a fee proportionate to that stated in paragraph 11.6.2.

11.4.5.7. The cost of utilities, fuel and sanitary facilities at the site.

11.4.5.8. Minor expenses such as telegrams, long distance telephone calls, telephone service at the site, expressage and similar petty cash items in connection with the Work.

11.4.5.9. Cost of premiums for additional Bonds and insurance required because of changes in the Work.

11.5. The term Cost of the Work shall not include any of the following:

11.5.1. Payroll costs and other compensation of CONTRACTOR's officers, executives, principals (of partnership and sole proprietorships), general 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 a branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in paragraph 11.4.1. or specifically covered by paragraph 11.4.4--all of which are to be considered administrative costs covered by the CONTRACTOR's fee.

11.5.2. Expenses of CONTRACTOR's principal and branch offices other than CONTRACTOR's office at the site.

11.5.3. Any part of CONTRACTOR's capital expenses, including interest on CONTRACTOR's capital employed for the Work and charges against CONTRACTOR for delinquent payments.

11.5.4. Cost of premiums for all Bonds and for all insurance whether or not CONTRACTOR is required by the Contract Documents to purchase and maintain the same (except for the cost of premiums covered by subparagraph 11.4.5.9 above).

11.5.5. 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.

Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in paragraph 11.4.

11.6. The CONTRACTOR's fee allowed to CONTRACTOR for overhead and profit shall be determined as follows:

11.6.1. a mutually acceptable fixed fee

11.7. Whenever the cost of any Work is to be determined pursuant to paragraphs 11.4 and 11.5, CONTRACTOR will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in form acceptable to ENGINEER an itemized cost breakdown together with supporting data.

Cash Allowance:

11.8. 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 furnished and performed for such sums as may be acceptable to OWNER and ENGINEER. CONTRACTOR agrees that:

11.8.1. the 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

11.8.2. CONTRACTOR's cost for unloading and handling on the site, labor, installation costs, overhead, profit and other expenses contemplated for the 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.

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.

11.9. ***Unit Price Work:***

11.9.1. 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 established unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement. 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 in accordance with paragraph 9.10.

11.9.2. 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.

11.9.3. OWNER or CONTRACTOR may make a claim for an adjustment in the Contract Price in accordance with Article 11 if:

11.9.3.1. 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

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

11.9.3.3. if 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 TIMES

12.1. The Contract Times (or Milestones) may only be changed by a Change Order or a Written Amendment. Any claim for an adjustment of the Contract Times (or Milestones) shall be based on written notice delivered by the party making the claim to the other party and to ENGINEER promptly (but in no event later than thirty days) after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the extent of the claim with supporting data shall be delivered within sixty days after such occurrence (unless ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by the claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant has reason to believe it is entitled as a result of the occurrence of said event. All claims for adjustment in the Contract Times (or Milestones) shall be determined by ENGINEER in accordance with paragraph 9.11 if OWNER and CONTRACTOR cannot otherwise agree. No claim for an adjustment in the Contract Times (or Milestones) will be valid if not submitted in accordance with the requirements of this paragraph 12.1.

12.2. All time limits stated in the Contract Documents are of the essence of the Agreement.

12.3. Where CONTRACTOR is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay beyond the control of CONTRACTOR, the Contract Times (or Milestones) will be extended in an amount equal to the time lost due to such delay if a claim is made therefore as provided in paragraph 12.1. 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. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of CONTRACTOR.

12.4. Where CONTRACTOR is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay beyond the control of both OWNER and CONTRACTOR, an extension of the Contract Times (or Milestones) in an amount equal to the time lost due to such delay shall be CONTRACTOR's sole and exclusive remedy for such delay. In no event shall OWNER be liable to CONTRACTOR, any Subcontractor, any Supplier, any other person or organization, or to any surety for or employee or agent of any of them, for damages arising out of or resulting from (i) delays caused by or within the control of CONTRACTOR, or (ii) delays beyond the control of both parties including but not limited to fires, floods, epidemics, abnormal weather conditions, acts of God or acts or neglect by utility owners or other contractors performing other work as contemplated by Article 7.

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

13.1. *Notice of Defects*: Prompt notice of all *defective* Work of which OWNER or ENGINEER have actual knowledge will be given to CONTRACTOR. All *defective* Work may be rejected, corrected or accepted as provided in this Article 13.

Access to Work:

13.2. OWNER, ENGINEER, ENGINEER's Consultants, other representatives and personnel of OWNER, independent testing laboratories and governmental agencies with jurisdiction interests will have access to the Work at reasonable times for their observation, inspecting and testing. CONTRACTOR shall provide them proper and safe conditions for such access and advise them of CONTRACTOR's site safety procedures and programs so that they may comply therewith as applicable.

Tests and Inspections:

13.3. 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.

13.4. 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:

13.4.1. for inspections, tests or approvals covered by paragraph 13.5 below;

13.4.2. that costs incurred in connection with tests or inspections conducted pursuant to paragraph 13.9 below shall be paid as provided in said paragraph 13.9; and

13.4.3. as otherwise specifically provided in the Contract Documents.

13.5. 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. CONTRACTOR shall also 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 of materials, mix designs, or equipment submitted for approval prior to CONTRACTOR's purchase thereof for incorporation in the Work.

13.6. If any Work (or the work of others) that is to be inspected, tested or approved is covered by CONTRACTOR without written concurrence of ENGINEER, it must, if requested by ENGINEER, be uncovered for observation.

13.7. Uncovering Work as provided in paragraph 13.6 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.

Uncovering Work:

13.8. 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.

13.9. 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. If it is found that such Work is *defective*, CONTRACTOR shall pay all claims, costs, losses and damages caused by, arising out of or resulting from 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, and, if the parties are unable to agree as to the amount thereof, may make a claim therefore as provided in Article 11. If, however, such 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 Milestones), or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement and reconstruction; and, if the parties are unable to agree as to the amount or extent thereof, CONTRACTOR may make a claim therefore as provided in Articles 11 and 12.

OWNER May Stop the Work:

13.10. If the Work is *defective*, or CONTRACTOR fails to supply sufficient skilled workers or suitable materials or equipment, or fails to furnish or 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 or any surety or other party.

Correction or Removal of Defective Work:

13.11. If required by ENGINEER, CONTRACTOR shall promptly, as directed, either correct all *defective* Work, whether or not fabricated, installed or completed, or, if the Work has been rejected by ENGINEER, remove it from the site and replace it with Work that is not *defective*. CONTRACTOR shall pay all claims, costs, losses and damages caused by or resulting from such correction or removal (including but not limited to all costs of repair or replacement of work of others).

13.12. ***Correction Period:***

13.12.1. If within one year after the date of Substantial Completion or such longer period of time as may be prescribed by Laws or Regulations or 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*, CONTRACTOR shall promptly, without cost to OWNER and in accordance with OWNER's written instructions: (i) correct such *defective* Work, or, if it has been rejected by OWNER, remove it from the site and replace it with Work that is not *defective*, and (ii) satisfactorily correct or remove and replace any damage to other Work or the work of others resulting there from. If CONTRACTOR does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, OWNER may have the *defective* Work corrected or the rejected Work removed and replaced, and all claims, costs, losses and damages caused by or resulting from such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by CONTRACTOR.

13.12.2. 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 or by Written Amendment.

13.12.3. Where *defective* Work (and damage to other Work resulting there from) has been corrected, removed or replaced under this paragraph 13.12, 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.

Acceptance of Defective Work:

13.13. If, instead of requiring correction or removal and replacement of *defective* Work OWNER (and, prior to ENGINEER's recommendation of final payment, also ENGINEER) prefers to accept it, OWNER may do so. CONTRACTOR shall pay all claims, costs, losses and damages attributable to OWNER's evaluation of and determination to accept such *defective* Work (such costs to be approved by ENGINEER as to reasonableness). 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, and, if the parties are unable to agree as to the amount thereof, OWNER may make a claim therefore as provided in Article 11. If the acceptance occurs after such recommendation, an appropriate amount will be paid by CONTRACTOR to OWNER.

OWNER May Correct Defective Work:

13.14. 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 13.11, of 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 and remedy any such deficiency. In exercising the rights and remedies under this paragraph OWNER shall proceed expeditiously. In connection with such corrective and 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. All claims, costs, losses and damages incurred or sustained by OWNER in exercising such rights and remedies 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, and, if the parties are unable to agree as to the amount thereof, OWNER may make a claim therefore as provided in Article 11. 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. CONTRACTOR shall not be allowed an extension of the Contract Times (or Milestones) because of any delay in the performance of the Work attributable to the exercise by OWNER of OWNER's rights and remedies hereunder.

ARTICLE 14--PAYMENTS TO CONTRACTOR AND COMPLETION

Schedule of Values:

14.1. The schedule of values established as provided in paragraph 2.9 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.

Application for Progress Payment

14.2. At least twenty days before the date established 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 and other arrangements to protect OWNER's interest therein, all of which will be satisfactory to OWNER. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

CONTRACTOR's Warranty of Title:

14.3. 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.

Review of Applications for Progress Payment:

14.5. ENGINEER's recommendation of any payment requested in an Application for Payment will constitute a representation by ENGINEER to OWNER, based on ENGINEER's on-site 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:

14.5.1. the Work has progressed to the point indicated.

14.5.2. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under paragraph 9.10, and to any other qualifications stated in the recommendation), and

14.5.3. 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.

However, by recommending any such payment ENGINEER will not thereby be deemed to have represented that: (i) exhaustive or continuous on-site inspections have been made to check the quality or the quantity of the Work beyond the responsibilities specifically assigned to ENGINEER in the Contract Documents or (ii) that there may not be other matters or issues between the parties that might entitle CONTRACTOR to be paid additionally by OWNER or entitle OWNER to withhold payment to CONTRACTOR.

14.6. ENGINEER's recommendation of any payment, including final payment, shall not mean that ENGINEER is 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 furnishing or performance of Work, or for any failure of CONTRACTOR to perform or furnish Work in accordance with the Contract Documents.

14.7. 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 referred to in paragraph 14.5. ENGINEER may also refuse to recommend any such payment, or, because of subsequently discovered evidence or the results of subsequent inspections or tests, nullify any such payment previously recommended, to such extent as may be necessary in ENGINEER's opinion to protect OWNER from loss because:

14.7.1. the Work is *defective*, or completed Work has been damaged requiring correction or replacement,

14.7.2. the Contract Price has been reduced by Written Amendment or Change Order,

14.7.3. OWNER has been required to correct *defective* Work or complete Work in accordance with paragraph 13.14, or

14.7.4. ENGINEER has actual knowledge of the occurrence of any of the events enumerated in paragraphs 15.2.1 through 15.2.4 inclusive.

OWNER may refuse to make payment of the full amount recommended by ENGINEER because:

14.7.5. claims have been made against OWNER on account of CONTRACTOR's performance or furnishing of the Work,

14.7.6. 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.

14.7.7. there are other items entitling OWNER to a set-off against the amount recommended, or

14.7.8. OWNER has actual knowledge of the occurrence of any of the events enumerated in paragraphs 14.71. through 14.7.3 or paragraphs 15.2.1 through 15.2.4 inclusive;

but OWNER must have CONTRACTOR immediate written notice (with a copy to ENGINEER) stating the reasons for such action and promptly pay CONTRACTOR the amount so withheld, or any adjustment thereto agreed to by OWNER and CONTRACTOR, when CONTRACTOR corrects to OWNER's satisfaction the reasons for such action.

Substantial Completion:

14.8. When CONTRACTOR considers the entire Work ready for its intended use CONTRACTOR shall notify OWNER and ENGINEER in writing that the entire Work is substantially complete (except for items specifically listed by CONTRACTOR as incomplete) and request that ENGINEER issue a certificate of Substantial Completion. Within a reasonable time thereafter, OWNER, CONTRACTOR and ENGINEER shall make an inspection of the Work to determine the status of completion. If ENGINEER does not consider the Work substantially complete, ENGINEER will notify CONTRACTOR in writing giving the reasons therefore. If ENGINEER considers the Work substantially complete, ENGINEER will prepare and 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 fourteen days after submission of the tentative certificate to OWNER notify CONTRACTOR in writing, stating the reasons therefore. If, after consideration of OWNER's objections, ENGINEER considers the Work substantially complete, ENGINEER will within said fourteen 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. 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, 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.

14.9. OWNER shall have the right to exclude CONTRACTOR from the Work after the date of Substantial Completion, but OWNER shall allow CONTRACTOR reasonable access to complete or correct items on the tentative list.

Partial Utilization:

14.10. Use by OWNER at OWNER's option of any substantially completed part of the Work which: (i) has specifically been identified in the Contract Documents, or (ii) 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, may be accomplished prior to Substantial Completion of all the Work subject to the following:

14.10.1. OWNER at any time may request CONTRACTOR in writing to permit OWNER to use any such part of the Work which OWNER believes to be ready for its intended use and substantially complete. If CONTRACTOR agrees that such part of the Work is substantially complete, CONTRACTOR will certify to OWNER and ENGINEER that such part of the Work is substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. 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. 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 therefore. If ENGINEER considers that part of the Work to be substantially complete, the provisions of paragraphs 14.8 and 14.9 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.

14.10.2. No occupancy or separate operation of part of the Work will be accomplished prior to compliance with the requirements of paragraph 5.15 in respect of property insurance.

Final Inspection:

14.11. Upon written notice from CONTRACTOR that the entire Work or an agreed portion thereof is complete, ENGINEER will 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.

Final Application for Payment:

14.12. After CONTRACTOR has completed all such corrections to the satisfaction of ENGINEER and delivered in accordance with the Contract Documents all maintenance and operating instructions, schedules, guarantees, Bonds, certificates or other evidence of insurance required by paragraph 5.4, certificates of inspection, marked-up record documents (as provided in paragraph 6.19) and other documents, CONTRACTOR may make application for final payment following the procedure for progress payments. The final Application for Payment shall be accompanied (except as previously delivered) by: (i) all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by subparagraph 5.4.13, (ii) consent of the surety, if any, to final payment, and (iii) complete and legally effective releases or waivers (satisfactory to OWNER) of all Liens arising out of or filed in connection with the Work. In lieu of such releases or waivers of Liens and as approved by OWNER, CONTRACTOR may furnish receipts or releases in full and an affidavit of CONTRACTOR that: (i) the releases and receipts include all labor, services, material and equipment for which a Lien could be filed, and (ii) all payrolls, material and equipment bills and other indebtedness connected with the Work for which OWNER or OWNER's property might in any way be responsible have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, CONTRACTOR may furnish a Bond or other collateral satisfactory to OWNER to indemnify OWNER against any Lien.

Final Payment and Acceptance:

14.13. 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 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 14.15. Otherwise, ENGINEER will return the Application to CONTRACTOR, indicating in writing the reasons for refusing to recommend final payment, in which case CONTRACTOR shall make the necessary corrections and resubmit the Application.

14.14. 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 and recommendation of ENGINEER, and without terminating the Agreement, 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 5.1, 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.

Waiver of Claims:

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

14.15.1. 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 14.11, 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

14.15.2. a waiver of all claims by CONTRACTOR against OWNER other than those previously made in writing and still unsettled.

ARTICLE 15--SUSPENSION OF WORK AND TERMINATION

OWNER May Suspend Work:

15.1. At any time and without cause, OWNER may suspend the Work, or any portion thereof for a period of not more than ninety 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 allowed an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if CONTRACTOR makes an approved claim therefore as provided in Articles 11 and 12.

OWNER May Terminate:

15.2. Upon the occurrence of any one or more of the following events:

15.2.1. if CONTRACTOR persistently fails 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 2.9 as adjusted from time to time pursuant to paragraph 6.6);

15.2.2. if CONTRACTOR disregards Laws or Regulations of any public body having jurisdiction;

15.2.3. if CONTRACTOR disregards the authority of ENGINEER; or

15.2.4. if CONTRACTOR otherwise violates in any substantial way any provisions of the Contract Documents;

OWNER may, after giving CONTRACTOR (and the surety, if any,) seven days' written notice and to the extent permitted by Laws and Regulations, terminate the services of CONTRACTOR, 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), 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 finish the Work as OWNER may deem expedient. In such case CONTRACTOR shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds all claims, costs, losses and damages sustained by OWNER arising out of or resulting from 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, provided that when exercising any rights or remedies under this paragraph OWNER shall not be required to obtain the lowest price for the Work performed.

15.3. 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 monies due CONTRACTOR by OWNER will not release CONTRACTOR from liability.

15.4. Upon seven day's written notice to CONTRACTOR and ENGINEER, OWNER may, without cause and without prejudice to any other right or remedy of OWNER, elect to terminate the Agreement. In such case, CONTRACTOR shall be paid (without duplication of any items);

15.4.1. for 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;

15.4.2. for 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;

15.4.3. for all claims, costs, losses and damages incurred in settlement of terminated contracts with Subcontractors, Suppliers and others; and

15.4.4. for reasonable expenses directly attributable to termination.

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.

CONTRACTOR May Stop Work or Terminate:

15.5. If, through no act or fault of CONTRACTOR, the Work is suspended for a period of more than ninety days by OWNER or under an order of court or other public authority, or ENGINEER fails to act on any Application of Payment within thirty days after it is submitted or OWNER fails for thirty 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 and ENGINEER do not remedy such suspension or failure within that time, terminate the Agreement and recover from OWNER payment on the same terms as provided in paragraph 15.4. In lieu of terminating the Agreement and without prejudice to any other right or remedy, if ENGINEER has failed to act on an Application for Payment within thirty days after it is submitted, or OWNER has failed for thirty days to pay CONTRACTOR any sum finally determined to be due, CONTRACTOR may upon seven day's written notice to OWNER and ENGINEER stop the Work until payment of all such amount due CONTRACTOR, including interest thereon. The provisions of this paragraph 15.5 are not intended to preclude CONTRACTOR from making claim under Articles 11 and 12 for an increase in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to CONTRACTOR's stopping Work as permitted by this paragraph.

ARTICLE 16--DISPUTE RESOLUTION

If and to the extent that OWNER and CONTRACTOR have agreed on the method and procedure for resolving disputes between them that may arise under this Agreement, such dispute resolution method and procedure, if any, shall be as set forth in Exhibit GC-A, "Dispute Resolution Agreement," to be attached hereto and made a part hereof. If no such agreement on the method and procedure for resolving such disputes has been reached, and subject to the provisions of paragraphs 9.10, 9.11, and 9.12, OWNER and CONTRACTOR may exercise such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any dispute.

ARTICLE 17--MISCELLANEOUS

Giving Notice:

17.1. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if 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 if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

Computation of Times:

17.2.1. 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.

17.2.2. A calendar day of twenty-four hours measured from midnight to the next midnight will constitute a day.

Notice of Claim:

17.3. Should OWNER or CONTRACTOR suffer injury or damage to person or property because of any error, omission or act of the other party or of any of the other party's employees or agents or others for whose acts the other party is legally liable, claim will be made in writing to the other party within a reasonable time of the first observance of such injury or damage. The provisions of this paragraph 17.3 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitations or repose.

Cumulative Remedies:

17.4. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto, and, in particular but without limitation, the warranties, guarantees and obligations imposed upon CONTRACTOR by paragraphs 6.12, 6.16, 6.30, 6.31, 6.32, 13.1, 13.12, 13.14, 14.3 and 15.2 and all of the rights and remedies available to OWNER and ENGINEER thereunder, 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, and 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.

Professional Fees and Court Costs Included:

17.5. Whenever reference is made to "claims, costs, losses and damages," it shall include in each case, but not be limited to, all fees and charges of engineers, architects, attorneys and other professionals and all court or arbitration or other dispute resolution costs.

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1. ENUMERATION OF PLANS, SPECIFICATIONS AND ADDENDA

Following are the Plans, Specifications and Addenda which form a part of this contract, as set forth in Paragraph 1 of the General Conditions, "Contract and Contract Documents":

DRAWINGS

General Construction:	Nos. _____
Heating and Ventilating:	" _____
Plumbing:	" _____
Electrical:	" _____
_____	" _____
_____	" _____

SPECIFICATIONS:

General Construction	Page _____ to _____, incl.
	Page _____ to _____, incl.
Heating and Ventilating:	Page _____ to _____, incl.
Plumbing:	Page _____ to _____, incl.
Electrical:	Page _____ to _____, incl.
_____	Page _____ to _____, incl.
_____	Page _____ to _____, incl.

ADDENDA:

No.	_____	Date	_____	No.	_____	Date	_____
No.	_____	Date	_____	No.	_____	Date	_____

2. STATED ALLOWANCES

Pursuant to Article 11.8 of the General Conditions, the Contractor shall include the following cash allowances in his proposal:

(a) For _____ (Page _____ of Specifications) $

(b) For _____ (Page _____ of Specifications) $

(c) For _____ (Page _____ of Specifications) $

(d) For _____ (Page _____ of Specifications) $

(e) For _____ (Page _____ of Specifications) $

(f) For _____ (Page _____ of Specifications) $ _____

3. A. Payments to Contractor

1. To insure the proper performance of this contract, the Owner shall retain five percent (5%) of the amount of each estimate until final completion and acceptance of all work covered by this contract: Provided that the Contractor shall submit his estimate not later than the first day of the month: Provided further that on completion and acceptance of each separate building, public work, or other division of the contract, on which the price is stated separately in the contract, payment may be made in full, including retained percentages thereon, less authorized deductions.

2. In preparing estimates the material delivered on the site and preparatory work done may be taken into consideration.

3. All material and work covered by partial payments made shall thereupon become the sole property of the Owner, but this provision shall not be construed as relieving the Contractor from the sole responsibility for the care and protection of materials and work upon which payments have been made or the restoration of any damaged work, or as a waiver of the right of the Owner to require the fulfillment of all of the terms of the contract.

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

B. Payments by Contractor

The Contractor shall pay (a) for all transportation and utility services not later than the 20th day of the calendar month following that in which services are rendered, (b) for all materials, tools, and other expendable equipment to the extent of ninety percent (90%) of the cost thereof, not later than the 20th day of the calendar month following that in which such materials, tools, and equipment are delivered at the site of the project, and the balance of the cost thereof, not later than the 30th day following the completion of that part of the work in or on which such materials, tools, and equipment are incorporated or used, and (c) to each of his subcontractors, not later than the 5th day following each payment to the Contractor, the respective amounts allowed the Contractor on account of the work performed by his subcontractors to the extent of each subcontractor's interest therein.

C. Time for Completion and Liquidated Damages

It is hereby understood and mutually agreed, by and between the Contractor and the Owner, that the date of beginning and the time for completion as specified in the contract of the work to be done hereunder are ESSENTIAL CONDITIONS of this contract; and it is further mutually understood and agreed that the work embraced in this contract shall be commenced on a date to be specified in the "Notice to Proceed".

The Contractor agrees that said work shall be prosecuted regularly, diligently, and uninterruptedly at such rate of progress as will insure full completion thereof within the time specified. It is expressly understood and agreed, by and between the Contractor and the Owner, that the time for the completion of the work described herein is a reasonable time for the completion of the same, taking into consideration the average climatic range and usual industrial conditions prevailing in this locality.

If the said Contractor shall neglect, fail or refuse to complete the work within the time herein specified, or any proper extension thereof granted by the Owner, then the Contractor does hereby agree, as a part consideration for the awarding of this contract, to pay to the Owner the amount specified in the contract, not as a penalty but as liquidated damages for such breach of contract as hereinafter set forth, for each and every calendar day that the Contractor shall be in default after the time stipulated in the contract for completing the work.

The said amount is fixed and agreed upon by and between the Contractor and the Owner because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the Owner would in such event sustain, and said amount is agreed to be the amount of damages which the Owner would sustain and said amount shall be retained from time to time by the Owner from current periodical estimates.

It is further agreed that time is of the essence of each and every portion of this contract and of the specifications wherein a definite and certain length of time is fixed for the performance of any act whatsoever; and where under the contract an additional time is allowed for the completion of any work, the new time limit fixed by such extension shall be of the essence of this contract. Provided that the Contractor shall not be charged with liquidated damages or any excess cost when the Owner determines that the Contractor is without fault and the Contractor's reasons for the time extension are acceptable to the Owner; Provided further that the Contractor shall not to be charged with liquidated damages or any excess cost when the delay in completion of the work is due:

(a) To any preference, priority or allocation order duly issued by the Government.

(b) To unforeseeable cause beyond the control and without the fault or negligence of the Contractor, including, but not restricted to, acts of God, or of the public enemy, acts of the Owner, acts of another Contractor in the performance of a contract with the Owner, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and severe weather; and

(c) To any delays of Subcontractors or suppliers occasioned by any of the causes specified in subsections (a) and (b) of this article:

Provided further that the Contractor shall, within ten (10) days from the beginning of such delay, unless the Owner shall grant a further period of time prior to the date of final settlement of the contract, notify the Owner, in writing, of the delay and notify the Contractor within a reasonable time of its decision in the matter.

D. Protection of Lives and Health

"The Contractor shall exercise proper precaution at all times for the protection of persons and property and shall be responsible for all damages to persons or property, either on or off the site, which occur as a result of his prosecution of the work. The safety provisions of applicable laws and building and construction codes, in addition to specific safety and health regulations described by Chapter XIII, Bureau of Labor Standards, Department of Labor, Part 1518, Safety and Health Regulations for Construction, as outlined in the Federal Register, Volume 36, No. 75, Saturday, April 17, 1971. Title 29 - LABOR, shall be observed and the Contractor shall take or cause to be taken, such additional safety and health measures as the Contracting Authority may determine to be reasonably necessary."

E. Subcontracts

The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5 (a)(1) through (10) and such other clauses as the (Department of Housing and Urban Development) may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

F. Interest of Member of or Delegate to Congress

No member of or Delegate to Congress, or Resident Commissioner, shall be admitted to any share or part of this contract or to any benefit that may arise there from, but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

G. Other Prohibited Interests

No official of the Owner who is authorized in such capacity and on behalf of the Owner to negotiate, make, accept or approve, or to take part in negotiating, making, accepting, or approving any architectural, engineering, inspection, construction or material supply contract or any subcontract in connection with the construction of the project, shall become directly or indirectly interested personally in this contract or in any part hereof. No officer, employee, architect, attorney, engineer or inspector of or for the Owner who is authorized in such capacity and on behalf of the Owner to exercise any legislative, executive, supervisory or other similar functions in connection with the construction of the project, shall become directly or indirectly interested personally in this contract or in any part thereof, any material supply contract, subcontract, insurance contract, or any other contract pertaining to the project.

H. Use and Occupancy Prior to Acceptance by Owner

The Contractor agrees to the use and occupancy of a portion or unit of the project before formal acceptance by the Owner, provided the Owner:

(a) Secures written consent of the Contractor except in the event, in the opinion of the Architect/Engineer, the Contractor is chargeable with unwarranted delay in final clean-up of punch list items or other contract requirements.

(b) Secures endorsement from the insurance carrier and consent of the surety permitting occupancy of the building or use of the project during the remaining period of construction, or,

(c) When the project consists of more than one building, and one of the buildings is occupied, secures permanent fire and extended coverage insurance, including a permit to complete construction. Consent of the surety must also be obtained.

I. Photographs of the Project

If required by the Owner, the Contractor shall furnish photographs of the project, in the quantities and as described in the Supplemental General Conditions.

J. Suspension of Work

Should the Owner be prevented or enjoined from proceeding with work either before or after the start of construction by reason of any litigation or other reason beyond the control of the Owner, the Contractor shall not be entitled to make or assert claim for damage by reason of said delay; but time for completion of the work will be extended to such reasonable time as the Owner may determine will compensate for time lost by such delay with such determination to be set forth in writing.

4. FEDERAL LABOR STANDARDS PROVISIONS

Applicability

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

A. 1. (i) Minimum Wages

All laborers and mechanics employed or working upon the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less than often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period.

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

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

(1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(b) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and HUD or its designee agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by HUD or its designee to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

(c) In the event the contractor, the laborers or mechanics to be employed in the classification or their representative, and HUD or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), HUD or its designee shall refer the questions, including the views of all interested parties and the recommendation of HUD or its designee, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

(d) The wage rate (including the fringe benefits where appropriate) determined pursuant to subparagraphs (1)(b) or (c) of this paragraph, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third persons, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, provided, that the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

2. Withholding

HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices and trainees, employed by the contractor or any subcontractor the full amount of wages required by the contract.
In the event of failure to pay any laborer or mechanic, including any apprentice or trainee, employed or working on the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), all or part of the wages required by the contract, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased. HUD or its designee may, after written notice to the contractor, disburse such amounts withheld for and on account of the contractor or subcontractor to the respective employees to whom they are due. The Comptroller General shall make sure disbursements in the case of direct Davis-Bacon Act contracts.

3. (i) Payrolls and basic records.

Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work (or under the United States Housing Act of 1937, or under the Housing Act of 1949, in the construction or development of the project). Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in Section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5 (a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1 (b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs. (Approved by the Office of Management and Budget under OMB Control Numbers 1215-0140 and 1215-0017.)

(ii)(a) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant, sponsor, or owner, as the case may be, for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR Part 5.5(a)(3)(i). This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal Stock Number 029-005-00014-1), U.S. Government Printing Office, Washington, D.C. 20402. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. (Approved by the Office of Management and Budget under OMB Control Number 1215-0149).

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

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

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

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

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

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

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

4. (i) Apprentices.

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered
program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe

benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Bureau of Apprenticeship and Training, or a State Apprenticeship Agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees.

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal employment opportunity.

The utilization of apprentices, trainees and journeyman under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

5. Compliance with Copeland Act requirements.

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

6. Subcontracts.

   The contractor or subcontractor will insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as HUD or its designee may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR Part 5.5

7. Contract termination; debarment.

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

8. Compliance with Davis-Bacon and Related Act Requirements.

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

9. Disputes concerning labor standards.

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

10. Certification of Eligibility.

    (i) By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.
    (ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.
    (iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001. Additionally, U.S. Criminal Code, Section 1010, Title 18, U.S.C., "Federal Housing Administration transactions", provides in part "Whoever, for the purpose of ...influencing in any way the action of such Administration ...makes, utters or publishes any statement, knowing the same to be false ...shall be fined not more than $5,000 or imprisoned not more than two years, or both."

11. Complaints, Proceedings, or Testimony by Employees.

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

B. Contract Work Hours and Safety Standards Act

As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.

1. Overtime requirements.

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

2. Violation; liability for unpaid wages, liquidated damages.

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

3. Withholding for unpaid wages and liquidated damages.

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

4. Subcontracts.

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

C. Health and Safety

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

2. The contractor shall comply with all regulations issued by the Secretary of Labor pursuant to Title 29 Part 1926 (formerly part 1518) and failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act (Public Law 91-54, 83 Stat. 96).

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

5. SPECIAL HAZARDS

The Contractor's and his Subcontractor's Public Liability and Property Damage Insurance shall provide adequate protection against the following special hazards:

6. CONTRACTOR'S AND SUBCONTRACTOR'S PUBLIC LIABILITY, VEHICLE LIABILITY, AND PROPERTY DAMAGE INSURANCE

As required under Article 5 of the General Conditions, the Contractor's Public Liability Insurance and Vehicle Liability Insurance shall be in an amount not less than $_____for injuries, including accidental death, to any one person, and subject to the same limit for each person, in an amount not less than $_____on account of one accident, and Contractor's Property Damage Insurance in an amount not less than $_____.

The Contractor shall either (1) require each of his subcontractors to procure and to maintain during the life of his subcontract, Subcontractor's Public Liability and Property Damage Insurance of this type and in the same amounts as specified in the preceding paragraph, or (2) insure the activities of his subcontractors in his own policy.

7. PHOTOGRAPHS OF PROJECT

As provided in Paragraph 3.I of the Supplemental General Conditions, the Contractor will furnish photographs in the number, type, and stage as enumerated below:

8. SCHEDULE OF OCCUPATIONAL CLASSIFICATIONS AND MINIMUM HOURLY WAGE RATES AS REQUIRED UNDER PARAGRAPH 4.B OF THE SUPPLEMENTAL GENERAL CONDITIONS

Given on Pages _____, _____and _____.

9. BUILDER'S RISK INSURANCE

As provided in the General Conditions, Article 5.6, the Contractor will/will not** maintain Builder's Risk Insurance (fire and extended coverage) on a 100 percent completed value basis on the insurable portions of the project for the benefit of the Owner, the Contractor, and all Subcontractors, as their interests may appear.

_____

** Strike out one.

10. SPECIAL EQUAL OPPORTUNITY PROVISIONS

A. Activities and Contracts Not Subject to Executive Order 11246, as Amended

(Applicable to Federally assisted construction contracts and related subcontracts $10,000 and under.)

During the performance of this contract, the Contractor agrees as follows:

1. The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Contractor shall take affirmative action to ensure that applicants for employment are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship.

2. The Contractor shall post in conspicuous places, available to employees and applicants for employment, notices to be provided by Contracting Officer setting forth the provisions of this nondiscrimination clause. The Contractor shall state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

3. Contractors shall incorporate foregoing requirements in all subcontracts.

B. Executive Order 11246 (contracts/subcontracts above $10,000)

1. Section 202 Equal Opportunity Clause

During the performance of this contract, the Contractor agrees as follows:

a. The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment, or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

b. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration without regard to race, color, religion, sex, or national origin.

c. The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding a notice to be provided by the Contract Compliance Officer advising the said labor union or workers' representatives of the Contractor's commitment under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

d. The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

e. The Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the Department of the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and others.

f. In the event of the Contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be cancelled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

g. The Contractor will include the provisions of the sentence immediately preceding paragraph a. and the provisions of paragraphs a. through g. in every subcontract or purchase order unless exempted by rules, regulations, orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the Department may direct as a means of enforcing such provisions, including sanctions for non-compliance. Provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the Department, the Contractor may request the United States to enter into such litigation to protect the interest of the United States.

2. Notice of Requirement for Affirmative Action to ensure Equal Employment Opportunity (Executive Order 11246). (Applicable to contracts/subcontracts exceeding $10,000.)

a. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.

b. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

Goals for minority participation	Goals for female participation
Insert Goals	Insert Goals

NOTE: THESE GOALS MUST BE PROVIDED. Also, list State Geographic Area to be covered on following page.

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or Federally assisted) performed in the covered area. If the Contractor performs construction work in a geographic area located outside of the covered area, it shall apply the goals established for such geographic area where the work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both its Federally involved and non-Federally involved construction.

The contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts to meet the goals established for the geographical area where the contract resulting from this solicitation is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order, and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

c. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction subcontract in excess of $10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address, and telephone number of the subcontractor; employer identification number; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the contract is to be performed.

d. As used in this Notice, and in the contract resulting from this solicitation, the "covered area" is _____ _____.

3. Standard Federal Equal Employment Opportunity Construction Contract Specifications (Executive Order 11246)

a. As used in these specifications:

(1) "Covered area" means the geographical area described in the solicitation from which this contract resulted;

(2) "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;

(3) "Employer identification number" means the federal social security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941;

(4) "Minority" includes:

(a) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);

(b) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South America or other Spanish Culture or origin, regardless of race);

(c) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands);

(d) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

b. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of $10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

c. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

d. The Contractor shall implement the specific affirmative action standards provided in paragraphs g.(1) through (16) of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered construction contractors performing contracts in geographical areas where they do not have a Federal or Federally-assisted construction contract shall apply the minority and female goals established for the geographic area where the contract is being performed. Goals are published periodically in the Federal Register in notice form and such notices may be obtained from any Office of Federal Contract Compliance Programs office or from Federal procurement contracting officers. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

e. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.

f. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

g. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

(1) Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

(2) Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its union have employment opportunities available, and maintain a record of the organization's responses.

(3) Maintain a current file of the names, addresses, and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source, or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefore, along with whatever additional actions the Contractor may have taken.

(4) Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

(5) Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under g.(2) above.

(6) Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company's EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

(7) Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination, or other employment decisions including specific review of these items with on-site supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

(8) Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.

(9) Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date of the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

(10) Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer, and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work force.

(11) Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR part 60-3.

(12) Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

(13) Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

(14) Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

(15) Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

(16) Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

h. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations g.(1) through (16). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the Contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under g.(1) through (16) of these Specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation shall not be a defense for the Contractor's non-compliance.

i. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).

j. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

k. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

l. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

m. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph g. of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

n. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company's EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee, the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number where assigned, social security number, race, sex, status (e.g., mechanic, apprentice trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and location at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractor shall not be required to maintain separate records.

o. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

C. Certification of Nonsegregated Facilities (Over $10,000)

By the submission of this bid, the bidder, offeror, applicant or subcontractor certifies that he/she does not maintain or provide for his/her employees any segregated facility at any of his/her establishments, and that he/she does not permit employees to perform their services at any location, under his/her control, where segregated facilities are maintained. He/She certifies further that he/she will not maintain or provide for employees any segregated facilities at any of his/her establishments, and he/she will not permit employees to perform their services at any location under his/her control where segregated facilities are maintained. The bidder, offeror, applicant or subcontractor agrees that a breach of this certification is a violation of the Equal Opportunity Clause of this contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms, and other storage or dressing areas, ***transportation and housing facilities provided for employees which are segregated on the basis of race, color, religion, or are in fact segregated on the basis of race, color, religion, or otherwise. He/She further agrees that (except where he/she has obtained identical certifications from proposed subcontractors for specific time periods) he/she will obtain identical certification from proposed subcontractors prior to the award of subcontracts exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity Clause; that he/she will retain such certifications in his/her files; and that he/she will forward the following notice to such proposed subcontractors (except where proposed subcontractors have submitted identical certifications for specific time periods).

D. Civil Rights Act of 1964

Under Title VI of the Civil Rights Act of 1964, no person shall, on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance.

E. Section 109 of the Housing and Community Development Act of 1974

No person in the United States shall on the grounds of race, color, national origin, or sex be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity funded in whole or in part with funds made available under this title.

F. "The Section 3 Clause"

1. The work to be performed under this contract is on a project assisted under a program providing direct Federal financial assistance from the Department of Housing and Urban Development and is subject to the requirements of section 3 of the Housing Urban Development Act of 1968, as amended, 12 U.S.C. 1701u. Section 3 requires that to the greatest extent feasible, opportunities for training and employment be given to lower income residents of the area of the Section 3 covered project, and contracts for work in connection with the project be awarded to business concerns which are located in, or owned in substantial part by persons residing in the area of the Section 3 covered project.

2. The parties to this contract will comply with the provisions of said Section 3 and the regulations issued pursuant thereto by the Secretary of Housing and Urban Development set forth in 24 Part CFR 135, and all applicable rules and orders of the Department issued thereunder prior to the execution of this contract. The parties to this contract certify and agree that they are under no contractual or other disability which would prevent them from complying with these requirements.

3. The contractor will send to each labor organization or representative of workers with which he has a collective bargaining agreement or other contract or understanding, if any, a notice advising the said labor organization or workers' representative of his commitments under this Section 3 clause and shall post copies of the notice in conspicuous places available to employees and applicants for employment or training.

4. The contractor will include this Section 3 clause in every subcontract for work in connection with the project and will, at the direction of the applicant for or recipient of Federal Financial assistance, take appropriate action pursuant to the subcontract upon a finding that the subcontractor is in violation of regulations issued by the Secretary of Housing and Urban Development, 24 CFR Part 135. The contractor will not subcontract with any subcontractor where it has notice or knowledge that the latter has been found in violation of regulations under 24 CFR part 135 and will not let any subcontract unless the subcontractor has first provided it with a preliminary statement of ability to comply with the requirements of these regulations.

5. Compliance with the provisions of Section 3, the regulations set forth in 24 CFR Part 135, and all applicable rules and orders of the Department issued thereunder prior to the execution of the contract, shall be a condition of the Federal financial assistance provided to the project, binding upon the applicant or recipient, its contractors and subcontractors, its successors, and assigns to those sanctions specified by the grant or loan agreement or contract through which Federal assistance is provided, and to such sanctions as are specified by 24 CFR Part 135.

G. Age Discrimination Act of 1975

No person in the United States shall, on the basis of age, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under, any program or activity receiving Federal financial assistance.

H. Section 504 Handicapped

Non-Discrimination for Handicapped Workers

No otherwise qualified handicapped individual in the U.S., as defined in Section 7, Paragraph 6 of the Rehabilitation Act of 1973 shall, solely by reason of this handicap, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance.

11. CERTIFICATION OF COMPLIANCE WITH AIR AND WATER ACTS

(Applicable to Federally assisted construction contracts and related subcontracts exceeding $100,000)

Compliance with Air and Water Acts

During the performance of this contract the contractor and all subcontractors shall comply with the requirements of the Clean Air Act, as amended, 42 USC 1857 et seq., the Federal Water Pollution Control Act, as amended, 33 USC 1251 et seq., and the regulations of the Environmental Protection Agency with respect thereto, at 40 CFR Part 15, as amended.

In addition to the foregoing requirements, all nonexempt contractors and subcontractors shall furnish to the Owner, the following:

1. A stipulation by the Contractor or subcontractors, that any facility to be utilized in the performance of any nonexempt contract or subcontract, is not listed on the List of Violating Facilities issued by the Environmental Protection Agency (EPA) pursuant to 40 CFR 15.20.

2. Agreement by the Contractor to comply with all the requirements of Section 114 of the Clean Air Act, as amended, (42 USC 1857c-8) and Section 308 of the Federal Water Pollution Control Act, as amended, (33 USC 1318) relating to inspection, monitoring, entry, reports and information, as well as all other requirements specified in said Section 114 and Section 308, and all regulations and guidelines issued thereunder.

3. A stipulation that as a condition for the award of the contract, prompt notice will be given of any notification received from the Director, Office of Federal Activities, EPA, indicating that a facility utilized, or to be utilized for the contract, is under consideration to be listed on the EPA List of Violating Facilities.

4. Agreement by the Contractor that he will include, or cause to be included, the criteria and requirements in paragraph (1) through (4) of this section in every nonexempt subcontract and requiring that the Contractor will take such action as the Government may direct as a means of enforcing such provisions.

12. SPECIAL CONDITIONS PERTAINING TO HAZARDS, SAFETY STANDARDS AND ACCIDENT PREVENTION

A. Lead-Based Paint Hazards

(Applicable to contracts for construction or rehabilitation of residential structures.) The construction or rehabilitation of residential structures is subject to the HUD Lead-Based Paint regulations, 24 CFR Part 35. The Contractor and Subcontractors shall comply with the provisions for the elimination of lead-base paint hazards under sub-part B of said regulations. The Owner will be responsible for the inspections and certifications required under Section 35.14(f) thereof.

B. Use of Explosives (Modify as Required)

When the use of explosives is necessary for the prosecution of the work, the Contractor shall observe all local, state and Federal laws in purchasing and handling explosives. The Contractor shall take all necessary precaution to protect completed work, neighboring property, water lines, or other underground structures. Where there is danger to structures or property from blasting, the charges shall be reduced and the material shall be covered with suitable timber, steel or rope mats.

The Contractor shall notify all owners of public utility property of intention to use explosives at least eight hours before blasting is done, close to such property. Any supervision or direction of use of explosives by the engineer, does not in any way reduce the responsibility of the Contractor or his Surety for damages that may be caused by such use.

C. Danger Signals and Safety Devices (Modify as Required)

The Contractor shall make all necessary precautions to guard against damages to property and injury to persons. He shall put up and maintain in good condition, sufficient red or warning lights at night, suitable barricades and other devices necessary to protect the public. In case the Contractor fails or neglects to take such precautions, the Owner may have such lights and barricades installed and charge the cost of this work to the Contractor. Such action by the Owner does not relieve the Contractor of any liability incurred under these specifications or contract.

13. FLOOD DISASTER PROTECTION

This Contract is subject to the requirements of the Flood Disaster Protection Act of 1973 (P.L. 93-234). Nothing included as a part of this Contract is approved for acquisition or construction purposes as defined under Section 3(a) of said Act, for use in an area identified by the Secretary of HUD as having special flood hazards which is located in a community not then in compliance with the requirements for participation in the national flood insurance program pursuant to Section 201(d) of said Act; and the use of any assistance provided under this Contract for such acquisition or construction in such identified areas in communities then participating in the national flood insurance program shall be subject to the mandatory purchase of flood insurance requirements of Section 102(a) of said Act.

Any contract or agreement for the sale, lease, or other transfer of land acquired, cleared or improved with assistance provided under the Contract shall contain, if such land is located in an area identified by the Secretary as having special flood hazards and in which the sale of flood insurance has been made available under the National Flood Insurance Act of 1968, as amended, 42 U.S.C. 4001 et seq., provisions obligating the transferee and its successors or assigns to obtain and maintain, during the ownership of such land, such flood insurance as required with respect to financial assistance for acquisition or construction purposes under Section 102(a) of the Flood Disaster Protection Act of 1973.

14. ACCESS TO RECORDS/MAINTENANCE OF RECORDS

The Contractor shall maintain accounts and records, including personnel, property, and financial records, adequate to identify and account for all costs pertaining to the contract and such other records as may be deemed necessary by the locality to assure proper accounting for all funds. These records will be available for audit purposes to the locality or the State or any other authorized representative, and will be retained for three years after contract completion unless permission to destroy them is granted by the locality. Moreover, the locality, State, or any authorized representative shall have access to any books, documents, papers, and records of the Contractor which are directly pertinent to this contract for the purpose of making audit, examination, excerpts, and transcriptions.

15. CONFLICT OF INTEREST OF OFFICERS OR EMPLOYEES OF THE LOCAL JURISDICTION, MEMBERS OF THE LOCAL GOVERNING BODY, OR OTHER PUBLIC OFFICIALS

No officer or employee of the local jurisdiction or its designees or agents, no member of the governing body, and no other public official of the locality who exercises any function or responsibility with respect to this contract, during his/her tenure or for one year thereafter, shall have any interest, direct or indirect, in any contract or subcontract, or the proceeds thereof, for work to be performed. Further, the contractor shall cause to be incorporated in all subcontracts the language set forth in this paragraph prohibiting conflict of interest.

16. DRUG-FREE WORKPLACE

Under the provisions of Tennessee Code Annotate § 50-9-113 enacted by the General Assembly effective 2001, a) employers with five (5) or more employees who contract with either the state or a local government to provide construction services are required to submit an affidavit stating that they have a drug free workplace program that complies with Title 50, Chapter 9, in effect at the time of submission of a bid at least to the extent required of governmental entities. The statute, imposes other requirements on the contractor, but the grantee's responsibility is specifically limited in section (b) of the state as follows:

(b) A written affidavit by the principal officer of a covered employer provided to a local government at the time such bid or contract is submitted stating that the employer is in compliance with this section shall absolve the local government of all further responsibility under this section and any liability arising from the employer's compliance or failure of compliance with the provisions of this section.

17. PROJECT SIGN

If a project sign is erected, it must include the following:

Governor *(Name)*
Department of Economic and Community Development
Commissioner *(Name)*
CDBG Grant *(Amount)*

SPECIFICATIONS

Description of Project

Location (Recipient)

List of Contracts

Contract No.

Name and Address of Consultant or, if Prepared by Recipient Staff, the Name of the Office to be Contacted for Information Pertaining to Project

SECTION 00 6516

CERTIFICATE OF SUBSTANTIAL COMPLETION

Project: Wastewater Treatment Plant and Drip Dispersal Facilities

Agreement Date:_____ ____, 20 ____

Contractor: _____

_____

_____

Owner: Town of Huntland
100 Banks St
Huntland, TN 37345

Engineer: FOXPE LLC
233 Oceola Avenue #200
Nashville, Tennessee 37209

A walk-through inspection of the project was conducted on_____ _____, 20 __ , with representatives of the Contractor, Owner, and Engineer participating. A final Punch List of work remaining to be completed or deficiencies noted was prepared.

ENGINEER: The work performed under this contract has been reviewed and found to the Engineer's best knowledge, information, and belief to be substantially complete as of _____.

By: _____ Title: _____ Date: _____

CONTRACTOR: The Contractor will complete or correct all work noted on the list of remaining work items dated __ , and supplements issued thereto within ___ days of the substantial completion date unless time is extended by Owner. The failure to include any items on the list does not alter the responsibility of the Contractor to complete all work in accordance with the Contract Documents.

By: _____ Title: _____ Date: _____

OWNER: The Owner accepts the work as substantially complete and accepts full possession thereof including the responsibilities for security, maintenance, and insurance.

By: _____ Title: _____ Date: _____

SECTION 00 6519

PROJECT CLOSE OUT FORMS

The following forms must be fully filled out by the Contractor and properly executed prior to release of final payment:

1. Certificate of Property Restoration

2. Affidavit of Payment

3. Affidavit of Release of Liens

4. Consent of Surety for Final Payment

5. Final Waiver of Lien

   (To be executed by each and every subcontractor and supplier of materials.)

SECTION 00 6519.10

CERTIFICATE OF PROPERTY RESTORATION

Date _____

I, _____, easement property owner, agree that the Contractor for this project, _____

_____, has cleaned up and restored to my satisfaction my property at _____

_____ where the property was disturbed during construction.

Signed _____

Witness _____

END OF SECTION

SECTION 00 6519.13

AFFIDAVIT OF PAYMENT

To: _____
(Owner)

WHEREAS, the undersigned has been employed _____ _____ to furnish labor and materials for _____ _____ work, under a contract _____ for the improvement of the property described as _____ in the _____ of _____ , County of _____ _____, State of _____ of which _____ _____ is the Owner.

NOW, THEREFORE, this _____ day of _____, 20 _____. The undersigned, as the Contractor for the above-named Contract pursuant to the Conditions of the Contract hereby certifies that, except as listed below, he has paid in full or has otherwise satisfied all obligations for all materials and equipment furnished, for all work, labor, and services performed, and for all known indebtedness and claims against the Contractor for damages arising in any manner in connection with the performance of the Contract referenced above for which the Owner or his property might in any way be held responsible.

EXCEPTIONS: (If none, write "None." If required by the Owner, the Contractor shall furnish bond satisfactory to the Owner for each exception.)

ATTACHMENTS:

1. Consent of Surety to Final Payment. (Whenever Surety is involved, Consent of Surety is required.)
2. Contractor's Release or Waiver of Liens, conditional upon receipt of final payment.
3. Separate Releases or Waivers of Liens from Subcontractors and material and equipment suppliers.
4. Contractor's Affidavit of Release of Liens.

_____(SEAL)
CONTRACTOR (Name of sole ownership, corporation or partnership)

_____(SEAL)
(Signature of Authorized Representative)

(Affix corporate seal here)

TITLE:_____

SECTION 00 6519.16

AFFIDAVIT OF RELEASE OF LIENS

To: _____
(Owner)

WHEREAS, the undersigned has been employed by_____to furnish labor and materials for_____

_____work, under a contract _____
for the improvement of the property described as _____

_____ _____in the _____ of _____ County of _____, _____ State of _____ of which _____

_____ is the Owner.

NOW, THEREFORE, this _____day of _____, 20_____.

The undersigned, as the Contractor for the above-named Contract pursuant to the conditions of the Contract hereby certifies that to the best of his knowledge, information and belief, except as listed below, the Releases or Waivers of Lien attached hereto include the Contractor, all subcontractors, all suppliers of materials and equipment, and all performers of Work, labor or services, who have or may have liens against any property of the Owner arising in any manner out of the performance of the Contract referenced above.

EXCEPTIONS: (If none, write "None." If required by the Owner, the Contractor shall furnish bond satisfactory to the Owner for each exception.)

ATTACHMENTS:

1. Contractor's Release or Waiver of Liens, conditional upon receipt of final payment.
2. Separate Releases or Waivers of Liens from Subcontractors and material and equipment suppliers.

_____(SEAL)
CONTRACTOR (Name of sole ownership, corporation or partnership)

_____(SEAL)
(Affix corporate seal here) (Signature of Authorized Representative)

TITLE: _____

SECTION 00 6519.19

CONSENT OF SURETY FOR FINAL PAYMENT

Project Name _____

Location _____

Project No. _____ Contract No._____

Type of Contract _____

Amount of Contract _____

In accordance with the provisions of the above-named contract between the Owner and the Contractor, the following named surety:

_____

_____

on the Payment Bond of the following named Contractor:

_____

_____

hereby approves of final payment to the Contractor, and further agrees that said final payment to the Contractor shall not relieve the surety company named herein of any of its obligations to the following named Owner: as set forth in said surety company's bond:

_____

_____

IN WITNESS WHEREOF, the surety company has hereunto set its hand and seal this _____ day of _____, 20_____.

_____
(Name of Surety Company)

_____
(Affix corporate (Signature of Authorized Representative)

seal here) Title: _____

SECTION 00 6519.27

FINAL WAIVER OF LIEN

To: _____
(Owner)

WHEREAS, the undersigned has been employed by (A) _____

to furnish labor and materials for (B) _____

_____ work,

under a contract (C) _____

for the improvement of the premises described as (D) _____

_____

in the _____ (City-Village) of _____

County of _____, State of _____

of which _____

_____is the Owner.

NOW, THEREFORE, this _____ day of _____ 20____, for and in consideration of the sum of (E) _____

Dollars paid simultaneously herewith, the receipt whereof is hereby acknowledged by the undersigned, the undersigned does hereby waive and release any lien rights to, or claim of lien with respect to and on said above-described premises, and the improvements thereon, and on the monies or other considerations due or to become due from the Owner, or account of labor, services, material, fixtures, apparatus or machinery heretofore or which may hereafter be furnished by the undersigned to or for the above-described premises by virtue of said contract.

(F) _____ (SEAL)
(Name of sole ownership, corporation or partnership)

_____(SEAL)
(Affix corporate seal here) (Signature of Authorized Representative)

TITLE: _____

INSTRUCTIONS FOR FINAL WAIVER

A. Person or firm with whom you agreed to furnish either labor, or services, or materials.
B. Fill in nature and extent of work; strike the word labor or the word materials if not in your contract.
C. If you have more than one contract on the same premises, describe the contract by number if available, date, and extent of work.
D. Furnish an accurate enough description of the improvement and location of the premises so that it can be distinguished from any other property.
E. Amount shown should be the amount actually received and equal to that amount of contract as adjusted.
F. If waiver is for a corporation, corporate name should be used, corporate seal affixed and title of officer signing waiver should be set forth; if waiver is for a partnership, the partnership name should be used, partner should sign and designate himself as partner.

SECTION 00 7200

GENERAL CONDITIONS

1. Definitions
2. Additional Instructions and Detail Drawings
3. Schedules, Reports and Records
4. Drawings and Specifications
5. Shop Drawings
6. Materials, Services and Facilities
7. Inspection and Testing
8. Substitutions and “Or-Equals”
9. Patents
10. Surveys, Permits, Regulations
11. Protection of Work, Property and Persons
12. Supervision by Contractor
13. Changes in the Work
14. Changes in Contract Price
15. Time for Completion and Liquidated Damages
16. Correction of Work
17. Subsurface Conditions
18. Suspension of Work, Termination and Delay
19. Payments to Contractor
20. Acceptance of Final Payment as Release
21. Insurance
22. Contract Security
23. Assignments
24. Indemnification
25. Separate Contracts
26. Subcontracting
27. Engineer's Authority
28. Land and Rights-of-Way
29. Guaranty
30. Disputes
31. Taxes

1. DEFINITIONS

1.1. Wherever used in the **CONTRACT DOCUMENTS**, the following terms shall have the meanings indicated which shall be applicable to both the singular and plural thereof:

1.2. **ADDENDA** - Written or graphic instruments issued prior to the execution of the Agreement which modify or interpret the CONTRACT DOCUMENTS, DRAWINGS, AND SPECIFICATIONS by additions, deletions, clarifications or corrections.

1.3. **BID** - The offer or proposal of the BIDDER submitted on the prescribed form setting forth the prices for the Work to be performed.

1.4. **BIDDER** - Any person, firm or corporation submitting a BID for the WORK.

1.5. **BONDS** - Bid, Performance, and Payment Bonds and other instruments of security, furnished by the CONTRACTOR and his surety in accordance with the CONTRACT DOCUMENTS.

1.6. **CHANGE ORDER** - A written order to the CONTRACTOR authorizing an addition, deletion or revision in the WORK within the general scope of the CONTRACT DOCUMENTS, or authorizing an adjustment in the CONTRACT PRICE OR CONTRACT TIME.

1.7. **CONTRACT DOCUMENTS** - The contract, including Advertisement For Bids, Information For Bidders, BID, Bid Bond, Agreement, Payment Bond, Performance Bond, NOTICE OF AWARD, NOTICE TO PROCEED, CHANGE ORDER, DRAWINGS, SPECIFICATIONS, and ADDENDA.

1.8. **CONTRACT PRICE** - The total monies payable to the CONTRACTOR under the terms and conditions of the CONTRACT DOCUMENTS.

1.9. **CONTRACT TIME** - The number of calendar days stated in the CONTRACT DOCUMENTS for the completion of the WORK.

1.10. **CONTRACTOR** - The person, firm, or corporation with whom the OWNER has executed the Agreement.

1.11. **DRAWINGS** - The part of the CONTRACT DOCUMENTS which show the characteristics and scope of the WORK to be performed and which have been prepared or approved by the ENGINEER.

1.12. **ENGINEER** - The person, firm, or corporation named as such in the CONTRACT DOCUMENTS.

1.13. **FIELD ORDER** - A written order effecting a change in the WORK not involving an adjustment in the CONTRACT PRICE or an extension of the CONTRACT TIME during construction.

1.14. **NOTICE OF AWARD** - The written notice of the acceptance of the BID from the OWNER to the successful BIDDER.

1.15. **NOTICE TO PROCEED** - Written communication issued by the OWNER to the CONTRACTOR authorizing him to proceed with the WORK and establishing the date of commencement of the WORK.

1.16. **OWNER** - A public or quasi-public body or authority, corporation, association, partnership, or individual for whom the WORK is to be performed.

1.17. **PROJECT** - The undertaking to be performed as provided in the CONTRACT DOCUMENTS.

1.18. **RESIDENT PROJECT REPRESENTATIVE** - The authorized representative of the OWNER who is assigned to the PROJECT site or any part thereof.

1.19. **SHOP DRAWINGS** - All drawings, diagrams, illustrations, brochures, schedules, and other data which are prepared by the CONTRACTOR, a SUBCONTRACTOR, manufacturer, SUPPLIER, or distributor, which illustrate how specific portions of the WORK shall be fabricated or installed.

1.20. **SPECIFICATIONS** - A part of the CONTRACT DOCUMENTS consisting of written descriptions of a technical nature of materials, equipment, construction systems, standards, and workmanship.

1.21. **SUBCONTRACTOR** - An individual, firm or corporation having a direct contract with the CONTRACTOR or with any other SUBCONTRACTOR for the performance of a part of the WORK at the site.

1.22. **SUBSTANTIAL COMPLETION** - That date as certified by the ENGINEER when the construction of the PROJECT or a specified part thereof is sufficiently completed, in

accordance with the CONTRACT DOCUMENTS, so that the PROJECT or specified part can be utilized for the purposes for which it is intended.

1.23. **SUPPLEMENTAL GENERAL CONDITIONS** - Modifications to General Conditions required by a Federal agency for participation in the PROJECT and approved by the agency in writing prior to inclusion in the CONTRACT DOCUMENTS, or such requirements that may be imposed by applicable state laws.

1.24. **SUPPLIER** - Any person or organization who supplies materials or equipment for the WORK, including that fabricated to a specific design, but who does not perform labor at the site.

1.25. **WORK** - All labor necessary to produce the construction required by the CONTRACT DOCUMENTS, and all materials and equipment incorporated or to be incorporated in the PROJECT.

1.26. **WRITTEN NOTICE** - Any notice to any party of the Agreement relative to any part of this Agreement in writing and considered delivered and the service thereof completed, when posted by certified or registered mail to the said party at his last given address or delivered in person to said party or his authorized representative on the WORK.

2. ADDITIONAL INSTRUCTIONS AND DETAIL DRAWINGS

2.1. The CONTRACTOR may be furnished additional instructions and detail drawings, by the ENGINEER, as necessary to carry out the WORK required by the CONTRACT DOCUMENTS.

2.2. The additional drawings and instruction thus supplied will become a part of the CONTRACT DOCUMENTS. The CONTRACTOR shall carry out the WORK in accordance with the additional detail drawings and instructions.

3. SCHEDULES, REPORTS, AND RECORDS

3.1. The CONTRACTOR shall submit to the OWNER such schedule of quantities and costs, progress schedules, payrolls, reports, estimates, records and other data where applicable as are required by the CONTRACT DOCUMENTS for the WORK to be performed.

3.2. Prior to the first partial payment estimate the CONTRACTOR shall submit construction progress schedules showing the order in which he proposes to carry on the WORK, including dates at which he will start the various parts of the WORK, estimated date of completion of each part and, as applicable:

3.2.1. The dates at which special detail drawings will be required; and

3.3. Respective dates for submission of SHOP DRAWINGS, the beginning of manufacture, the testing and the installation of materials, supplies and equipment.

4. DRAWINGS AND SPECIFICATIONS

4.1. The intent of the DRAWINGS and SPECIFICATIONS is that the CONTRACTOR shall furnish all labor, materials, tools, equipment, and transportation necessary for the proper execution of the WORK in accordance with the CONTRACT DOCUMENTS and all incidental work necessary to complete the PROJECT in an acceptable manner, ready for use, occupancy or operation by the OWNER.

4.2. In case of conflict between the DRAWINGS and SPECIFICATIONS, the SPECIFICATIONS shall govern. Figure dimensions on DRAWINGS shall govern over scale dimensions, and detailed DRAWINGS shall govern over general DRAWINGS.

4.3. Any discrepancies found between the DRAWINGS and SPECIFICATIONS and site conditions or any inconsistencies or ambiguities in the DRAWINGS or SPECIFICATIONS shall be immediately reported to the ENGINEER, in writing, who shall promptly correct such inconsistencies or ambiguities in writing. WORK done by the CONTRACTOR after his discovery of such discrepancies, inconsistencies or ambiguities shall be done at the CONTRACTOR'S risk.

5. SHOP DRAWINGS

5.1. The CONTRACTOR shall provide SHOP DRAWINGS as may be necessary for the prosecution of the WORK as required by the CONTRACT DOCUMENTS. The ENGINEER shall promptly review all SHOP DRAWINGS. The ENGINEER'S approval of any SHOP DRAWING shall not release the CONTRACTOR from responsibility for deviations from the CONTRACT DOCUMENTS. The approval of any SHOP DRAWING which substantially deviates from the requirement of the CONTRACT DOCUMENTS shall be evidenced by a CHANGE ORDER.

5.2. When submitted for the ENGINEER'S review, SHOP DRAWINGS shall bear the CONTRACTOR'S certification that he has reviewed, checked, and approved the SHOP DRAWINGS and that they are in conformance with the requirements of the CONTRACT DOCUMENTS.

5.3. Portions of the WORK requiring a SHOP DRAWING or sample submission shall not begin until the SHOP DRAWING or submission has been approved by the ENGINEER. A copy of each approved SHOP DRAWING and each approved sample shall be kept in good order by the CONTRACTOR at the site and shall be available to the ENGINEER.

6. MATERIALS, SERVICES AND FACILITIES

6.1. It is understood that, except as otherwise specifically stated in the CONTRACT DOCUMENTS, the CONTRACTOR shall provide and pay for all materials, labor, tools, equipment, water, light, power, transportation, supervision, temporary construction of any nature, and all other services and facilities of any nature whatsoever necessary to execute, complete, and deliver the WORK within the specified time.

6.2. Materials and equipment shall be so stored as to insure the preservation of their quality and fitness for the WORK. Stored materials and equipment to be incorporated in the WORK shall be located so as to facilitate prompt inspection.

6.3. Manufactured supplies, materials, and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned as directed by the manufacturer.

6.4. Material, supplies, and equipment shall be in accordance with samples submitted by the CONTRACTOR and approved by the ENGINEER.

6.5. Materials, supplies, or equipment to be incorporated into the WORK shall not be purchased by the CONTRACTOR or the SUBCONTRACTOR subject to a chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller.

7. INSPECTION AND TESTING

7.1. All materials and equipment used in the construction of the PROJECT shall be subject to adequate inspection and testing in accordance with generally accepted standards, as required and defined in the CONTRACT DOCUMENTS.

7.2. All materials and equipment used in the construction of the PROJECT shall be subject to adequate inspection and testing in accordance with generally accepted standards, as required and defined in the CONTRACT DOCUMENTS.

7.3. The CONTRACTOR shall provide at his expense the testing and inspection services required by the CONTRACT DOCUMENTS.

7.4. If the CONTRACT DOCUMENTS, laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction require any WORK to specifically be inspected, tested, or approved by someone other than the CONTRACTOR, the CONTRACTOR will give the ENGINEER timely notice of readiness. The CONTRACTOR will then furnish the ENGINEER the required certificates of inspection, testing, or approval.

7.5. Inspections, tests, or approvals by the ENGINEER or others shall not relieve the CONTRACTOR from his obligations to perform the WORK in accordance with the requirements of the CONTRACT DOCUMENTS.

7.6. The ENGINEER and his representatives will at all times have access to the WORK. In addition, authorized representatives and agents of any participating Federal or State agency shall be permitted to inspect all work, materials, payrolls, records of personnel, invoices of materials, and other relevant data and records. The CONTRACTOR will provide proper facilities for such access and observation of the WORK and also for any inspection or testing thereof.

7.7. If any WORK is covered contrary to the written instructions of the ENGINEER it must, if requested by the ENGINEER, be uncovered for his observation and replaced at the CONTRACTOR'S expense.

7.8. If the ENGINEER considers it necessary or advisable that covered WORK be inspected or tested by others, the CONTRACTOR, at the ENGINEER'S request will uncover, expose, or otherwise make available for observation, inspection or testing as the ENGINEER may require, that portion of the WORK in question, furnishing all necessary labor, materials, tools, and equipment. If it is found that such WORK is defective, the CONTRACTOR will bear all the expenses of such uncovering, exposure, observation, inspection, and testing and of satisfactory reconstruction. If, however, such WORK is not found to be defective, the CONTRACTOR will be allowed an increase in the CONTRACT PRICE or an extension of the CONTRACT TIME, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction, and an appropriate CHANGE ORDER shall be issued.

8. SUBSTITUTIONS AND "OR-EQUALS"

8.1. Whenever a material, article, or piece of equipment is identified on the DRAWINGS or SPECIFICATIONS by reference to brand name or catalogue number, it shall be understood that this is referenced for the purpose of defining the performance or other salient requirements and that other products of equal capacities, quality, and function may be considered. The CONTRACTOR may recommend the use of an "or-equal" manufacturer or supplier or substitution of a material, article, or piece of equipment of equal substance and function for those referred to in the CONTRACT DOCUMENTS by reference to brand name or catalogue number, and if, in the sole opinion of the ENGINEER, such material, article, or piece of equipment is of equal substance and function to that specified, the ENGINEER may approve its substitution and use by the CONTRACTOR. Factors to be considered, but not limited to, include materials of construction, quality, durability, appearance, strength, design characteristics, reliability, performance, experience, economy of operation, and availability of responsive service.

8.2. Any cost differential shall be deductible from the CONTRACT PRICE and the CONTRACT DOCUMENTS for substitute and "or-equal" items and shall be appropriately modified by a CHANGE ORDER. The CONTRACTOR warrants that if substitutes or "or-equals" are approved, no major changes in the function or general design of the PROJECT will result. Incidental changes or extra component parts required to accommodate the substitute, or "or-equal" item will be made by the CONTRACTOR without a change in the CONTRACT PRICE or CONTRACT TIME. The CONTRACTOR shall be solely responsible for any changes to the design required to accommodate the use of substitute items, including reimbursement of the OWNER for ENGINEERS documented costs. Reimbursement of ENGINEERS cost to evaluate substitute items shall not depend on the final acceptability of substitute items. OWNER may require CONTRACTOR to furnish at CONTRACTORS expense a special performance guarantee or other surety with respect to any substitute. The CONTRACTOR shall provide all data in support of any proposed substitute or "or-equal" item at CONTRACTORS expense.

8.3. The ENGINEER will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to this paragraph. ENGINEER may require CONTRACTOR to furnish additional data about the proposed substitute or "or-equal" item. ENGINEER will be the sole judge of acceptability. No "or-equal" or substitute shall be ordered, installed, or utilized until ENGINEERS review is complete, which

will be evidenced by a CHANGE ORDER in the case of a substitute or an approved Shop Drawing for an "or-equal". ENGINEER will advise CONTRACTOR in writing of any negative determination.

9. PATENTS

9.1. The CONTRACTOR shall pay all applicable royalties and license fees. He shall defend all suits or claims for infringement of any patent rights and save the OWNER harmless from loss on account thereof. Except that the OWNER shall be responsible for any such loss when a particular process, design, or the product of a particular manufacturer or manufacturers is specified, however, if the CONTRACTOR has reason to believe that the design process or product specified is an infringement of a patent, he shall be responsible for such loss unless he promptly gives such information to the ENGINEER.

10. SURVEYS, PERMITS, REGULATIONS

10.1. The OWNER shall furnish all boundary surveys and establish all base lines for locating the principal component parts of the WORK together with a suitable number of benchmarks adjacent to the WORK as shown in the CONTRACT DOCUMENTS. From the information provided by the OWNER, unless otherwise specified in the CONTRACT DOCUMENTS, the CONTRACTOR shall develop and make all detail surveys needed for construction such as slope stakes, batter boards, stakes for pile locations and other working points, lines, elevations, and cut sheets.

10.2. The CONTRACTOR shall carefully preserve benchmarks, reference points and stakes and, in case of willful or careless destruction, he shall be charged with the resulting expense and shall be responsible for any mistakes that may be caused by their unnecessary loss or disturbance.

10.3. Permits and licenses of a temporary nature necessary for the prosecution of the WORK shall be secured and paid for by the CONTRACTOR unless otherwise stated in the SUPPLEMENTAL GENERAL CONDITIONS. Permits, licenses, and easements for permanent structures or permanent changes in existing facilities shall be secured and paid for by the OWNER, unless otherwise specified. The CONTRACTOR shall give all notices and comply with all laws, ordinances, rules, and regulations bearing on the conduct of the WORK as drawn and specified. If the CONTRACTOR observes that the CONTRACT DOCUMENTS are at variance therewith, he shall promptly notify the ENGINEER in writing and any necessary changes shall be adjusted as provided in Section 13. CHANGES IN THE WORK.

11. PROTECTION OF WORK, PROPERTY, AND PERSONS

11.1. The CONTRACTOR will be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the WORK. He will take all necessary precautions for the safety of, and will provide the necessary protection to prevent damage, injury or loss to all employees on the WORK and other persons who may be affected thereby, all the WORK and all materials or equipment to be incorporated therein, whether in storage on or off the site, and other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways,

structures, and utilities not designated for removal, relocation or replacement in the course of construction.

11.2. The CONTRACTOR will comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction. He will erect and maintain, as required by the conditions and progress of the WORK, all necessary safeguards for safety and protection. He will notify owners of adjacent utilities when prosecution of the WORK may affect them. The CONTRACTOR will remedy all damage, injury, or loss to any property caused, directly or indirectly, in whole or in part, by the CONTRACTOR, any SUBCONTRACTOR or anyone directly or indirectly employed by any of them or anyone for whose acts any of them be liable, except damage or loss attributable to the fault of the CONTRACT DOCUMENTS or to the acts or omissions of the OWNER or the ENGINEER or anyone employed by either of them or anyone for whose acts either of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of the CONTRACTOR.

11.3. In emergencies affecting the safety of persons or the WORK or property at the site or adjacent thereto, the CONTRACTOR, without special instruction or authorization from the ENGINEER or OWNER, shall act to prevent threatened damage, injury, or loss. He will give the ENGINEER prompt WRITTEN NOTICE of any significant changes in the WORK or deviations from the CONTRACT DOCUMENTS caused thereby, and a CHANGE ORDER shall be issued covering the changes and deviations involved.

12. SUPERVISION BY CONTRACTOR

12.1. The CONTRACTOR will supervise and direct the WORK. He will be solely responsible for the means, methods, techniques, sequences and procedures of construction. The CONTRACTOR will employ and maintain on the WORK a qualified supervisor or superintendent who shall have been designated in writing by the CONTRACTOR as the CONTRACTOR'S representative at the site. The supervisor shall have full authority to act on behalf of the CONTRACTOR and all communications given to the supervisor shall be as binding as if given to the CONTRACTOR. The supervisor shall be present on the site at all times as required to perform adequate supervision and coordination of the WORK.

13. CHANGES IN THE WORK

13.1. The OWNER may at any time, as the need arises, order changes within the scope of the WORK without invalidating the Agreement. If such changes increase or decrease the amount due under the CONTRACT DOCUMENTS, or in the time required for performance of the WORK, an equitable adjustment shall be authorized by CHANGE ORDER.

13.2. The ENGINEER, also, may at any time, by issuing a FIELD ORDER, make changes in the details of the WORK. The CONTRACTOR shall proceed with the performance of any changes in the WORK so ordered by the ENGINEER unless the CONTRACTOR believes that such FIELD ORDER entitles him to a change in CONTRACT PRICE or TIME, or both, in which event he shall give the ENGINEER WRITTEN NOTICE thereof within seven (7) days after the receipt of the ordered

change. Thereafter the CONTRACTOR shall document the basis for the change in CONTRACT PRICE or TIME within thirty (30) days. The CONTRACTOR shall not execute such changes pending the receipt of an executed CHANGE ORDER or further instruction from the OWNER.

14. CHANGES IN CONTRACT PRICE

14.1. The CONTRACT PRICE may be changed only by a CHANGE ORDER. The value of any WORK covered by a CHANGE ORDER or of any claim for increase or decrease in the CONTRACT PRICE shall be determined by one or more of the following methods in the order of precedence listed below:

(a) Unit prices previously approved.

(b) An agreed lump sum.

(c) The actual cost for labor, direct over-head, materials, supplies, equipment, and other services necessary to complete the work. In addition there shall be added an amount to be agreed upon but not to exceed fifteen (15) percent of the actual cost of the WORK to cover the cost of general overhead and profit. In no case shall the value of materials, supplies, equipment, and other services exceed actual cost or as identified in RS Means or equivalent, latest edition.

15. TIME FOR COMPLETION AND LIQUIDATED DAMAGES

15.1. The date of beginning and the time for completion of the WORK are essential conditions of the CONTRACT DOCUMENTS and the WORK embraced shall be commenced on a date specified in the NOTICE TO PROCEED.

15.2. The CONTRACTOR will proceed with the WORK at such rate of progress to insure full completion within the CONTRACT TIME. It is expressly understood and agreed, by and between the CONTRACTOR and the OWNER, that the CONTRACT TIME for the completion of the WORK described herein is a reasonable time, taking into consideration the average climatic and economic conditions and other factors prevailing in the locality of the WORK.

15.3. If the CONTRACTOR shall fail to complete the WORK within the CONTRACT TIME, or extension of time granted by the OWNER, then the CONTRACTOR will pay to the OWNER the amount for liquidated damages as specified in the BID for each calendar day that the CONTRACTOR shall be in default after the time stipulated in the CONTRACT DOCUMENTS.

15.4. The CONTRACTOR shall not be charged with liquidated damages or any excess cost when the delay in completion of the WORK is due to the following, and the CONTRACTOR has promptly given WRITTEN NOTICE of such delay to the OWNER or ENGINEER.

15.4.1. To any preference, priority, or allocation order duly issued by the OWNER.

15.4.2. To unforeseeable causes beyond the control and without the fault or negligence of the CONTRACTOR, including but not restricted to, acts of God or of the public enemy, acts of the OWNER, acts of another CONTRACTOR in the performance of a CONTRACT with the OWNER, fires, floods, epidemics, quarantine, restrictions, strikes, freight embargoes, and abnormal and unforeseeable weather; and

15.4.3. To any delays of SUBCONTRACTORS occasioned by any of the causes specified in paragraphs 15.4.1 and 15.4.2 of this article.

16. CORRECTION OF WORK

16.1. The CONTRACTOR shall promptly remove from the premises all WORK rejected by the ENGINEER for failure to comply with the CONTRACT DOCUMENTS, whether incorporated in the construction or not and the CONTRACTOR shall promptly replace and re-execute the WORK in accordance with the CONTRACT DOCUMENTS and without expense to the OWNER and shall bear the expense of making good all WORK of other CONTRACTORS destroyed or damaged by such removal or replacement.

16.2. All removal and replacement WORK shall be done at the CONTRACTOR'S expense. If the CONTRACTOR does not take action to remove such rejected WORK within ten (10) days after receipt of WRITTEN NOTICE, the OWNER may remove such WORK and store the materials at the expense of the CONTRACTOR.

17. SUBSURFACE CONDITIONS

17.1. The CONTRACTOR shall promptly, and before such conditions are disturbed, except in the event of an emergency, notify the OWNER by WRITTEN NOTICE of:

17.1.1. Subsurface or latent physical conditions at the site differing materially from those indicated in the CONTRACT DOCUMENTS; or

17.1.2. Unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in WORK of the character provided for in the CONTRACT DOCUMENTS.

17.2. The OWNER shall promptly investigate the conditions, and if he finds that such conditions do so materially differ and cause an increase or decrease in the cost of, or in the time required for, performance of the WORK, an equitable adjustment shall be made and the CONTRACT DOCUMENTS shall be modified by a CHANGE ORDER. Any claim of the CONTRACTOR for adjustment hereunder shall not be allowed unless he has given the required WRITTEN NOTICE, provided that the OWNER may, if he determines the facts so justify, consider and adjust any such claims asserted before the date of final payment.

18. SUSPENSION OF WORK, TERMINATION AND DELAY

18.1. The OWNER may suspend the WORK or any portion thereof for a period of not more than ninety days or such further time as agreed upon by the CONTRACTOR,

by WRITTEN NOTICE to the CONTRACTOR and the ENGINEER which notice shall fix the date on which WORK shall be resumed. The CONTRACTOR will resume that WORK on the date so fixed. The CONTRACTOR will be allowed an increase in the CONTRACT PRICE or an extension of the CONTRACT TIME, or both, directly attributable to any suspension.

18.2. If the CONTRACTOR is adjudged a bankrupt or insolvent, or if he makes a general assignment for the benefit of his creditors, or if a trustee or receiver is appointed for the CONTRACTOR or for any of his property, or if he files a petition to take advantage of any debtor's act, or to reorganized under the bankruptcy or applicable laws, or if he repeatedly fails to supply sufficient skilled workmen or suitable materials or equipment, or if he repeatedly fails to make prompt payments to SUBCONTRACTORS or for labor, materials, or equipment or if he disregards laws, ordinances, rules, regulations, or orders of any public body having jurisdiction of the WORK or if he disregards the authority of the ENGINEER, or if he otherwise violates any provision of the CONTRACT DOCUMENTS, then the OWNER may, without prejudice to any other right or remedy and after giving the CONTRACTOR and his surety a minimum of ten (10) days from delivery of a WRITTEN NOTICE, terminate the services of the CONTRACTOR and take possession of the PROJECT and of all materials, equipment, tools, construction equipment, and machinery thereon owned by the CONTRACTOR, and finish the WORK by whatever method he may deem expedient. In such case the CONTRACTOR shall not be entitled to receive any further payment until the WORK is finished. If the unpaid balance of the CONTRACT PRICE exceeds the direct and indirect costs of completing the PROJECT, including compensation for additional professional services, such excess SHALL BE PAID TO THE CONTRACTOR. If such costs exceed such unpaid balance, the CONTRACTOR will pay the difference to the OWNER. Such costs incurred by the OWNER will be determined by the ENGINEER and incorporated in a CHANGE ORDER.

18.3. Where the CONTRACTOR'S services have been so terminated by the OWNER, said termination shall not affect any right of the OWNER against the CONTRACTOR then existing or which may thereafter accrue. Any retention or payment of monies by the OWNER due the CONTRACTOR will not release the CONTRACTOR from compliance with the CONTRACT DOCUMENTS.

18.4. After ten (10) days from delivery of a WRITTEN NOTICE to the CONTRACTOR and the ENGINEER, the OWNER may without cause and without prejudice to any other right or remedy, elect to abandon the PROJECT and terminate the Contract. In such case, the CONTRACTOR shall be paid for all WORK executed and any expense sustained plus reasonable profit.

18.5. If, through no act or fault of the CONTRACTOR, the WORK is suspended for a period of more than ninety (90) days by the OWNER or under an order of court or other public authority, or the ENGINEER fails to act on any request for payment within thirty (30) days after it is submitted, or the OWNER fails to pay the CONTRACTOR substantially the sum approved by the ENGINEER or awarded by arbitrators within thirty (30) days of its approval and presentation, then the CONTRACTOR may, after ten (10) days from delivery of a WRITTEN NOTICE to the OWNER and the ENGINEER, terminate the CONTRACT and recover from the OWNER payment for all WORK executed and all expenses sustained. In addition,

and in lieu of terminating the CONTRACT, if the ENGINEER has failed to act on a request for payment or if the OWNER has failed to make any payment as aforesaid, the CONTRACTOR may upon then (10) days WRITTEN NOTICE to the OWNER and the ENGINEER stop the WORK until he has been paid all amounts then due, in which event and upon resumption of the WORK, CHANGE ORDERS shall be issued for adjusting the CONTRACT PRICE or extending the CONTRACT TIME or both to compensate for the costs and delays attributable to the stoppage of the WORK.

18.6. If the performance of all or any portion of the WORK is suspended, delayed, or interrupted as a result of a failure of the OWNER or ENGINEER to act within the time specified in the CONTRACT DOCUMENTS, or if no time is specified, within a reasonable time, an adjustment in the CONTRACT PRICE or an extension of the CONTRACT TIME, or both, shall be made by CHANGE ORDER to compensate the CONTRACTOR for the costs and delays necessarily caused by the failure of the OWNER or ENGINEER.

19. PAYMENTS TO CONTRACTOR

19.1. At least ten (10) days before each progress payment falls due (but not more often than once a month), the CONTRACTOR will submit to the ENGINEER a partial payment estimate filled out and signed by the CONTRACTOR covering the WORK performed during the period covered by the partial payment estimate and supported by such data as the ENGINEER may reasonably require. If payment is requested on the basis of materials and equipment not incorporated in the WORK but delivered and suitably stored at or near the site, the partial payment estimate shall also be accompanied by such supporting data, satisfactory to the OWNER, as will establish the OWNER'S title to the material and equipment and protect his interest therein, including applicable insurance. The ENGINEER will, within ten (10) days after receipt of each partial payment estimate, either indicate in writing his approval of payment and present the partial payment estimate to the OWNER, or return the partial payment estimate to the CONTRACTOR indicating in writing his reasons for refusing to approve payment. In the latter case, the CONTRACTOR may make the necessary corrections and resubmit the partial payment estimate. The OWNER will, within ten (10) days of presentation to him of an approved partial payment estimate, pay the CONTRACTOR a progress payment on the basis of the approved partial payment estimate. The OWNER shall retain an amount not exceeding ten (10) percent of each payment limited to five (5) percent of the total contract amount until final completion and acceptance of all work covered by the CONTRACT DOCUMENTS. On completion and acceptance of a part of the WORK on which the price is stated separately in the CONTRACT DOCUMENTS, payment may be made in full, including retained percentages, less authorized deductions.

19.2. The request for payment may also include an allowance for the cost of such major materials and equipment which are suitably stored either at or near the site.

19.3. Prior to SUBSTANTIAL COMPLETION, the OWNER, with the approval of the ENGINEER and with the concurrence of the CONTRACTOR, may use any completed or substantially completed portions of the WORK. Such use shall not constitute an acceptance of such portions of the WORK.

19.4. The OWNER shall have the right to enter the premises for the purpose of doing work not covered by the CONTRACT DOCUMENTS. This provision shall not be construed as relieving the CONTRACTOR of the sole responsibility for the care and protection of the WORK, or the restoration of any damaged WORK except such as may be caused by agents or employees of the OWNER.

19.5. Upon completion and acceptance of the WORK, the ENGINEER shall issue a certificate attached to the final payment request that the WORK has been accepted by him under the conditions of the CONTRACT DOCUMENTS. The entire balance found to be due the CONTRACTOR, including the retained percentages, but except such sums as may be lawfully retained by the OWNER, shall be paid to the CONTRACTOR within thirty (30) days of completion and acceptance of the WORK.

19.6. The CONTRACTOR will indemnify and save the OWNER or the OWNER'S agents harmless from all claims growing out of the lawful demands of SUBCONTRACTORS, laborers, workmen, mechanics, materialmen, and furnishers of machinery and parts thereof, equipment, tools, and all supplies, incurred in the furtherance of the performance of the WORK. The CONTRACTOR shall, at the OWNER'S request, furnish satisfactory evidence that all obligations of the nature designated above have been paid, discharged, or waived. If the CONTRACTOR fails to do so the OWNER may, after having notified the CONTRACTOR, either pay unpaid bills or withhold from the CONTRACTOR'S unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged where upon payment to the CONTRACTOR shall be resumed, in accordance with the terms of the CONTRACT DOCUMENTS, but in no event shall the provisions of this sentence be construed to impose any obligations upon the OWNER to either the CONTRACTOR, his Surety, or any third party. In paying any unpaid bills of the CONTRACTOR, any payment so made by the OWNER shall be considered as a payment made under the CONTRACT DOCUMENTS by the OWNER to the CONTRACTOR and the OWNER shall not be liable to the CONTRACTOR for any such payments made in good faith.

19.7. If the OWNER fails to make payment thirty (30) days after approval by the ENGINEER, in addition to other remedies available to the CONTRACTOR, there shall be added to each such payment interest at the maximum legal rate commencing on the first day after said payment is due and continuing until the payment is received by the CONTRACTOR.

20. ACCEPTANCE OF FINAL PAYMENT AS RELEASE

20.1. The acceptance by the CONTRACTOR of final payment shall be and shall operate as a release to the OWNER of all claims and all liability to the CONTRACTOR other than claims in stated amounts as may be specifically excepted by the CONTRACTOR for all things done or furnished in connection with this WORK and for every act and neglect of the OWNER and others relating to or arising out of this WORK. Any payment, however, final or otherwise, shall not release the CONTRACTOR or his sureties from any obligations under the CONTRACT DOCUMENTS or the Performance BOND and Payment BONDS.

21. INSURANCE

21.1. The CONTRACTOR shall purchase and maintain such insurance as will protect him from claims set forth below which may arise out of or result from the CONTRACTOR'S execution of the WORK, whether such execution be by himself or by any SUBCONTRACTOR or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

21.1.1. Claims under workmen's compensation, disability benefit, and other similar employee benefit acts:

21.1.2. Claims for damages because of bodily injury, occupational sickness or disease, or death of his employees:

21.1.3. Claims for damages because of bodily injury, sickness or disease, or death of any person other than his employees:

21.1.4. Claims for damages insured by usual personal injury liability coverage which are sustained (1) by any person as a result of an offense directly or indirectly related to the employment of such person by the CONTRACTOR, or (2) by any other person; and

21.1.5. Claims for damages because of injury to or destruction of tangible property, including loss of use resulting therefrom.

21.2. Certificates of Insurance acceptable to the OWNER shall be filed with the OWNER prior to commencement of the WORK. These Certificates shall contain a provision that coverages afforded under the policies will not be canceled unless at least fifteen (15) days prior WRITTEN NOTICE has been given to the OWNER.

21.3. The CONTRACTOR shall procure and maintain, at his own expense, during the CONTRACT TIME, liability insurance as hereinafter specified:

21.3.1. CONTRACTOR'S General Public Liability and Property Damage Insurance including vehicle coverage issued to the CONTRACTOR and protecting him from all claims for personal injury, including death, and all claims for destruction of or damage to property, arising out of or in connection with any operations under the CONTRACT DOCUMENTS, whether such operations be by himself or by any SUBCONTRACTOR under him, or anyone directly or indirectly employed by the CONTRACTOR or by a SUBCONTRACTOR under him. Insurance shall be written with a limit of liability of not less than $1,000,000 for all damages arising out of bodily injury, including death, at any time resulting therefrom, sustained by any one person in any one accident: and a limit of liability of not less than $1,000,000 aggregate for any such damages sustained by two or more persons in any one accident. Insurance shall be written with a limit of liability of not less than $500,000 for all property damage sustained by any one person in any one accident; and a limit of liability of not less than $500,000 aggregate for any such damage sustained by two or more persons in any one accident.

21.3.2. The CONTRACTOR shall acquire and maintain, if applicable, Fire and Extended Coverage insurance upon the PROJECT to the full insurable value thereof for the benefit of the OWNER, the CONTRACTOR, and SUBCONTRACTORS as their interest may appear. This provision shall in no way release the CONTRACTOR or CONTRACTOR'S surety from obligations under the CONTRACT DOCUMENTS to fully complete the PROJECT.

21.4. The CONTRACTOR shall procure and maintain, at his own expense, during the CONTRACT TIME, in accordance with the provisions of the laws of the state in which the work is performed. Workmen's Compensation Insurance, including occupational disease provisions, for all of his employees at the site of the PROJECT and in case any work is sublet, the CONTRACTOR shall require such SUBCONTRACTOR similarly to provide Workmen's Compensation Insurance, including occupational disease provisions for all of the latter's employees unless such employees are covered by the protection afforded by the CONTRACTOR. In case any class of employees engaged in hazardous work under this contract at the site of the PROJECT is not protected under Workmen's Compensation statue, the CONTRACTOR shall provide, and shall cause each SUBCONTRACTOR to provide, adequate and suitable insurance for the protection of his employees not otherwise protected.

21.5. The CONTRACTOR shall secure, if applicable, "All Risk" type Builder's Risk Insurance for WORK to be performed. Unless specifically authorized by the OWNER, the amount of such insurance shall not be less than the CONTRACT PRICE totaled in the BID. The policy shall cover not less than the losses due to fire, explosion, hail, lightning, vandalism, malicious mischief, wind, collapse, riot, aircraft, and smoke during the CONTRACT TIME, and until the WORK is accepted by the OWNER. The policy shall name as the insured the CONTRACTOR, the ENGINEER, and the OWNER.

22. CONTRACT SECURITY

22.1. The CONTRACTOR shall within ten (10) days after the receipt of the NOTICE OF AWARD furnish the OWNER with a Performance Bond and a Payment Bond in penal sums equal to the amount of the CONTRACT PRICE, conditioned upon the performance by the CONTRACTOR of all undertakings, covenants, terms, conditions, and agreements of the CONTRACT DOCUMENTS, and upon the prompt payment by the CONTRACTOR to all persons supplying labor and materials in the prosecution of the WORK provided by the CONTRACT DOCUMENTS. Such BONDS shall be executed by the CONTRACTOR and a corporate bonding company licensed to transact such business in the state in which the WORK is to be performed and named on the current "Department of the Treasury's Listing of Approved Sureties (Department Circular 570)." The expense of these BONDS shall be borne by the CONTRACTOR. If at any time a surety on any such BOND is declared a bankrupt or loses its right to do business in the state in which the WORK is to be performed or is removed from the listing of approved sureties, CONTRACTOR shall within ten (10) days after notice from the OWNER to do so, substitute an acceptable BOND (or BONDS) in such form and sum and signed by such other surety or sureties as may be satisfactory to the OWNER. The premiums on such BOND shall be paid by the CONTRACTOR. No further

payments shall be deemed due nor shall be made until the new surety or sureties shall have furnished an acceptable BOND to the OWNER.

23. ASSIGNMENTS

23.1. Neither the CONTRACTOR nor the OWNER shall sell, transfer, assign, or otherwise dispose of the Contract or any portion thereof, or of his right, title, or interest therein, or his obligations thereunder, without written consent of the other party.

24. INDEMNIFICATION

24.1. The CONTRACTOR will indemnify and hold harmless the OWNER and the ENGINEER and their agents and employees from and against all claims, damages, losses, and expenses including attorney's fees arising out of or resulting from the performance of the WORK, provided that any such claims, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property including the loss of use resulting therefrom: and is caused in whole or in part by any negligent or willful act or omission of the CONTRACTOR, and SUBCONTRACTOR, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable.

24.2. In any and all claims against the OWNER or the ENGINEER, or any of their agents or employees, by any employee of the CONTRACTOR, any SUBCONTRACTOR, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation shall not be limited in any way be any limitation on the amount or type of damages, compensation, or benefits payable by or for the CONTRACTOR or any SUBCONTRACTOR under workmen's compensation acts, disability benefit acts or other employee benefits acts.

24.3. The obligation of the CONTRACTOR under this paragraph shall not extend to the liability of the ENGINEER, his agents or employees arising out of the preparation or approval of maps, DRAWINGS, opinions, reports, surveys, CHANGE ORDERS, designs, or SPECIFICATIONS.

25. SEPARATE CONTRACTS

25.1. The OWNER reserves the right to let other contracts in connection with this PROJECT. The CONTRACTOR shall afford other CONTRACTORS reasonable opportunity for the introduction and storage of their materials and the execution of their WORK and shall properly connect and coordinate his WORK with theirs. If the proper execution or results of any part of the CONTRACTOR'S WORK depends upon the WORK of any other CONTRACTOR, the CONTRACTOR shall inspect and promptly report to the ENGINEER any defects in such WORK that render it unsuitable for such proper execution and results.

25.2. The OWNER may perform additional WORK related to the PROJECT by himself, or he may let other contracts containing provisions similar to these. The CONTRACTOR will afford the other CONTRACTORS who are parties to such Contracts (or the OWNER, if he is performing the additional WORK himself), reasonable opportunity for the introduction and storage of materials and equipment

and the execution of WORK, and shall properly connect and coordinate his WORK with theirs.

25.3. If the performance of additional WORK by other CONTRACTORS or the OWNER is not noted in the CONTRACT DOCUMENTS prior to the execution of the CONTRACT, written notice thereof shall be given to the CONTRACTOR prior to starting any such additional WORK. If the CONTRACTOR believes that the performance of such additional WORK by the OWNER or others involves him in additional expense or entitles him to an extension of the CONTRACT TIME, he may make a claim therefor as provided in Sections 14 and 15.

26. SUBCONTRACTING

26.1. The CONTRACTOR may utilize the services of specialty SUBCONTRACTORS on those parts of the WORK which, under normal contracting practices, are performed by specialty SUBCONTRACTORS.

26.2. The CONTRACTOR shall not award WORK to SUBCONTRACTOR(S), in excess of fifty (50%) percent of the CONTRACT PRICE, without prior written approval of the OWNER.

26.3. The CONTRACTOR shall be fully responsible to the OWNER for the acts and omissions of his SUBCONTRACTORS, and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by him.

26.4. The CONTRACTOR shall cause appropriate provisions to be inserted in all subcontracts relative to the WORK to bind SUBCONTRACTORS to the CONTRACTOR by the terms of the CONTRACT DOCUMENTS in so far as applicable to the WORK of SUBCONTRACTORS and to give the CONTRACTOR the same power as regards terminating any subcontract that the OWNER may exercise over the CONTRACTOR under any provision of the CONTRACT DOCUMENTS.

26.5. Nothing contained in this CONTRACT shall create any contractual relation between any SUBCONTRACTOR and the OWNER.

27. ENGINEER'S AUTHORITY

27.1. The ENGINEER shall act as the OWNER'S representative during the construction period. He shall decide questions which may arise as to quality and acceptability of materials furnished and WORK performed. He shall interpret the intent of the CONTRACT DOCUMENTS in a fair and unbiased manner. The ENGINEER will make visits to the site and determine if the WORK is proceeding in accordance with the CONTRACT DOCUMENTS.

27.2. The CONTRACTOR will be held strictly to the intent of the CONTRACT DOCUMENTS in regard to the quality of materials, workmanship, and execution of the WORK. Inspections may be made at the factory or fabrication plant of the source of material or equipment supply.

27.3. The ENGINEER will not be responsible for the construction means, controls, techniques, sequences, procedures, or construction safety.

27.4. The ENGINEER shall promptly make decisions relative to interpretation of the CONTRACT DOCUMENTS.

28. LAND AND RIGHTS-OF-WAY

28.1. Prior to issuance of NOTICE TO PROCEED, the OWNER shall obtain all land and rights-of-way necessary for carrying out and for the completion of the WORK to be performed pursuant to the CONTRACT DOCUMENTS, unless otherwise mutually agreed.

28.2. The OWNER shall provide to the CONTRACTOR information which delineates and describes the lands owned and rights-of-way acquired.

28.3. The CONTRACTOR shall provide at his own expense and without liability to the OWNER any additional land and access thereto that the CONTRACTOR may desire for temporary construction facilities, or for storage of materials.

29. GUARANTY

29.1. The CONTRACTOR shall guarantee all materials and equipment furnished and WORK performed for a period of one (1) year from the date of SUBSTANTIAL COMPLETION. The CONTRACTOR warrants and guarantees for a period of one (1) year from the date of SUBSTANTIAL COMPLETION of the system that the completed system is free from all defects due to faulty materials or workmanship and the CONTRACTOR shall promptly make such corrections as may be necessary by reason of such defects including the repairs of any damage to other parts of the system resulting from such defects. The OWNER will give notice of observed defects with reasonable promptness. In the event that the CONTRACTOR should fail to make such repairs, adjustments, or other WORK that may be made necessary by such defects, the OWNER may do so and charge the CONTRACTOR the cost thereby incurred. The Performance BOND shall remain in full force and effect through the guarantee period.

30. DISPUTES

30.1. If the parties are unable to resolve a dispute, claim, or controversy relating to this Contract by direct discussions or by voluntary nonbinding mediation, the OWNER and the CONTRACTOR may pursue their respective remedies at law or equity.

31. TAXES

31.1. The CONTRACTOR will pay all sales, consumer, use and other similar taxes required by the law of the place where the WORK is performed.

END OF SECTION

SECTION 00 7300

SUPPLEMENTAL GENERAL CONDITIONS

1. DEFINITIONS

1.1. The following shall be added to the definitions listed in the General Conditions:

(a) APPROVED - shall mean as approved, directed, required or permitted by the Engineer, unless specified otherwise.

(b) CITY, COUNTY, OR AUTHORITY – Town of Huntland, Tennessee

(c) CONTRACT DOCUMENTS - The Contract Documents shall also include Certificate of Owner's Attorney, General Conditions, Supplemental General Conditions, funding agency requirements, EEO and MBE/WBE requirements, wage rate decisions, and all other certificates, regulations and documents herein bound.

(d) ENGINEER -FOXPE LLC, or its lawfully designated successor.

(e) OWNER – Town of Huntland.

(f) OWNER'S ATTORNEY – David Stewart

(g) SUBSTANTIAL COMPLETION - The determination as to whether the project is sufficiently complete so it can be utilized for its intended purposes will be based upon a consideration of completion items and submittals specified in the Specifications.

(h) SUPPLEMENTAL GENERAL CONDITIONS - Also such modifications to the General Conditions as the Owner or Engineer may deem necessary.

(i) The SITE is the location of the proposed WORK as shown on the Drawings.

2. ADDITIONAL INSTRUCTIONS AND DETAIL DRAWINGS

2.1. (RESERVED)

3. SCHEDULES, REPORTS, AND RECORDS

3.1. Each such schedule is to be subject to change from time to time in accordance with the progress of the work.

3.2. The Contractor shall also furnish on forms to be supplied by the Owner and/or his Engineer:

(a) a detailed estimate giving a complete breakdown of a lump sum contract price and

(b) periodic itemized estimates of work done for the purpose of making partial payments thereon.

The costs employed in making up any of these schedules will be used only for determining the basis of partial payments and will not be considered as fixing a basis for additions to or deductions from the Contract Price.

4. DRAWINGS AND SPECIFICATIONS

4.1. The Drawings, Specifications and Addenda shall form part of this Contract and the provisions thereof shall be as binding upon the parties hereto as if they were herein fully set forth. The table of contents, titles, headings, running headlines and marginal notes contained in the Contract Documents are solely to facilitate reference to various provisions of the Contract Documents and in no way affect, limit, or cast light on the interpretation of the provisions to which they refer.

4.2. Upon award of the Contract, the Contractor upon request will be supplied free of charge up to six complete sets of the Drawings and Specifications. If the Contractor requests additional prints or specifications, they will be furnished to him at cost at the Contractor's expense.

4.3. The Contractor shall keep on the job a copy of the Drawings and Specifications and shall at all times give the Owner and Engineer access thereto. Anything mentioned in the Specifications and not shown on the Drawings or shown on the Drawings and not mentioned in the Specifications shall be of like effect as if shown or mentioned in both.

4.4. The Contractor shall not take advantage of any errors or omission which may exist in the Drawings and Specifications but shall immediately call them to the attention of the Engineer whose prompt interpretation or correction thereof shall be conclusive.

5. SHOP DRAWINGS

5.1. After checking and verifying all field measurements, the Contractor shall submit to the Engineer for review one electronic PDF set of all Shop Drawings, which shall have been checked by and stamped with the approval of Contractor and identified as the Engineer may require. The data shown on the Shop Drawings will be complete with respect to dimensions, design criteria, materials of construction and the like to enable the Engineer to review the information as required.

5.2. The Contractor shall also submit for the Engineer's review with such promptness as to cause no delay in work, all samples required by the Contract Documents. All samples will have been checked by and stamped with the approval of the Contractor, identified clearly as to material, manufacturer, any pertinent catalog numbers and the use for which intended.

5.3. At the time of each submission, the Contractor shall in writing call the Engineer's attention to any deviations that the Shop Drawing or sample may have from the requirements of the Contract Documents.

5.4. The Engineer will review with reasonable promptness those Shop Drawings and samples submitted in accordance with the Contractor's approved Submittal Schedule, but his review shall be only for general conformance with the information given in the Contract Documents. The Contractor shall make any corrections required by the Engineer and shall return the required number of corrected copies of Shop Drawings and resubmit new samples. The Contractor shall direct specific attention in writing or on resubmitted Shop Drawings to revisions other than the corrections called for by the Engineer on previous submissions. Contractor's stamp of approval on any Shop Drawing or sample shall constitute a representation to the Owner and the Engineer that the Contractor has either determined and verified all quantities, dimensions, field construction criteria, materials, catalog numbers, and similar data, or he assumes full responsibility for doing so, and that he has reviewed or coordinated each Shop Drawing or sample with the requirements of the work and the Contract Documents.

5.5. Engineer's review of Shop Drawings or samples shall not relieve the Contractor from his responsibility for any deviations from the requirements of the Contract Documents unless the Contractor has in writing called the Engineer's attention to such deviation at the time of submission and the Engineer has concurred in writing with the specific deviation, nor shall any review by the Engineer relieve the Contractor from responsibility for errors or omissions in the Shop Drawings.

5.6. Once approved, the Contractor shall submit four paper sets of all Shop Drawings.

6. MATERIALS, SERVICES AND FACILITIES

6.1. Any work necessary to be performed after regular working hours, on Sundays or on legal holidays, shall be performed without additional expense to the Owner.

6.2. The Contractor warrants that he has good title to all materials, supplies, and equipment used by him in the work.

6.3. All materials required in the work may be stored on the site upon which the project is to be constructed, subject to approval by the Engineer, but all such materials, tools, and machinery shall be neatly and compactly stored in such a manner as to not interfere with traffic and to cause the least inconvenience to the property owners. All fire hydrants must at all times be kept free and unobstructed, and water and gas shut-off boxes, underground power and telephone line manholes must not be covered by such materials.

6.4. Materials, tools, and machinery shall not be piled or placed against trees unless the trees shall be amply protected against injury therefrom. All materials, tools, machinery, etc., stored upon public thoroughfares must be provided with warning lights at night to warn the traffic of such obstruction.

6.5. The Contractor shall make his own arrangements for delivery and handling of equipment and materials as he may require for the prosecution of the work. The location of all temporary lines, roadways and similar facilities shall be subject to

the approval of the Engineer, and these shall be located and operated so as not to interfere with other work carried on by the Owner or by other contractors.

6.6. It is agreed that any temporary power lines, roadways or other facilities which the Contractor furnishes, installs, maintains, and removes at the completion of the work, may be used by the Owner or any of its contractors at such reasonable time or times as may be directed by the Engineer. Likewise, it is provided that similar facilities of other contracts will become available to the Contractor under similar conditions.

6.7. Adequate sanitary facilities shall be provided by the Contractor. All such sanitary facilities shall conform to the requirements of the respective State and County Departments of Public Health.

6.8. Office space and furnishings for the Resident Project Representative, if required, will be as specified in the Specifications. If required, office space must be provided before the Contractor's first partial payment estimate will be approved. No separate payment shall be made for office space.

6.9. Contractor shall furnish six hard hats which shall be made available to authorized representatives and agents of the Owner and any interested governmental agency while visiting the job site.

7. INSPECTION AND TESTING

7.1. Where testing and inspection of materials or equipment are required by the Contract supplying the applicable materials and equipment, as no separate payment will be made for these services. The laboratory or inspection agency shall be approved by the Owner.

7.2. Where mill tests of materials are required by the Engineer under the Contract Documents, Contractor shall furnish certified copies of such mill tests.

7.3. Where shop equipment performance tests are specified, the Engineer shall be permitted to witness such tests. In the absence of a witnessed test, certified copies of shop tests shall be submitted at the discretion of the Engineer. Cost of Engineer's services and any travel and associated room and board to witness this test will be borne by the Contractor.

7.4. No payment will be made to the Contractor for samples taken for tests such as concrete cylinders, etc., where testing is required by the Contract Documents.

8. SUBSTITUTIONS AND “OR-EQUALS”

8.1. The Owner, through the Engineer, will consider proposals for substitution of materials, equipment, and methods or “or-equal” items only when such proposals are accompanied by full and complete technical data and all other information required to evaluate the proposed substitution.

8.2. The Contractor shall not substitute materials, equipment, or methods unless such substitution or “or-equal” item has been specifically approved for this project by the Engineer.

8.3. The Contract, if awarded, will be on the basis of materials, equipment, and methods defined and specified in the Contract Documents, Specifications, and Drawings, or substitute or “or-equal” materials and equipment as defined in paragraph 8 of the General Conditions approved by the Engineer and identified by Addendum. Request for Engineer’s clarification of materials and equipment considered “or-equal” prior to the Effective Date of the Agreement must be received by the Engineer at least 10 days prior to the date for receipt of bids. Request for Engineer’s clarification of materials and equipment considered as substitutes prior to the Effective Date of the Agreement must be received by the Engineer at least 15 days prior to the date for receipt of bids. Each request must conform to the requirements of the General Conditions and shall be made only by the bidding Contractor. The burden of proof of the merit of the proposed item is upon the Contractor and the Engineer’s decision of approval or disapproval will be final. If Engineer approves any proposed “or-equal” or substitute item, such approval will be set forth in an Addendum issued to all prospective Bidders. Bidding Contractors shall not rely upon approvals in any other manner.

8.4. The Contractor shall verify prior to bidding that all specified items will be available in time for installation during orderly and timely progress of the project.

8.5. In the event specified items will not be so available, the Contractor shall notify the Engineer prior to receipt of bids.

8.6. Costs of delays because of non-availability of specified items, when such delays could have been avoided by the Contractor, will be back charged as necessary and shall not be borne by the Owner.

8.7. In cases where experience clauses are used, an alternate bond or cash deposit may be accepted from manufacturers which do not meet the specified experience period. The bond or cash deposit provided by the manufacturer or supplier will guarantee replacement of the equipment or process in the event of failure or unsatisfactory service. The period of time for which the bond or cash deposit is required shall be the same as the experience period of the time specified.

9. PATENTS

9.1. License and/or royalty fees for the use of a process which is authorized by the Owner of the project must be reasonable and paid to the holder of the patent, or his authorized licensee, directly by the Owner and not by or through the Contractor.

10. SURVEYS, PERMITS, REGULATIONS

10.1. The baseline and benchmark, if applicable, are indicated on the Drawings. The Contractor shall be responsible for all surveying required for laying out and constructing the Work.

10.2. The Contractor shall procure all permits and licenses, pay all charges or fees, and give all notices necessary for the completion of the work.

11. PROTECTION OF WORK, PROPERTY AND PERSONS

11.1. In order to protect the lives and health of his employees under the Contract, the Contractor shall comply with all pertinent provisions of the "Manual of Accident Prevention in Construction" issued by the Associated General Contractors of America, Inc., and shall maintain an accurate record of all cases of death, occupational disease and injury requiring medical attention or causing loss of time from work, arising out of and in the course of employment on work under the Contract.

11.2. The Contractor alone shall be responsible for the safety, efficiency, and adequacy of his plant, appliances and methods, and for any damage which may result from their failure or their improper construction, maintenance, or operation.

11.3. The Contractor shall, at his own expense, shore up and protect any buildings, bridges, or other public or private structures which may be encountered or endangered in the prosecution of the work, and that may not be otherwise provided for, and he shall repair and make good any damages to such property by reason of his operations. All existing fences which were removed by the Contractor due to prosecution of the work shall be replaced by the Contractor. No extra payment will be made for said work or materials.

11.4. Contractor shall repair or replace at his own expense any existing water pipes, power and communication lines, or other public utilities, roads, drainpipes, sewers, drainage ditches and all plantings (including grass) that are damaged during construction. The site shall be left in its present condition after all cleanup work has been done. Any damage to drainage or water pipes, local sewers, or plantings (including grass, utilities, roads, parking space, or other structures) shall be repaired and replaced immediately in the condition found. Such repairs and replacement shall be at the expense of the Contractor.

11.5. Contractor shall preserve all governmental markers (e.g. U.S.G.S., T.V.A., etc.), and none such will be removed or disturbed without prior approval of the Engineer. Any removal and replacement of such markers shall be at the expense of the Contractor.

11.6. The Contractor shall employ watchmen on the work as necessary to protect the work from damage, vandalism, etc., and shall, when necessary, erect and maintain such strong and suitable barriers and such lights as will effectually prevent the happening of any accident to health, limb or property. Lights shall be maintained between the hours of one-half hour before sunset and one-half hour after sunrise.

11.7. Contractor will be required, at his own expense, to do everything necessary to support, protect and sustain all sewer, water or gas pipe; service pipes; electric lights; power, telephone, or telegraph poles; conduits; and other fixtures laid across or along the site of the work. The Engineer, as well as the company or

the corporation owning said poles, pipes or conduits, must be notified by the Contractor before any such fixtures are removed or molested. In case any of the said sewer, gas, or water pipes; service pipes; electric lights; power, telephone or telegraph poles; conduits; or other fixtures are damaged, they shall be repaired by the authorities having control of the same, and the expense of said repairs shall be deducted from the monies due or to become due the Contractor under this Contract.

11.8. Should it become necessary to temporarily change the position or remove any poles, electric conduits, water pipes, gas pipes, or other pipes or wires, the Contractor shall notify the Engineer and company or the corporation owning said poles, pipes or conduits of the location and circumstances, and shall cease work if necessary, until satisfactory arrangements have been made by the owners of the said poles, pipes, conduits, or wires to properly care for the same. No claims for damages will be allowed on account of any delay occasioned thereby. The entire cost of such temporary changes or removal must be included in the unit or lump sum prices bid for the various items of work under this Contract.

11.9. In the event of temporary suspension of work, or during inclement weather, or whenever the Engineer shall direct, the Contractor will, and will cause his subcontractors to protect carefully his and their work and materials against damage or injury from the weather. If, in the opinion of the Engineer, any work or materials shall have been damaged or injured by reason of failure on the part of the Contractor or any of his subcontractors to so protect the work, such materials shall be removed and replaced at the expense of the Contractor.

11.10. Before, during, and after installation, the Contractor shall furnish and maintain satisfactory protection to all equipment against injury by weather, flood or breakage, thereby permitting the work to be left in a perfect condition at the completion of the contract. No extra payment will be made for this work but the entire cost of the same shall be included in the price bid for the construction of the work done under this contract.

11.11. All chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reactant, or of other classification, must show approval of either EPA or USDA. Use of all such chemicals and disposal of residues shall strictly conform with the manufacturer's instructions.

11.12. Reasonable care shall be taken during construction to avoid damage to vegetation. Ornamental shrubbery and tree branches shall be temporarily tied back, where appropriate, to minimize damage. Trees which receive damage to branches shall be trimmed of those branches to improve the appearance of the tree. Tree trunks receiving damage from equipment shall be treated with a tree dressing.

12. SUPERVISION BY CONTRACTOR

12.1. It is understood that the Contractor's representative shall be one who can be continued in that capacity for the particular job involved unless he ceases to be

on the Contractor's payroll. Changes in supervision must be approved by the Engineer.

13. CHANGES IN THE WORK

13.1. All Change Orders, including a change in technical design or an increase in cost, must be approved by the Owner, the Engineer and those governmental agencies whose approval is required.

13.2. Before executing any Change Order involving adjustment of the contract price, where necessary and desirable, the Contractor shall first obtain the consent of his surety.

13.3. No claim for extra work or cost shall be allowed unless the same was done in pursuance of a written order of the Engineer approved by the Owner. When the work is performed under the terms of the General Conditions, the Contractor shall furnish satisfactory bills, payrolls, and vouchers covering all items of cost and when requested by the Owner, give the Owner access to accounts relating thereto.

13.4. The location of utility lines, pavements, and other appurtenant construction shown on the Drawings may be raised or lowered, may be moved from one location to another, or may be lengthened or shortened by the Owner because of clearances needed, easement changes, design changes, or any other reason. In such case, the Contractor shall be entitled to payment for the work based on the unit prices shown in the Bid Schedule. No additional payment will be allowed because of such changes unless the Contractor notifies the Owner in writing prior to commencing that portion of the work and an appropriate change order is prepared.

13.5. If additional time is requested on account of a change in the work, the documentation of the basis for the requested time shall include a detailed justification and calculation relating the time extension to the project schedule and critical path. Any time extensions claimed for abnormal weather must be supported by historical weather records for the period in question. Generally, for changes that do not directly affect work elements on the critical path of the project, additional time will be granted only in proportion to the cost of the change over the original contract price.

13.6. Failure to submit the written notice or failure to document the basis for the change in contract price or time within the times specified shall bar the Contractor from all future claims for a change in contract price or an extension of time on account of the change.

13.7. Changes in contract price will not be granted in connection with so-called “Acts of God” or nature (i.e., floods, storms, earthquakes, etc.).

14. CHANGES IN CONTRACT PRICE

14.1. For any change in contract price, the Contractor shall submit a detailed price breakdown sufficient to permit analysis of all material, labor, equipment,

subcontract, and overhead costs, as well as profit, regardless of whether the change is an increase or a decrease in price. Any amounts claimed by subcontractors must be supported by a similar price breakdown.

14.2. The change in contract price shall be deemed to cover all costs, overhead, and profit attributable to the change, including any delays or impacts related thereto. There will be no reservation of rights for future or further increases in contract price in connection with a particular change.

15. TIME FOR COMPLETION AND LIQUIDATED DAMAGES

15.1. The said amount is fixed and agreed upon by and between the Contractor and the Owner because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the Owner would in such event sustain, and said amount is agreed to be the amount of damages which the Owner would sustain, and said amount shall be retained from time to time by the Owner from current periodic estimates.

15.2. The Owner will suffer financial loss if the project is not Substantially Completed on the date set forth in the Contract Documents. The Contractor and his Surety shall be liable for and shall pay to the Owner the sums stipulated in the Bid or Contract as fixed, agreed, and liquidated damages for each calendar day of delay until the project is Substantially Completed.

16. CORRECTION OF WORK

16.1. If, in the opinion of the Engineer, it is undesirable to replace any defective or damaged materials or to reconstruct or correct any portion of the work injured or not performed in accordance with the Contract Documents, the compensation to be paid to the Contractor hereunder shall be reduced by such amount as, in the judgment of the Engineer, shall be equitable.

17. SUBSURFACE CONDITIONS

17.1. Owner and Engineer make no representations or guarantee, either expressed or implied, about any subsurface conditions that may be encountered within the scope of the project. The Contractor should satisfy himself/herself by on-site inspections, core-drillings or other methods of the subsurface conditions that may be encountered. The risk of encountering and correcting such subsurface conditions shall be borne solely by the Contractor, and the Contract price shall include the cost of performing the work complete-in-place.

17.2. The Engineer may have made certain subsurface explorations in the vicinity of the work to be constructed under this Contract. These borings were made only for the Engineer's information in designing the project. Copies of these logs of borings and their locations will be provided to prospective Bidders upon request. These logs of borings are furnished only as information to Bidders for whatever interpretation and use they desire to make of conditions found when the borings were made. The Owner and Engineer do not warrant that the same conditions exist between borings and the Bidder shall satisfy himself as to the nature of the subsurface conditions throughout the project. If the Bidder wishes to make

borings at any location, he shall be afforded the opportunity to do so. Cost of such borings shall be at the Bidder's expense.

18. SUSPENSION OF WORK, TERMINATION, AND DELAY

18.1. In the event a portion of the work is delayed or interrupted, the Contractor shall continue to prosecute those portions of the work unaffected by the delay or interruption.

18.2. In the event of a delay or interruption in the work, the Contractor shall make reasonable and appropriate adjustments in his job site resources (manpower and equipment) to minimize the overall cost impact of the delay or interruption.

18.3. In the event of a delay or interruption in the work due to the failure of the Owner or Engineer to act within the time specified in the Contract Documents, or if no time is specified, within a reasonable time, the Contractor shall so notify the Engineer in writing immediately upon becoming aware of the delay. The Contractor shall submit a detailed justification for any claim for adjustment in contract price or extension in contract time on account of the delay or interruption as soon as the price or time impact can be quantified, but in no case later than 30 days following the end of the delay or interruption. Failure to submit the written notification or the justification within the time specified shall bar the Contractor from all future claims for adjustment in contract price or time on account of the delay.

19. PAYMENTS TO CONTRACTOR

19.1. No separate payment will be made for any items specified in the General Conditions or Supplemental General Conditions. Payments for such items shall be included in the unit price and lump sum prices bid by the Contractor for items listed in the Bid Schedule.

20. ACCEPTANCE OF FINAL PAYMENT AS RELEASE

20.1. (RESERVED)

21. INSURANCE

21.1. Each insurance policy shall be renewed at least 30 days before the expiration date thereof.

21.2. Insurance must be carried by a recognized insurance company licensed to do business in the state in which the project is constructed and approved by the Owner's Attorney.

21.3. The Contractor's and his Subcontractor's Public Liability and Property Damage Insurance shall provide protection in the amounts specified in Paragraph 21.3.1 of the General Conditions and as further specified in the Special Conditions (if included) against the following special hazards:

(a) Blasting damage

(b) Damage to existing structures

(c) Damage to private driveways, walks, shrubbery, plantings, etc.

(d) Damage to public utilities, electric, water, telephone, gas, sewerage, etc.

(e) Damage to U.S. Government markers.

21.4. The Contractor shall not commence work under this Contract until he has obtained all the insurance required and such insurance has been approved by the Owner, nor shall the Contractor allow any subcontractor to commence work on his subcontract until the insurance required of the subcontractor has been so obtained and approved.

21.5. In the event any insurance coverage should be canceled or allowed to lapse, Contractor will not be permitted to work until adequate and satisfactory insurance is in effect. Failure to keep insurance policies in effect WILL NOT be cause for any claims for extension of time under this Contract.

21.6. Limits of liability for general public liability and property damage insurance shall not be less than:

(a)	Bodily Injury	$1,000,000 each person $1,000,000 each occurrence
(b)	Property Damage	$500,000 each occurrence $500,000 aggregate

21.7. Limits of liability for comprehensive motor vehicle liability and property damage insurance.

(a)	Bodily Injury	$1,000,000 each person $1,000,000 each occurrence
(b)	Property Damage	$250,000 each occurrence

21.8. The Contractor shall provide builder's risk insurance to protect the Contractor and the Owner against risks of damage to buildings, structures, materials, and equipment not otherwise covered under installation floater insurance, from the perils of fire and lightning, the perils included in the standard extended coverage endorsement, and the perils of vandalism and malicious mischief. The amount of such insurance shall be not less than the insurable value of the work at completion less the value of the materials and equipment insured under installation floater insurance. If the work does not include the construction of building structures, builder's risk insurance may be omitted providing the installation floater insurance fully covers the work.

21.9. The Contractor shall provide installation floater insurance to protect the Contractor and the Owner from all insurable risks of physical loss or damage to materials, products and equipment not otherwise covered under builder's risk insurance while in warehouses or storage areas, during installation, during testing, and after the work is completed. Equipment such as pumps, motors, engine-generators, compressors, process equipment, switchgear, transformers, panel boards, control equipment, and other similar equipment shall be insured

under installation floater insurance when the aggregate value of the equipment exceeds $10,000.

21.10. If the work does not include the construction of building structures or installation of equipment, the builder's risk insurance and installation floater insurance may be omitted.

22. CONTRACT SECURITY

22.1. A Payment Bond in the amount of 100 percent of the contract price and a Performance Bond in the amount of 100 percent of the contract price shall be required in the form set forth in the Contract Documents.

23. ASSIGNMENTS

23.1. In case the Contractor assigns all or any part of any monies due or to become due under this Contract, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any monies due or to become due to the Contractor shall be subject to prior claims of all persons, firms and corporations for services rendered or materials supplied for the performance of the work called for in this contract.

24. INDEMNIFICATION

24.1. (RESERVED)

25. SEPARATE CONTRACTS

25.1. (RESERVED)

26. SUBCONTRACTING

26.1. The Contractor shall not award any work to any Subcontractor without prior written approval of the Owner, which approval will not be given until the Contractor submits to the Owner a written statement concerning the proposed award to the Subcontractor, which statement shall contain such information as the Owner may require.

27. ENGINEER'S AUTHORITY

27.1. The Engineer may appoint such resident project representatives as he may desire. Scope of the resident project representative's authority will extend to all parts of the work and to the preparation and manufacture of the materials to be used. A resident project representative is placed on the work to keep the Engineer and Owner informed as to the progress of construction and the manner in which it is being done and also to call to the attention of the Contractor any deviation from the Drawings and Specifications.

27.2. The resident project representatives have the authority to reject defective material or work that is being improperly done subject to the final decision of the Engineer. The resident project representatives are not authorized to revoke,

alter, enlarge, or relax the provisions of these conditions, nor are they authorized to approve or accept any portion of the completed work, or to issue instructions contrary to the Drawings and Specifications.

27.3. The Contractor may request written instructions from the Engineer upon any important items which lie within the resident project representative's jurisdiction.

28. LAND AND RIGHTS-OF-WAY

28.1. In the event all land and rights-of-way have not been obtained as herein contemplated before construction begins, the Contractor shall begin the work upon such land and rights-of-way as the Owner may have previously acquired, and no claim for damages whatsoever will be allowed by reason of the delay in obtaining the remaining land and rights-of-way. Should the Owner be prevented or enjoined from proceeding with the work, or from authorizing its prosecution, either before or after the commencement, by reason of any litigation, or by reason of its inability to procure any lands or rights-of-way for the work, the Contractor shall not be entitled to make or assert claim for damage by reason of said delay, or to withdraw from the Contract except by consent of the Owner; but time for completion of the work will be extended to such time as the Owner determines will compensate for the time lost by such delay such determination to be set forth in writing.

29. GUARANTY

29.1. (RESERVED)

30. DISPUTES

30.1. (RESERVED)

31. TAXES

31.1. (RESERVED)

32. CONFLICTING CONDITIONS

32.1. Any provision in any of the Contract Documents which may be in conflict or inconsistent with any of the paragraphs in the General Conditions or the Federal Regulations shall be void to the extent of such conflict or inconsistency except if when and as clarified by the Supplemental General Conditions. Interpretations of any conflicts not clarified may be requested by the Contractor in writing to the Engineer. In the event of conflicts between funding agency documents, the more restrictive will apply.

32.2. In case of unresolved conflict between items of the Contract Documents, the following order of precedence shall govern, with the higher item taking precedence over a lower item:

(a) Contract (including Supplemental Agreements and Change Orders thereto)

(b) Addenda
(c) Bid Proposal
(d) Supplemental General Conditions
(e) General Conditions
(f) Specifications
(g) Governing Standard Specifications
(h) Schedules on Drawings
(i) Notes on Drawings
(j) Details on Drawings
(k) Large Scale Drawings
(l) Small Scale Drawings
(m) Dimensions Given in Figures
(n) Scaled Dimensions

32.3. In the event of any discrepancy between any drawing and the figure written thereon, the figures, unless obviously incorrect, shall be taken as correct.

33. REQUIRED PROVISIONS DEEMED INSERTED

33.1. Each and every provision of law and clause required by law to be inserted in this Contract shall be deemed to be inserted herein, and the Contract shall be read and enforced as though it were included herein, and 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 or correction.

34. PROHIBITED INTEREST

34.1. No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this Contract or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this Contract if made with a corporation for its general benefit.

34.2. No official of the Owner who is authorized in such capacity and on behalf of the Owner to negotiate, make, accept or approve, or to take part in negotiating, making, accepting or approving any architectural, engineering, inspection, construction or material supply contract or any subcontract in connection with the construction of the Project, shall become directly or indirectly interested personally in this Contract or in any part hereof. No officer, employee, architect, attorney, engineer or inspector of or for the Owner who is authorized in such capacity and on behalf of the Owner to exercise any legislative, executive, supervisory or other similar functions in connection with the construction of the Project, shall become directly or indirectly interested personally in this contract or in any part thereof, any material, supply contract, subcontract, insurance contract, or any other contract pertaining to the Project.

35. USE OF PREMISES AND REMOVAL OF DEBRIS

35.1. The Contractor expressly undertakes at his own expense:

(a) To take every precaution against injuries to persons or damage to property;

(b) To store his apparatus, materials, supplies and equipment in such orderly fashion at the site of the work as will not unduly interfere with the progress of his work or the work of any other contractors;

(c) To place upon the Work or any part thereof only such loads as are consistent with the safety of that portion of the Work;

(d) To clean up frequently all refuse, rubbish, scrap materials and debris caused by these operations, to the end that at all times the site of the Work shall present a neat, orderly and workmanlike appearance;

(e) Before final payment to remove all surplus material, false work, temporary structures, including foundations thereof, plant of any description and debris of every nature resulting from his operations, and to put the site in a neat, orderly condition;

(f) To effect all cutting, fitting or patching of his work required to make the same to conform to the Drawings and Specifications and, except with the consent of the Engineer, not to cut or otherwise alter the work of any other contractor.

36. ESTIMATE OF QUANTITIES

36.1. Wherever the estimated quantities of work to be done and materials to be furnished under this Contract are shown in any of the Contract Documents including the proposal, they are given for use in comparing Bids, and the right is especially reserved except as herein otherwise specifically limited, to increase or diminish them as may be deemed reasonably necessary or desirable by the Owner to complete the Work contemplated by this Contract, and such increase or decrease shall in no way nullify this Contract, nor shall any such increase or decrease give cause for claims or liability for damages.

37. CONTRACTOR'S OBLIGATIONS

37.1. The Contractor shall in good workmanlike manner perform all work and furnish all supplies and materials, machinery, equipment, facilities and means, except as herein otherwise expressly specified, necessary or proper to perform and complete the Work required by this Contract, within the time herein specified, in accordance with the provisions of this Contract and said Specifications and in accordance with the Drawings covered by this Contract and all supplemental drawings, and in accordance with the directions of the Engineer as given from time to time during the progress of the Work. He shall furnish, erect, maintain and remove such construction plant and such temporary works as may be required. The Contractor shall observe, comply with and be subject to all terms,

conditions, requirements, and limitations of the Contract and Specifications and shall do, carry on, and complete the entire work to the satisfaction of the Engineer and the Owner.

37.2. The Contractor shall restore disturbed areas to original or better condition.

37.3. When work performed under this Contract is in areas where easements and working agreements have been obtained by the Owner on private properties, it shall be the responsibility of the Contractor to protect trees, shrubs, gardens, etc., insomuch as is possible and to restore said properties to the satisfaction of the property owners, said protection and restoration shall include but not be limited to the fencing off of trees and shrubs, transplanting of trees and shrubs, etc., replacing topsoil removed with topsoil of equal or better quality, re-grassing, and replacing fences. All expenses for said protection and restoration shall be borne by the Contractor, and no separate payment shall be made for this work.

37.4. When work is done on private property in easements and working agreements obtained by the Owner, the Contractor shall furnish affidavits from the property owners attesting to the fact that their property has been satisfactorily restored before that portion of the work will be considered for final payment.

38. PAYMENTS BY CONTRACTOR

38.1. The Contractor shall pay (a) for all transportation and utility services not later than the 20th day of the calendar month following that in which services are rendered, (b) for all materials, tools, and other expendable equipment to the extent of 90 percent of the cost thereof, not later than the 20th day of the calendar month following that in which such materials, tools, and equipment are delivered at the site of the Project, and the balance of the cost thereof not later than the 30th day following the completion of that part of the Work in or on which such materials, tools, and equipment are incorporated or used, and (c) to each of his subcontractors, not later than the 5th day following each payment to the Contractor, the respective amounts allowed the Contractor on account of the work performed by his subcontractors to the extent of each subcontractor's interest therein.

39. INFORMATION TO BE FURNISHED

39.1. Contractor shall fill out all questionnaire forms completely in preparing his Bid and after award shall supply to the Engineer all pertinent information required.

40. WAIVER

40.1. It is expressly understood and agreed that any waiver granted by the Engineer or the Owner of any term, provision or covenant of this Contract shall not constitute a precedent nor breach of the same or any other terms, provisions or covenants of this Contract.

40.2. Neither the acceptance of the Work by the Owner nor the payment of all or any part of the sum due the Contractor hereunder shall constitute a waiver by the

Owner of any claim which the Owner may have against the Contractor or surety under this Contract or otherwise.

41. CONNECTING OF EXISTING WORK

41.1. Contractor shall remove such existing masonry and piping as is necessary in order to make the proper connections to these structures at the locations shown. Also, he shall make the necessary pipeline, roadway, and other connections at the several points in order that on completion of the Contract, all required flows may flow through the several pipelines and structures. No extra payment shall be made for this work, but the entire cost of the same shall be included in the price bid for the various items of the Work to be done under this Contract.

42. PROGRAM AND METHOD OF CONSTRUCTION

42.1. The order or sequence of execution of the Work and the general arrangements of the construction plant to be installed shall at all times be subject to the review of the Engineer. If at any time before the commencement or during the progress of the Work, or any part of it, such features, and appliances used or to be used appear to the Engineer as insufficient, or improper, he may order the Contractor to improve their character, and the Contractor shall conform to such orders, but the failure of the Engineer to demand any increase of safety, efficiency, adequacy, or any improvement shall not release the Contractor from his obligation to secure the safe conduct and quality of the Work specified.

43. BUILDINGS AND SHANTIES

43.1. No shanties, camps, or buildings for the housing of men employed on the Work shall be erected on land owned or leased by the Owner unless a permit, in writing, is secured from the Owner allowing their construction. Should permission be asked and granted, the Contractor must comply with all regulations regarding the construction and maintenance of such buildings.

44. CONSTRUCTION METHODS AND PROTECTION OF PROPERTIES

44.1. Cooperation with Utilities - The Contractor shall be cooperative at all times with all utilities, or their duly authorized agent or contractor, installing or connecting new services and shall coordinate all phases of the work with said utilities to avoid unnecessary delays or complications.

44.2. Damage to Property

(a) The Contractor is warned to prevent excessive dust or air pollution that may disfigure or soil any public or private facilities. The use of water sprinklers or other approved devices to reduce dust will be necessary if such is the case. Additionally, in cases of heavy rains or storms, every effort shall be made to prevent mud or water which may result due to the construction from accumulating on or damaging any property or any private owner.

(b) Contractor shall use special care in working in areas where the right-of-way crosses private property. Contractor shall also replace, at his/her own expense, any existing water pipes, power lines, communication lines, or other public utilities, roads, drainpipes, sewers, drainage ditches, and all plantings including grass and/or sod on private property. The site shall be left in its present condition after all cleanup work has been done. Any damage to drainage pipes, water pipes, local sewers, plantings (including grass and/or sod), utilities, roads, parking space, or other structures shall be repaired and replaced immediately in the condition found. Such repairs and replacement shall be at the expense of the Contractor.

44.3. Existing Sanitary, Combined and/or Storm Sewers

(a) Whenever existing sewers are broken or damaged as a result of traffic or excavation by the Contractor, the maintenance, replacement, and/or repairs to the damaged existing sanitary, combined, and/or storm sewer shall be the Contractor's responsibility, except as otherwise provided for on the Drawings and in the Contract Documents, or as authorized by the Engineer, and the expense of maintaining, repairing, replacing, or connecting to existing sewers shall be borne by the Contractor.

(b) No separate payment will be made for handling sewage from existing sewers or interrupted connections, since it shall be the responsibility of the Contractor to maintain services until such time as the proposed or relocated sewers can be constructed. If the Contractor should damage any existing sewer, such that it affects the public interest, health, or general welfare, the Contractor shall replace or repair that sewer at his/her own expense as directed by the Engineer.

(c) Contractor shall make all connections to existing sewerage facilities as shown on the Drawings.

45. SEWAGE, SURFACE, AND FLOOD FLOWS

45.1. The Contractor shall furnish all the necessary equipment, shall take all necessary precautions and shall assume the entire cost of handling any sewage, seepage, storm, surface, and flood flows which may be encountered at any time during the construction of the Work. The manner of providing for these flows shall meet the approval of the Engineer, and the entire cost of said work shall be included in prices bid for the various items of the Work to be done under this Contract.

45.2. The Contractor will minimize siltation and bank erosion during construction.

45.3. During the period of construction, the Contractor shall cooperate with the Owner's employees in maintaining all existing collection, pumping, and treatment facilities in operation. The cost of any temporary conveyances or bypass pumping shall be included in the price bid for other items of work under this Contract, as no separate payment will be made.

45.4. The Contractor shall not discharge or allow discharge of pollutants, as defined in the Clean Water Act, including fill and sediment, into waters of the State or

United States, including wetlands, unless authorized by an appropriate State or Federal permit. This prohibition specifically applies to silt and sediment in storm water runoff and in water pumped from trenches and excavations.

45.5. In the event that pollutants are discharged or otherwise released to the environment as the result of the Contractor's negligence or unlawful conduct, it is understood and agreed that the Contractor shall bear all risks associated with such release(s), shall indemnify the Owner and the Engineer from any liabilities resulting from the release(s), and shall not make any claim for additional compensation for delays or damage resulting from such release(s).

46. OBSTRUCTIONS ENCOUNTERED

46.1. In addition to showing the structures to be built under this Contract, the Drawings show certain information obtained by the Owner regarding the pipelines and other structures which exist along the site of the Work, both at and below the surface of the ground. The Owner expressly disclaims any responsibility for the accuracy or completeness of the information given on the Drawings with regard to existing structures and pipelines, and the Contractor will not be entitled to any extra compensation on account of inaccuracy or incompleteness of such information, said structures and pipelines being shown only for the convenience of the Contractor who must verify the information to his own satisfaction. The giving of this information upon the Drawings will not relieve the Contractor of his obligations to support and protect all pipelines and other structures which may be encountered during the construction of the work and to make good all damages done to such pipelines and structures as provided in these Supplemental General Conditions.

47. USE OF STREETS

47.1. During the progress of the Work, the Contractor shall make ample provision for both vehicular and foot traffic on any public road and shall indemnify and save harmless the Owner from any expense whatsoever due to his operations over said roadways. The Contractor shall also provide free access to all fire hydrants, water and gas valves located along the line of his work. Gutters and waterways must be kept open or other provisions made for the removal of storm water. Street intersections may be blocked only one-half at a time, and the Contractor shall lay and maintain temporary driveways, bridges and crossings such as in the opinion of the Engineer are necessary to reasonably accommodate the public and to provide access to needed private driveways. In the event of the Contractor's failure to comply with these provisions, the Owner may cause the same to be done and will deduct the cost of such work from any monies due or to become due the Contractor under this Contract, but the performance of such work by the Owner or at its insistence shall serve in no way to release the Contractor from his general or particular liability for the safety of the public or the Work.

47.2. Required line crossings of all streets and roads shall be done in accordance with the applicable state Department of Transportation procedures.

47.3. Contractor will be permitted to close a street when necessary for the proper prosecution of the work. The Contractor shall keep the Police and Fire Department continuously informed as to his intentions to close streets and give the Police Department sufficient notice in order that "No Parking" signs may be placed at the proper time to clear the street for construction.

47.4. The Contractor shall maintain property barricades and flagmen to detour traffic.

47.5. At all times the Contractor is responsible for damage to city and county streets as a result of their use in this project. The streets must be kept clear of all dirt, stone, or other debris. All debris, dirt, etc., whether caused by rains, storms, spillage from trucks or otherwise, shall be kept out of sewers. The Contractor is responsible for and may not plead ignorance of city and county ordinances and amendments thereto that may affect this use of streets or sewers.

48. CONSULTING AND RESIDENT OBSERVATION SERVICES DURING CONSTRUCTION

48.1. In providing the Owner with consulting services and resident project representation during construction, the Engineers and their employees do not assume any duty to supervise construction means or methods and safety procedures followed by any contractor, subcontractor and/or their respective employees or to any other person; nor for any public liability or for property damage caused through acts of the Contractor, subcontractor and/or their respective employees or any other person.

49. SAFETY AND HEALTH REGULATIONS

49.1. The Contractor shall comply with the Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91-596) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL 91-54).

49.2. Contractor shall allow free access to any Department of Labor Representative for inspection purposes.

50. ACCESS BY REPRESENTATIVES OF GOVERNMENTAL AGENCIES

50.1. The authorized representatives and agents of all governmental agencies involved in this project shall have access to the work at all times and shall be permitted to inspect all work, materials, payrolls, records of personnel, invoices of materials, and other relevant data and records. Contractor shall provide proper facilities for the access and inspection of the work by such persons.

51. LOCAL AND STATE LAWS

51.1. The Contractor shall abide by all local and State laws or ordinances to the extent that such requirements do not conflict with Federal laws or regulations.

52. NEW JOB OPPORTUNITIES (WHERE REQUIRED BY FUNDING AGENCY ONLY)

52.1. The Contractor shall:

(a) To the maximum extent practicable, follow hiring and employment practices which will assure that performance of the Work results in new job opportunities for the unemployed and the underemployed; and

(b) Insert or cause to be inserted the same or similar provisions in each construction subcontract.

53. CONSTRUCTION RESTRICTIONS

53.1. Heavy construction machinery shall not be used within 500 feet of residential areas between the hours of 06:30 pm and 6:30 am except as otherwise provided herein.

53.2. No blasting or drilling shall be performed within 500 feet of residential areas between the hours of 06:30 pm. and 6:30 am.

54. LEAD BASE PAINT AND JOINT SEALERS

54.1. No lead-based paints, protective coatings or joint sealers may be used on this project.

55. ASPHALT

55.1. Pursuant to the conditions as set out in the Specifications for hot asphaltic concrete binder and surface courses with particular reference to the limitations or temperature and weather conditions, the Owner may at its option and upon written notice, suspend the Contract over the winter and bad weather months. The Contract may then be resumed when weather conditions will permit the application of the above pavement, at the discretion of the Engineer. The notice to resume said contract shall be in writing. The suspended period will in no way be counted against the Contractor's allotted time to do the entire work.

55.2. This provision does not relieve the Contractor of the responsibility to maintain existing work already completed or any other responsibilities of the Contract; nor shall the Contractor, upon the basis of this fair notice herein; be eligible to make claim for or receive any damages for loss of overhead, plant expense, or anticipated profits, nor any other expenses incurred due to delay.

56. ABANDONMENT OR TERMINATION OF CONTRACT

56.1. For contracts over $10,000, the Owner reserves the right to abandon the Contract if it will be in the Owner's best interest. The Contractor will be paid a fair payment, as negotiated with the Owner, for the work completed to date.

57. EVIDENCE OF PAYMENT

57.1. Contractor may be asked to present acceptable evidence from time to time that all bills have been paid for labor, materials, and equipment for which payment on account has been made in monthly estimates. Before final payment is made, Contractor shall, if required by the Owner, present sworn affidavit that all labor,

materials, equipment, and service engaged for the work have been paid in full and that there are no outstanding debts or liens on any portions of the work.

58. ACCESSIBILITY OF RECORDS (PROJECTS WITH FEDERAL FUNDS ONLY)

58.1. The Owner, representatives of applicable federal agencies, the Comptroller General of the United States, or any of their duly authorized representatives, for a period of three years beyond completion of the Contract, shall have access to any books, documents, papers, and records of the Contractor which are directly pertinent to this Project for the purpose of making audit, examination, excerpts, and transcriptions of contracts in excess of $10,000.

59. WORK WEEK, OVERTIME PAY, SHOW-UP PAY, AND ON-CALL PAY

59.1. All work performed under this Contract shall be performed on a 40-hour work week basis and shall include not only the prime Contractor but any and all subcontractors. The 40-hour work week shall be established by the Contractor at the Pre-construction Conference. Any deviation from the established work week will be approved in advance in writing by the Owner. Any additional cost incurred by the Owner due to deviations from the established work week will be borne by the Contractor. The Contractor shall provide written acknowledgment that he will pay any overtime cost incurred by the Owner at the time of requesting an increase in the 40-hour work week.

59.2. The Contractor will be assessed for each hour of overtime incurred by the Engineer's field representative(s) as a result of extended work hours (i.e., a total of more than 40 hours per calendar week) by the Contractor or his subcontractors.

59.3. If the Contractor advises the Engineer's field representative(s) that he will work on a particular day and subsequently decides not to work and does not so advise the representative(s) before he departs for the job site, the Contractor will be assessed an amount equal to 2 hours of the representative's time for "show-up" pay plus round-trip travel time and mileage. Show-up pay will not be assessed in the event of inability to work due to unanticipated inclement weather.

59.4. If the Contractor requests that the Engineer's field representative(s) be available to work on a weekend or a holiday but does not actually commit to work, the Contractor will be assessed an amount equal to 8 hours of the representative's time for "on-call" pay for each day that the Contractor so requests.

59.5. The above assessments for field representative's overtime pay, show-up pay, and on-call pay will be deducted as a separate line item on the Contractor's next progress payment request. Unless otherwise stated, the Engineer's field representative's time will be assessed at $90.00 per hour for regular time and $135.00 per hour for overtime.

59.6. Available working times are Monday through Friday, 6:30 am to 6:30 pm except as otherwise provided herein. Work outside these times shall only be performed with the Owners permission.

END OF SECTION

SECTION 00 7373

SUPPLEMENTAL GENERAL CONDITIONS FOR TENNESSEE

A. LOCAL AND STATE LAWS

Senate Bill No. 1726 (Public Acts 1978 [Chapter 692]), known as the Underground Utility Damage Prevention Act (and all amendments thereto), enacted by the General Assembly of the State of Tennessee, is in its entirety to be considered a part of these documents.

B. TENNESSEE WATER QUALITY CONTROL ACT OF 1977

Tennessee Code Annotated (TCA) 69-3-108, Rule 1200-4-10-.05 (General NPDES Permit for Storm Water Discharges Associated with Construction Activity) requirements, in their entirety, shall be considered a part of these documents.

C. CONTRACTORS LICENSING ACT OF 1976

House Bill No. 2180 (Public Chapter No. 882) known as the Contractors Licensing Act of 1976 (and all amendments thereto), enacted by the General Assembly of the State of Tennessee, is in its entirety to be considered a part of these Specifications.

D. BLASTING - T.C.A. §68-105-103

Persons who conduct blasting operations must notify Department of Commerce and Insurance at least 72 hours prior to the commencement of the operation. Civil penalties may be imposed for failure to comply.

E. ESCROW ACCOUNT OF CONTRACTOR RETAINAGE (Contracts over $500,000)

1. Tennessee Code Annotated (TCA) 66-34-104 as amended (Public Chapter No. 340) House Bill No. 966 and Senate Bill No. 388. If applicable, the Owner will set up separate escrow account for deposit of retainage due Contractor in accordance with TCA 66-34-104 and amendments. These requirements shall be a part of these Specifications in their entirety.

2. TCA 66-34-104. Retention of Portion of Contract Price in Escrow — Applicability — Mandatory Compliance

    (a) Whenever, in any contract for the improvement of real property, a certain amount or percentage of the contract price is retained, that retained amount shall be deposited in a separate, interest bearing, escrow account with a third party which must be established upon the withholding of any retainage.

    (b) As of the time of the deposit of the retained funds, the funds shall become the sole and separate property of the prime contractor or remote contractor to whom they are owed, subject to the rights of the person withholding the retainage in the event the prime contractor or remote contractor otherwise entitled to the funds defaults on or does not complete its contract.

(c) In the event that the party withholding the retained funds fails to deposit the funds into an escrow account as provided herein, such party shall be responsible for paying the owner of the retained funds an additional three-hundred-dollar ($300) penalty per day for each and every day that such retained funds are not deposited into such escrow account.

(d) The party with the responsibility for depositing the retained amount in a separate, interest-bearing, escrow account with a third party shall have the affirmative duty to provide written notice that it has complied with the requirements of this section to any prime contractor upon withholding the amount of retained funds from each and every application for payment, including:

1. Identification of the name of the financial institution with whom the escrow account has been established;

2. Account number; and

3. Amount of retained funds that are deposited in the escrow account with the third party.

(e) Upon satisfactory completion of the contract, to be evidenced by a written release by the owner or prime contractor owing the retainage, all funds accumulated in the escrow account together with all interest on the account shall be paid immediately to the prime contractor or remote contractor to whom the funds and interest are owed.

(f) In the event the owner or prime contractor, as applicable, fails or refuses to execute the release provided for in subsection (c), then the prime contractor or remote contractor, as applicable, may seek any remedy in a court of proper jurisdiction and the person holding the fund as escrow agent shall bear no liability for the nonpayment of the fund to the prime contractor or remote contractor; provided, however, that all claims, demands, disputes, controversies, and differences that may arise between the owner, prime contractor or prime contractors, and remote contractor or remote contractors regarding the funds may be, upon written agreement of all parties concerned, settled by arbitration conducted pursuant to the Tennessee Uniform Arbitration Act, compiled in title 4, chapter 5, part 3, or the Federal Arbitration Act, 9 U.S.C. § 1, et seq., as may be applicable.

(g) In contracts to which the state or any department, board or agency of the state, including the University of Tennessee, is a party, interest shall be paid on the retained amounts at the same rate interest is paid on the funds of local governments participating in the local government investment pool established pursuant to § 9-4-704, for the contract period.

(h) The provisions of this section shall be applicable to the state, any department, board or agency of the state, including the University of Tennessee, and all counties and municipalities and all departments,

boards or agencies of the counties and municipalities, including all school and education boards, and any other subdivision of the state.

(i) This section shall be applicable to all prime contracts and all subcontracts thereunder for the improvement of real property when the contract amount of such prime contract is five hundred thousand dollars ($500,000) or greater, notwithstanding the amount of such subcontracts.

(j) Compliance with this section shall be mandatory and may not be waived by contract.

(k) Failure to deposit the retained funds into an escrow account as provided herein, within seven (7) days' receipt of written notice regarding such failure, is a class A misdemeanor.

[Acts 1975, ch. 345, §§ 1-4; TCA, §§ 64-1148—64-1151; Acts 1985, ch. 340, §§ 1, 2; 1986, ch. 551, § 9; 2007, ch. 189, § 43; 2007, ch. 201, §§ 1, 2; TCA § 66-11-144; Acts 2008, ch. 804, §§ 1, 2; 2010, ch. 875, § § 1, 2; 2012, ch. 609, § § 2-5.]

3. TCA 66-34-203. Withholding of Payment or Retainage by Owner

Nothing in this chapter shall prevent the owner from reasonably withholding payment or a portion of a payment to the contractor; provided, that such withholding is in accordance with the provisions of the written contract between the owner and the contractor. The owner may also withhold a reasonable amount of retainage as specified in the written contract between the owner and the contractor; provided, however, that the retainage amount may not exceed five percent (5%) of the amount of the contract.

[Acts 1991, ch. 45, § 1; 2007, ch. 201, § 4.]

4. TCA 66-34-103. Withholding of Retainage — Violations — Penalties

(a) All construction contracts on any project in this state, both public and private, may provide for the withholding of retainage; provided, however, that the retainage amount may not exceed five percent (5%) of the amount of the contract.

(b) The owner, whether public or private, shall release and pay all retainages for work completed pursuant to the terms of any contract to the prime contractor within ninety (90) days after completion of the work or within ninety (90) days after substantial completion of the project for work completed, whichever occurs first. As used in this subsection (b), work completed shall be construed to mean the completion of the scope of the work and all terms and conditions covered by the contract under which the retainage is being held. The prime contractor shall pay all retainages due any subcontractor within ten (10) days after receipt of the retainages from the owner. Any subcontractor receiving the retainage from the prime contractor shall pay to any subcontractor or material supplier all retainages due the subcontractor or material supplier within ten (10) days after receipt of the retainages.

(c) Any default in the making of the payments shall be subject to those remedies provided in this part.

(d) In the event that an owner or prime contractor withholds retainage that is for the use and benefit of the prime contractor or its subcontractors pursuant to § 66-34-104(a) and (b), neither the prime contractor nor any of its subcontractors shall be required to deposit additional retained funds into an escrow account in accordance with § 66-34-104(a) and (b).

(e) (1) It is an offense for a person, firm, or corporation to fail to comply with subsection (a) or (b) or § 66-34-104(a).

(2) (A) A violation of this subsection (e) is a Class A misdemeanor, subject to a fine only of three thousand dollars ($3,000).

(B) Each day a person, firm or corporation fails to comply with subsection (a) or (b) or § 66-34-104(a) is a separate violation of this subsection (e).

(C) Until the violation of this subsection (e) is remediated by compliance, the punishment for each violation shall be consecutive to all other such violations.

(3) In addition to the fine imposed pursuant to subdivisions (e)(2)(A) and (B), the court shall order restitution be made to the owner of the retained funds. In determining the appropriate amount of restitution, the formula stated in § 40-35-304 shall be used.

[Acts 2007, ch. 201, § 3; 2008, ch. 804, § 3; 2012, ch. 609, § 1.]

F. CONFLICTS BETWEEN DOCUMENTS

In the event of conflicts between funding agency documents, the more restrictive shall apply.

SECTION 01 1100

SUMMARY OF WORK

1. GENERAL

1.1 SCOPE

A. The work described in these Contract Documents consists of furnishing, delivering, and installing all materials, equipment, and products for the construction of the following major elements: construction of a package fixed film wastewater treatment system, including FRP tankage, pumps, mixers, filters, UV disinfection equipment, drip dispersal facilities, and associated site and electrical work for a complete project as shown or specified in the Contract Documents.

B. Furnish all materials, power, equipment, tools, labor, transportation, and other items necessary or convenient to the Contractor for the installation of the equipment, materials, and products specified or described in these Contract Documents and for the completion of all work to be performed by the Contractor as specified herein.

C. Coordinate the startup of the Wastewater Treatment Plant and Drip Dispersal Facilities project with the Sewer Collection System project. The Sewer Collection System project is a separate contract the Owner has entered into that is to be concurrently constructed. Neither this contract nor the Sewer Collection System project can be started up without the other concurrently occurring. The contract time under this contract is to complete the Wastewater Treatment Plant and Drip Dispersal Facilities and be ready for closeout. The Wastewater Treatment Plant and Drip Dispersal Facilities must be ready for startup and operation within 425 days from the Notice to Proceed.

D. The work includes, but is not limited to, the following major work elements:

1. Installation of a package fixed film wastewater treatment system, including FRP tankage, pumps, and mixers

2. Construction of a masonry building

3. Installation of a skid mounted filtration and UV disinfection equipment system

4. Installation of drip dispersal facilities

5. Site work

6. Site Piping

7. Electrical and control facilities

8. The Contractor shall be responsible for selection and payment of the geotechnical engineer and concrete testing services are required on drawing

S1.0. The contractor shall submit to the Engineer for his approval the firm(s) to be utilized.

1.2 PROJECT COORDINATION

A. The Contractor shall be responsible for project coordination, which includes but is not limited to the following:

1. Work of employees and subcontractors under contract to him. Conduct work to ensure compliance with schedules.

2. Submission of all invoices, progress schedules, progress reports, progress estimates, and other data needed in support of requests for payment.

3. Product and equipment deliveries adequate to maintain the schedule of construction. Report noncompliance to Owner with a recommendation for remedy.

4. Obtaining and use of all temporary structures, offices, storage sheds, and utilities.

5. Obtaining any required building permits, special permits, and approvals from all authorities having jurisdiction.

6. Testing laboratory activities associated with Contractor's scope of work.

7. Check-out of systems and equipment and start-up operations.

8. Work and operations between the Contractor and all trades in such a manner that no union labor dispute of jurisdiction arises regarding unloading, handling, installations, and connections to utilities and otherwise of the various items in the various trades.

B. Coordination with Ongoing City Operations:

1. One week prior to construction activities, the Contractor shall notify property owners adjacent to work areas in writing of proposed construction. The written notification shall include a brief description of activities to be accomplished, schedule of events, and an emergency contact phone number for the contractor’s project superintendent.

2. The Contractor shall notify affected utility customers at least 24 hours before interrupting the customer’s service.

3. Work shall not be performed in residential areas between the hours of 7:00 p.m. and 7:00 a.m., except in a case of urgent necessity in the interest of public health and safety with Owner permission.

1.3 SUBSTANTIAL COMPLETION

A. The work will not be considered to be fully functional and usable by the Owner for its intended purposes and will not be considered substantially complete until the following items are submitted:

1. Copies of final Operation and Maintenance Manuals in conformance with Section 01 7823, Operating and Maintenance Data.

2. Copies of Equipment Start-up Report and Certification Report forms signed by authorized factory representatives on items of process, mechanical, and control equipment in conformance with Section 01 3200, Schedules and Reports.

3. Delivery of specified spare parts and copies of signed Spare Parts Inventory Report forms in accordance with Section 01 3200, Schedules and Reports.

4. Training of Owner's operators and maintenance personnel as specified in the appropriate specification sections.

5. Delivery of specified keys for all permanent locks.

6. Copies of specified inspection and test reports and certifications on materials.

7. Copies of written warranties on equipment and products in accordance with Section 01 7836, Warranties and Bonds.

B. In addition to the above submissions, the work will not be considered to be fully functional and useful by the Owner for its intended purposes and will not be accepted as substantially complete until all of the following components and/or items have been completed:

1. Foundations and structures, including railings and gratings.

2. Process and mechanical equipment pumping systems.

3. Process and mechanical piping and valving, including pressure and leak testing.

4. Alarm, control systems, telemetry, and instrumentation.

5. Electrical panels and equipment.

6. Electrical and control wiring and conduits.

7. Check-out and start-up of equipment and controls, including telemetry, communication, and alarm systems, if provided.

8. Fencing. (Where damaged)

9. Roadways, parking areas, and stone surfaces.

10. Slope protection and riprap.

11. Signage and identification.

12. The following items, unless waived in writing by the Owner due to inclement weather:

    a. Finish grading.
    b. Seeding and mulching.
    c. Pavements. (Where damaged.)
    d. Sidewalks. (Where damaged.)

1.4 FINAL COMPLETION

A. The work under these Contract Documents will not be considered for final acceptance as complete until all of the following items have been completed or submitted:

1. Any items not completed at the time of substantial completion, including all remaining punch list items.

2. Final cleanup.

3. Restoration of all disturbed or damaged properties.

4. Executed project close-out documents included with the Contract Documents.

5. Record drawings.

6. As-built surveys, if required by the Specifications.

1.5 ACCEPTANCE AND START-UP OF OPERABLE COMPONENTS

A. Because of the need to maintain operation during construction, it may be necessary to accept as substantially complete and start-up operable components of the project at various times prior to the completion and acceptance of the entire project.

B. An “operable component” of the project, as used herein, shall mean a complete process subsystem capable of independent operation and shall include all associated structures, equipment, piping, controls, etc.

C. Acceptance and start-up of operable components shall not relieve the Contractor of his obligation to substantially complete the project within the Contract Time.

1.6 OWNER’S CONTINUED OCCUPANCY OF EXISTING FACILITIES

A. The Contractor shall perform his obligations as set forth in these Contract Documents in a manner that will not unduly hinder or jeopardize the continued operation or reliability of the Owner’s water system in any way.

B. Construction activities or operations for which there is no alternative to a temporary shutdown or hindrance to the operation of the water system shall be carefully coordinated in advance with the water plant superintendent through or in cooperation with the Engineer.

1.7 TEMPORARY SHUTDOWNS

A. The costs of temporary dewatering, pumping, piping, etc. shall be included in the lump sum price bid for the work. No separate payment will be made.

B. All construction activities requiring a temporary shutdown of the system shall be clearly shown on the Contractor's Progress Schedule. The Contractor shall furnish the Engineer and Owner with a written description of the work to be accomplished during the proposed shutdown, a written work plan, and an estimate of the duration of the shutdown at least ten (10) working days prior to the scheduled shutdown for review and approval.

C. Construction activities shall be planned and executed as required to minimize the duration of shutdowns.

D. Procurement. Contractor shall order and obtain all equipment, parts, valves, and materials needed for the work prior to any shutdown.

1.8 VIDEO

A. Prior to construction, Contractor shall color video record the entire project site including the route of any linear construction, all easements and right-of-way, and the route of all service lines where included in the construction. The Contractor shall identify the line designation and station number or mileage, all natural land marks, the street address of the area in view if available, and any other areas, structures, fences, trees, landscaping, etc., subject to potential disturbance. The Contractor shall provide the Owner with one (1) copy of the video on DVD with audio comments.

END OF SECTION

SECTION 01 2113

ALLOWANCES

1. GENERAL

1.1. ALLOWANCES IN CONTRACT SUM

A. Include allowances stated in the Contract Documents in the Contract Sum.

B. Use of the allowances shall be authorized in writing by the Engineer and approved by the Owner.

1.2. ADMINISTRATION OF ALLOWANCES

A. Contractor's duties in selection of products or provision of services under allowances.

1. Assist the Engineer and Owner in determining qualified suppliers or installers.

2. Obtain bids from suppliers and installers when requested by the Engineer.

3. Make appropriate recommendations for consideration by the Engineer.

B. Adjustment of Costs

1. Should the net cost be more or less than the specified amount of the allowance, the Contract Sum will be adjusted accordingly by Change Order.

2. At Contract Close Out, reflect approved changes to the Contract Sum in the final application for payment.

3. The Contractor will be limited to a maximum mark-up for overhead and profit of 15 percent on allowance items.

1.3. SPECIFIED ALLOWANCES

A. Furnish and install the equipment or systems identified in the Bid Schedule, Section 00 4143, under Allowances and as specified herein and shown on the Drawings that have been pre-selected by the Owner. Detailed scope of supply and pricing information for the Suppliers identified are provided in the Appendix to these documents. These equipment cost allowances only cover the equipment and items specified and included in the scope. Equipment handling, installation, startup, overhead and profit, terms and conditions, taxes and any other items required for a complete and functional installation shall be provided by the Contractor under the lump sum base bid for the project.

B. Owner specified miscellaneous items not covered in contract documents.

1. Include lump sum allowance of $25,000.

2. This allowance is provided to cover the cost of unspecified and necessary repairs to existing equipment and appurtenances discovered during the work, including Owner or Engineer requested improvements not specified herein.

3. Such work shall be directed and approved by a field order.

END OF SECTION

SECTION 01 2200

MEASUREMENT AND PAYMENT

1. GENERAL

1.1. RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplemental Conditions and other Division 1 specification sections, apply to this section.

1.2. LUMP SUM PRICES

A. Lump sum prices shall include all items of work shown on the Drawings, specified, or otherwise required or necessary for complete, working systems including work, services, fees, equipment or material not specifically listed, overhead, profit, and applicable taxes.

B. A “Schedule of Values” is required to facilitate payment for partial completion of lump sum items as the project progresses.

2. PARTIAL PAYMENT

A. Partial payment may be made for stored material on site, providing:

1. The material meets the specifications outlined elsewhere in these documents.

2. The material is stored according to the recommendations of the Engineer and/or manufacturer.

3. The Contractor submits copies of all shipping invoices for the stored materials delivered to the site.

3. MEASUREMENT AND PAYMENT

3.1. MEASUREMENT AND PAYMENT - LUMP SUM

A. Measurement and payment for all items of work shown on the Drawings, specified, or otherwise required or necessary for complete, working systems shall be made at the lump sum prices listed in the Bid Schedule. No separate payment shall be made for items of work, services, fees, or equipment not specifically listed, but payment for those items shall be included in the payment for items listed.

END OF SECTION

SECTION 01 2976

APPLICATIONS FOR PAYMENT

1. GENERAL

1.1. REQUIREMENTS INCLUDED

A. Submit Applications for Payment to the Engineer.

1.2. RELATED DOCUMENTS

A. Contract between Owner and Contractor.

B. General Conditions: Progress Payments, Retainages and Final Payment.

C. Section 01 7800, Project Closeout.

1.3. FORMAT AND INFORMATION REQUIRED

A. Review preliminary application with resident project representative.

B. Submit applications typed on forms acceptable to the Owner.

C. Provide itemized data on application:

1. Format, schedules, line items, unit prices, units completed by month and project-to-date, and values.

2. Documentation of employee wages, as requested.

1.4. PREPARATION OF APPLICATION FOR EACH PROGRESS PAYMENT

A. Application Form

1. Fill in required information, including that for Change Orders executed prior to date of submittal of application.

2. Fill in summary of dollar values to agree with respective totals indicated.

3. Fill in summary of dollar values to agree with respective totals indicated.

B. Continuation Sheets

1. Fill in total list of all scheduled component items of work, with item number and scheduled dollar value for each item.

2. Fill in dollar value in each column for each scheduled line item when work has been performed or products stored. Round off values to nearest dollar, or as specified for the Bid Schedule.

3. List each Change Order executed prior to date of submission. List by Change Order number and description, as for an original component item of work.

4. To receive approval for payment on component material stored on site, submit copies of the original paid invoices with the application for payment along with the material location report (see Section 01 3200, Schedules and Reports).

1.5. SUBSTANTIATING DATA FOR PROGRESS PAYMENTS

A. Substantiating Data. When the Owner or the Engineer requires substantiating data, submit suitable information, with a cover letter identifying:

1. Project.

2. Application number and date.

3. Detailed list of enclosures.

4. For stored products:

a. Item number and identification as shown on application.

b. Description of specific material.

B. Submit one copy of data and cover letter for each copy of application.

1.6. PREPARATION OF APPLICATION FOR FINAL PAYMENT

A. Fill in application form as specified for progress payments.

1.7. SUBMITTAL PROCEDURE

A. Submit Applications for Payment to the Engineer at the times stipulated in the Contract.

B. Number: Six copies of each application.

1.8. PROCESSING OF PERIODIC APPLICATIONS FOR PAYMENT

A. No applications for payment for work under this Contract will be processed until the Contractor's Preliminary Construction Schedule, Submittal Tabulation, and Schedule of Values are submitted in accordance with the requirements of Section 01 3200, Schedules and Reports.

B. No further applications for payment will be processed after the due date of the Contractor's Construction Schedule and Submittal Schedule until both schedules are submitted in conformance with the requirements of Section 01 3200, Schedules and Reports.

C. No applications will be processed for stored materials unless the application is accompanied with copies of original paid invoices and the Material Location Report specified in Section 01 3200, Schedules and Reports.

D. No applications for more than 80 percent of the Contract Price will be approved until copies of draft Operation and Maintenance Manuals are submitted in conformance with Section 01 7823, Operating and Maintenance Data.

E. No further applications for payment will be processed after the expiration of the Contract Time, including approved extensions thereof, until the date of Substantial Completion as described in these Contract Documents.

2. PRODUCTS (Not Used)

3. EXECUTION (Not Used)

END OF SECTION

SECTION 01 3119

PROJECT MEETINGS

1. GENERAL

1.1. SCOPE

A. This section specifies administrative and procedural requirements for project meetings including but not limited to:

1. Preconstruction Conference.
2. Pre-Installation Conferences.
3. Coordination Meetings.
4. Progress Meetings.

B. Construction schedules are specified in another Division 1 section.

1.2. RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplemental Conditions and other Division 1 specification sections, apply to this section.

1.3. PRECONSTRUCTION CONFERENCE

A. Attend and participate in a preconstruction conference and organizational meeting at the project site or other convenient location no later than 15 days after execution of the Agreement and prior to commencement of construction activities. Conduct the meeting to review responsibilities and personnel assignments.

B. Attendees. The Owner, Engineer and their consultants, the contractor and its superintendent, major subcontractors, manufacturers, suppliers and other concerned parties shall each be represented at the conference by persons familiar with and authorized to conclude matters relating to the work.

C. Agenda. Discuss items of significance that could affect progress including such topics as:

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. Distribution of Contract Documents.
7. Submittal of shop drawings, product data and samples.

8. Preparation of record documents.
9. Use of the premises.
10. Office, work and storage areas.
11. Equipment deliveries and priorities.
12. Safety procedures.
13. First aid.
14. Security.
15. Housekeeping.
16. Working hours.

1.4. PRE-INSTALLATION CONFERENCES

A. Conduct a pre-installation conference at the site before each construction activity that requires coordination with other construction. The installer and representatives of manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise the Engineer of scheduled meeting dates.

1. Review the progress of other construction activities and preparations for the particular activity under consideration at each pre-installation conference, including requirements for:

a. Contract documents.
b. Options.
c. Related change orders.
d. Purchases.
e. Deliveries.
f. Shop drawings, product data and quality control samples.
g. Possible conflicts.
h. Compatibility problems.
i. Time schedules.
j. Weather limitations.
k. Manufacturer's recommendations.
l. Compatibility of materials.
m. Acceptability of substrates.
n. Temporary facilities.
o. Space and access limitations.
p. Governing regulations.
q. Safety.
r. Inspection and testing requirements.
s. Required performance results.
t. Recording requirements.
u. Protection.

2. Record significant discussions and agreements and disagreements of each conference, along with the approved schedule. Distribute the record of the meeting to everyone concerned, promptly, including the Owner and Engineer.

3. Do not proceed if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of work and reconvene the conference at the earliest feasible date.

1.5. COORDINATION MEETINGS

A. Conduct project coordination meetings at regularly scheduled times convenient for all parties involved. Project coordination meetings are in addition to specific meetings held for other purposes, such as regular progress meetings and special pre-installation meetings.

B. Request representation at each meeting by every party currently involved in coordination or planning for the construction activities involved.

C. Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

1.6. PROGRESS MEETINGS

A. Conduct progress meetings at the project site at regularly scheduled intervals but not less than monthly. Notify the Owner and Engineer of scheduled meeting dates. Coordinate dates of meetings with preparation of the payment request.

B. Attendees. In addition to representatives of the Owner and Engineer, each subcontractor, supplier or other entity concerned with current progress or involved in planning, coordination or performance of future activities shall be represented at these meetings by persons familiar with the Project and authorized to conclude matters relating to progress.

C. Agenda. Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the current status of the project.

1. Contractor's Construction Schedule: Review progress since the last meeting. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the contract time.

2. Contractor's Submittal Schedule: Review progress since the last meeting. Determine where each activity is in relation to the Contractor's Submittal Schedule, whether on time or ahead or behind schedule. Determine how submittals behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to

ensure that current and subsequent activities will be completed within the contract time.

3. Review the present and future needs of each entity present, including such items as:

    a. Interface requirements.
    b. Time.
    c. Sequences.
    d. Deliveries.
    e. Off-site fabrication problems.
    f. Access.
    g. Site utilization.
    h. Temporary facilities and services.
    i. Hours of work.
    j. Hazards and risks.
    k. Housekeeping.
    l. Quality and work standards.
    m. Change Orders.
    n. Documentation of information for payment requests.

D. Reporting. No later than 5 days after each progress meeting date, distribute copies of minutes of the meeting to each party present and to other parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.

1. Schedule Updating: Revise the construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule concurrently with the report of each meeting.

2. PRODUCTS (Not Applicable)

3. EXECUTION (Not Applicable)

END OF SECTION

SECTION 01 3200

SCHEDULES AND REPORTS

1. GENERAL

1.1. SUMMARY

A. General. This section specifies administrative and procedural requirements for schedules and reports required for proper performance of the work.

B. Coordination. Each prime Contractor shall closely coordinate scheduling and reporting with the scheduling and reporting of other prime Contractors.

C. Schedules required include:

1. Preliminary Construction Schedule, including Submittals Tabulation.
2. Contractor's Construction Schedule.
3. Submittal Schedule.
4. Schedule of Values.

D. Reports required include:

1. Daily Construction Reports.
2. Material Location Reports.
3. Field Correction Reports.
4. Spare Parts Inventory Reports.
5. Equipment Start-up Report and Certifications.

E. Project meeting minutes are included in Section 01 3119, Project Meetings.

F. Inspection and test reports are included in Section 01 4500, Quality Control Services.

1.2. RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplemental Conditions and other Division 1 specification sections, apply to this section.

1.3. PRELIMINARY CONSTRUCTION SCHEDULE

A. Bar Chart Schedule. Submit a preliminary horizontal bar chart type construction schedule within 7 days of the date established for commencement of the work.

B. Bar Chart Schedule. The Contractor for General Construction shall submit a preliminary horizontal bar chart type construction schedule, with a copy to each prime Contractor, within 7 days of the date established for commencement of the work. Within 5 working days of this submittal, each other prime Contractor shall

submit a matching preliminary horizontal bar chart schedule showing their construction operations sequenced and coordinated with general construction.

1. Provide a separate time bar for each significant construction activity. Coordinate each element on the schedule with other construction activities. Schedule each construction activity in proper sequence. Provide a continuous vertical line to identify the first working day of each week.

2. Indicate completion of the work in advance of the date established for substantial completion.

3. If adjustments are necessary for sequencing and coordination of the work, the Contractor for general construction shall arrange a meeting with the other prime Contractors at the earliest possible date. At this meeting each prime Contractor shall negotiate reasonable adjustments to their schedules.

C. Submittal Tabulation. With the submittal of the preliminary construction schedule, include a tabulation by date of submittals required during the first 90 days of construction. List those submittals required to maintain orderly progress of the work, and those required early because of long lead time for manufacture or fabrication.

1. At the Contractor's option, submittal dates may be shown on the schedule, in lieu of being tabulated separately.

1.4. CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Bar Chart Schedule. Prepare a comprehensive, fully developed, horizontal bar chart type Contractor's construction schedule based on the preliminary construction schedule and on whatever updating and feedback was received since the start of the project.

B. Bar Chart Schedule. The Contractor for general construction shall secure time commitments for performing critical construction activities from each of the other prime Contractors and shall prepare a combined construction schedule for the entire project. The Schedule shall be a comprehensive, multi-sheet, integrated, fully developed horizontal bar chart type schedule based on the preliminary construction schedules and reflecting updating and feedback received since the start of the project.

1. Submit the schedule within 30 calendar days of the date established for commencement of the work, unless a longer time has been requested and approved.

2. Provide a separate time bar for each significant construction activity. Provide a continuous vertical line to identify the first working day of each week.

a. If practical, use the same breakdown of units of the work as indicated in the "Schedule of Values."

3. For significant construction activities that require 3 months or longer to complete, indicate an estimated completion percentage in 10 percent increments within the time bar. As work progresses, place a contrasting mark in each bar to indicate actual completion percentage.

4. Prepare the schedule on a sheet, or series of sheets, of stable transparency, or other reproducible media, of sufficient width to show data clearly for the entire construction period.

    a. Show the activities of each prime contract on a separate sheet.

    b. Prepare a simplified summary sheet indicating the combined construction activities of the prime contracts.

5. Secure time commitments for performing critical elements of the work from parties involved. Coordinate each element on the schedule with other portions of the work; include minor elements involved in the overall sequence of the work. Show each construction activity in proper sequence. Indicate graphically sequences necessary for completion of related portions of the work. Show critical path activities or elements.

6. Coordinate the Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests and other required schedules and reports.

7. Indicate completion of the work in advance of the date established for substantial completion. Indicate substantial completion on the schedule to allow ample time for the Engineer's administrative procedures necessary for certification of substantial completion.

C. Work Stages. Use crosshatched bars to indicate important stages of construction for each major portion of the work.

D. Such stages include, but are not necessarily limited to:

1. Subcontract awards.
2. Purchases.
3. Mockups.
4. Fabrication.
5. Sample testing.
6. Deliveries.
7. Installation.
8. Testing.
9. Adjusting.
10. Curing.
11. Start-up and placement into final use and operation.

E. Distribution. Following the Engineer's response to initial submittal of the Contractor's construction schedule, print and distribute copies to the Engineer,

Owner, separate contractors, subcontractors, suppliers, fabricators, and other parties required to comply with scheduled dates.

1. Post copies of the schedule in the project meeting room and temporary field office.

2. When revisions are made, distribute the updated schedule to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the work and are no longer involved in performance of construction activities.

F. Schedule Updating. Revise the schedule immediately after each meeting or other activity, where revisions have been recognized or made. Issue the updated schedule concurrently with report of each meeting.

1.5. SUBMITTAL SCHEDULE

A. Prepare a complete submittal schedule concurrent with the development of the Contractor's construction schedule. Submit the schedule within 30 calendar days of the date established for commencement of the work, unless a longer period has been requested and approved.

1. Coordinate submittal schedule with the list of subcontracts, Schedule of Values, and the list of products specified in Section 01 6000, Materials and Equipment, as well as the Contractor's construction schedule.

2. Prepare the schedule in chronological order; include submittals listed on the tabulation of submittals required during the first 90 days of construction. Provide the following information on the schedule:

   a. Schedule date for the first submittal.
   b. Related section number.
   c. Submittal category.
   d. Name of subcontractor.
   e. Description of the part of the work covered.
   f. Scheduled date of the Engineer's final release or approval.

3. Scheduled submittal dates shall be staggered.

4. Items of a critical nature shall be prioritized and so noted.

5. Scheduled final release or approval dates shall be coordinated with construction schedule.

B. Distribution. Following the Engineer's response to initial submittal, print and distribute the schedule to the Engineer, Owner, separate Contractors, subcontractors, suppliers, fabricators, and other parties required to comply with submittal dates indicated.

1. Post copies in the project meeting room and temporary field office.

2. When revisions are made, distribute the updated schedule to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned part of the work and are no longer involved in the performance of construction activities.

C. Schedule Updating. Revise the schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue the updated schedule concurrently with report of each meeting.

1.6. SCHEDULE OF VALUES

A. Prepare and submit a schedule of values established in the Agreement within 15 days of the date established for commencement of the work.

1. Refer to Section 01 2200, Measurement and Payment, for a listing of categories of work where unit prices are required.

2. Refer to individual specification sections for portions of the work where the establishment of unit prices is required. Methods of measurement and pricing are specified in these sections.

B. Prepare the schedule in tabular form, including the following items:

1. Name of the part of the work.
2. Related specification section.
3. Name of subcontractor assigned.
4. Unit of measurement.
5. Price per unit.

C. Distribution. Distribute to the Owner, Engineer, and each party involved in performance of the portion of the work, where established unit prices could come into force and effect.

D. Following review by the Owner and Engineer, revise the schedule of values to correct any elements which the Owner and Engineer find unacceptable. After revision, the schedule of values shall be submitted for further review.

1.7. REPORTS

A. Daily Construction Reports. Prepare a daily construction report, recording the following information concerning events at the site; and submit duplicate copies to the Engineer at weekly intervals:

1. List of subcontractors at the site.
2. List of separate contractors at the site.
3. Approximate count of personnel at the site.
4. High and low temperature, general weather conditions.
5. Accidents (refer to accident reports).
6. Meetings and significant decisions.
7. Unusual events (refer to special reports).

8. Stoppages, delays, shortages, losses.
9. Meter readings and similar recordings.
10. Emergency procedures.
11. Orders and requests of governing authorities.
12. Change Orders received, implemented.
13. Services connected, disconnected.
14. Equipment or system tests and start-ups.
15. Partial completions, occupancies.
16. Substantial completions authorized.

B. Material Location Reports. At monthly intervals prepare a comprehensive list of materials delivered to and stored at the site. The list shall be cumulative, showing materials previously reported plus items recently delivered. Include with the list a statement of progress on and delivery dates for all materials or items of equipment being fabricated or stored away from the building site. Submit copies of the list to the Engineer at monthly intervals.

C. Field Correction Report. When the need to take corrective action that requires a departure from the Contract Documents arises, prepare a detailed report including a statement describing the problem and recommended changes. Indicate reasons the Contract Documents cannot be followed. Submit a copy to the Engineer immediately.

D. Spare Parts Inventory Report. Document in writing on forms provided by the Engineer delivery to the Owner of specified spare parts. Include the manufacturer's name, part name, number, and quantity delivered. Reports shall be signed by representatives of the Contractor, Owner, and Engineer. Reports are due prior to substantial completion.

1.8. LOGS

A. RFI Log. Maintain a tabular log of all Requests for Information (RFI). Number RFIs in a sequential manner. Note date of request and date of response for each. Update the RFI log monthly and distribute at the monthly progress meeting.

B. Shop Drawing and Product Data Submittal Log. Maintain a tabular log of all shop drawing and product data submittals. Number submittals in a sequential manner. Note dates of initial submittal, first return, resubmittal, second or final return along with Engineer’s action noted for each submittal. Update the shop drawing submittal log monthly and distribute at the monthly progress meeting.

C. Change Order Request/Proposal Log. Maintain a tabular log of all change order requests/proposals. Number change order requests/proposals in a sequential manner. Note date of submittal, brief description of covered work, proposed price, requested number of days (if applicable), and status (denied/approved/pending). For those that are approved, indicate in which change order they are included. Update the log monthly and distribute at the monthly progress meeting.

D. O & M Manual Log. Maintain a tabular log of all O & M Manual submittals. Number submittals in a sequential manner. Note dates of initial submittal, first return, resubmittal, second or final return along with Engineer's action noted for each submittal. Update the O & M Manual submittal log monthly and distribute at the monthly progress meeting.

1.9. EQUIPMENT START-UP REPORT AND CERTIFICATION

A. An experienced, authorized service representative of the manufacturer of each item of equipment shall visit the site of the work and inspect, check, adjust if necessary, and approve the equipment installation. In each case, the equipment manufacturer's representative shall be present when the equipment is placed in operation and shall revisit the job site as often as necessary until all trouble is corrected and the equipment installation and operation are satisfactory in the opinion of the Engineer.

B. Each equipment manufacturer's representative shall furnish to the Owner, through the Engineer, a written report certifying that the equipment (1) has been properly installed and lubricated; (2) is in accurate alignment; (3) is free from any undue stress imposed by connecting piping or anchor bolts; and (4) has been operated under full load conditions and that it operated satisfactorily. Work will not be accepted as substantially complete until executed Equipment Start-up Report and certification forms have been submitted in accordance with the requirements of this section.

C. Properly coordinate the visits by the manufacturer's representatives, particularly where the operation of an item of equipment is dependent on the operation of other equipment. Prior to calling the manufacturer's representative, ensure that all necessary related equipment, structures, piping, and electrical work is complete. Pay for any revisits to the site by the manufacturer's representative made necessary due to the Contractor's failure to properly coordinate the visits.

D. Secure the services of the manufacturer's representative at the site of the work for as long as is necessary to check the installation and place the equipment in satisfactory operation.

2. PRODUCTS (Not Applicable)

3. EXECUTION

3.1. PAYMENT

A. No requests for payment for work under this Contract will be processed until the Contractor's Preliminary Construction Schedule, Submittals Tabulation, and Schedule of Values are submitted and found acceptable by the Owner and Engineer in conformance with the requirements of this section.

B. No further requests for payment will be processed after the due date of the Contractor's Construction Schedule and Submittal Schedule until both schedules are submitted in conformance with the requirements of this section.

C. If payment is being requested for stored materials, the material location report must be included with the request for payment.

END OF SECTION

SECTION 01 3233

CONSTRUCTION PHOTOGRAPHS

1. GENERAL

1.1. SUMMARY

A. General. This section specifies administrative and procedural requirements for construction photographs.

B. Costs. Costs for photographs and associated items shall be included in the lump sum bid price or unit prices contained for other items of work. No separate payment shall be allowed, with the exception of additional photographs, which is addressed elsewhere in this section.

1.2. RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplemental Conditions or General Provisions and other Division 1 specification sections, apply to this section.

1.3. SUBMITTALS

A. Digitally Stored Photographs. Contractor shall provide digital photographs created and stored in a standard format. Transmittal may be electronic and shall occur no less frequently than monthly. Photographs must be received by the Engineer before partial payment requests can be processed.

1.4. QUALITY ASSURANCE

A. Engage a qualified, experienced photographer to take photographs during construction.

B. Associated Services. Cooperate with the photographer's work. Provide reasonable auxiliary services as requested, including access to and use of temporary facilities including temporary lighting.

2. PRODUCTS

2.1. PHOTOGRAPHIC COPIES

A. The photographs shall be taken with a digital camera capable of being programmed to show the date the photo was taken on the front of the photograph.

B. Identification. Provide date on front of the photo per the previous paragraph. The following information shall be provided with each photograph:

1. Name of the Project.
2. Name and address of the photographer.

3. Name of the Engineer.
4. Name of the Contractor.
5. Provide notation of vantage point marked for location and direction of shot on a key plan of the site.

3. EXECUTION

3.1. PHOTOGRAPHIC REQUIREMENTS

A. Take at least 4 color photographs in accordance with requirements indicated, to best show the status of construction and progress since taking the previous photographs.

1. Frequency: Take photographs daily as the work progresses. Submit to Engineer monthly coinciding with the cutoff date associated with each Application for Payment.

2. Vantage Points: The photographer shall select the vantage points for each shot each month to best show the status of construction and progress since the last photographs were taken.

3. Description: A description of each photograph shall be noted.

B. Additional Photographs. From time to time the Engineer may issue requests for additional photographs, in addition to periodic photographs specified. Additional photographs will be paid for by the Owner or Engineer, and are not included in the contract sum or an allowance.

END OF SECTION

SECTION 01 3323

SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

1. GENERAL

1.1. SUMMARY

A. This section specifies administrative and procedural requirements for submittal of shop drawings, product data, and samples to verify that products, materials, and systems proposed for use comply with provisions of the Contract Documents.

B. Shop drawings are required for all materials, products, and equipment furnished on this project, unless otherwise specified.

C. Standard information prepared without specific reference to the project is not considered to be shop drawings. Where multiple products are included, specific notation to that model or product being proposed for this project shall be clearly noted. Products not being provided shall similarly be marked out.

D. Coordination drawings are a special type of shop drawing that show the relationship and integration of different construction elements that require close and careful coordination during fabrication or during installation to fit in the restricted space provided or to function as intended.

E. Product data include, but are not limited to, the following:

1. Manufacturer's product specifications.
2. Manufacturer's installation instructions.
3. Standard color charts.
4. Catalog cuts.
5. Roughing-in diagrams and templates.
6. Standard wiring diagrams.
7. Printed performance curves.
8. Operational range diagrams.
9. Mill reports.
10. Standard product operating and maintenance manuals.

F. Samples include, but are not limited to, the following:

1. Partial sections of manufactured or fabricated components.
2. Small cuts or containers of materials.
3. Complete units of repetitively used materials.
4. Swatches showing color, texture, and pattern.
5. Color range sets.
6. Components used for independent inspection and testing.

G. Administrative Submittals. Refer to other Division 1 sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to:

1. Permits.
2. Applications for payment.
3. Performance and payment bonds.
4. Insurance certificates.
5. Listing of subcontractors.

H. Inspection and Test Reports. Submittal of inspection and test reports is included under Section 01 4000, Quality Control Services.

1.2. RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplemental Conditions and other Division 1 specification sections, apply to this section.

1.3. CONTRACTOR'S RESPONSIBILITY

A. It is the duty of the Contractor to check all drawings, data, and samples prepared by or for him before submitting them to the Engineer for review. Each and every copy of the Drawings and data shall bear Contractor's stamp showing that they have been so checked. Shop drawings submitted to the Engineer without the Contractor's stamp will be returned to the Contractor for conformance with this requirement. Shop drawings shall indicate any deviations in the submittal from requirements of the Contract Documents.

B. The Contractor shall determine and verify:

1. Field measurements.
2. Field construction criteria.
3. Catalog numbers and similar data.
4. Conformance with Specifications.
5. Coordination with related project elements, including verification of all dimensions to provide a complete system

C. Do not begin any of the work covered by a drawing, data, or a sample returned for correction until a revision or correction thereof has been reviewed and accepted by the Engineer.

D. Submit to the Engineer all drawings and schedules sufficiently in advance of construction requirements to provide no less than 21 calendar days for checking and appropriate action from the time the Engineer receives them.

E. Stagger shop drawing submittals and indicate priority for critical delivery items on the shop drawing submittal schedule.

F. Initial submittals shall be made in PDF format with delivery to the Engineer to be made electronically wherever possible. Submit four, final approved copies for the Engineer plus the number of copies the Contractor requires of descriptive or product data submittals to complement shop drawings (up to a maximum of eight copies). The Engineer will retain four sets.

G. Contractor shall be responsible for and bear all cost of damages which may result from the ordering of any material or from proceeding with any part of the work prior to the review by Engineer of the necessary shop drawings.

1.4. ENGINEER'S REVIEW OF SHOP DRAWINGS

A. The Engineer's review of drawings, data, and samples submitted by the Contractor is for general conformance with the design concept of the project and for general compliance with the information given in the Contract Documents. The Engineer's review and exception, if any, will not constitute an approval of dimensions, quantities, and details of the material, equipment, device, or item shown.

B. The review of drawings and schedules shall not be construed:

1. As permitting any departure from the Contract requirements;

2. As relieving the Contractor of responsibility for any errors, including details, dimensions, and materials;

3. As approving departures from details furnished by the Engineer, except as otherwise provided herein.

C. If the drawings or schedules 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.

D. When reviewed by the Engineer, each of the shop drawings will be identified as having received such review, being so stamped and dated. Shop drawings stamped "REVISE AND RESUBMIT" and with required corrections shown will be returned to the Contractor for correction and resubmittal.

E. Resubmittals will be handled in the same manner as first submittals. On resubmittals the Contractor shall direct specific attention, in writing or on resubmitted shop drawings, to revisions other than the corrections requested by the Engineer on previous submissions. Make any corrections required by the Engineer.

F. If the Contractor considers any correction indicated on the Drawings to constitute a change to the Contract Drawings or Specifications, the Contractor shall give written notice thereof to the Engineer.

G. The Engineer will review a submittal/resubmittal a maximum of 3 times, after which the cost of review will be borne by the Contractor. The cost of engineering will be equal to the Engineer's charges to the Owner under the terms of the Engineer's agreement with the Owner.

H. 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.

I. No partial submittals will be reviewed. Submittals not complete will be returned to the Contractor and will be considered "Rejected" until resubmitted.

1.5. SUBMITTAL PROCEDURES

A. Coordination. Coordinate preparation and processing of submittals with performance of the work. Transmit each submittal to the Engineer sufficiently in advance of scheduled performance of related construction activities to avoid delay.

1. Coordinate each submittal with other submittals and related activities that require sequential activity including:

    a. Testing.
    b. Purchasing.
    c. Fabrication.
    d. Delivery.

2. Coordinate transmittal of different types of submittals for the same element of the work and different elements of related parts of the work so that processing will not be delayed by the Engineer's 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 forthcoming.

    b. No extension of time will be authorized because of the Contractor's failure to transmit submittals to the Engineer sufficiently in advance of the work to permit processing.

B. Submittal Preparation. Prepare and submit shop drawings in accordance with the following:

1. Attach a submittal cover sheet to each copy of a shop drawing. The submittal cover sheet shall contain the following information:

    a. Project name and Owner’s name.
    b. Contractor’s name and address.
    c. Engineer’s name and address.
    d. Specification section and title.

e. Drawing reference number.
f. Submittal number.
g. Space to indicate the results of the Contractor's review.
h. Space to indicate any deviations from the Contract Documents or comments by the Contractor.
i. Space approximately 8 inches wide and 4 inches high for the Engineer to indicate the results of his review and any comments.

2. Each shop drawing submittal shall be assigned a sequential number, beginning with the number 1. Resubmittals shall be identified by a number suffix (i.e., 1.1, 1.2, etc.).

C. Submittal Transmittal. Package each submittal appropriately for transmittal and handling. Transmit each submittal from Contractor to Engineer, and to other destinations, as indicated, by use of a transmittal form. Submittals received from sources other than the Contractor will be returned to the sender without action. A separate transmittal shall be used for each shop drawing submittal.

1.6. SHOP DRAWINGS

A. The term "shop drawings," when used in the Contract Documents, shall be considered to mean Contractor's plans for material and equipment which become an integral part of the Project. These drawings shall be complete and detailed. Shop drawings shall consist of fabrication, erection and setting drawings and schedule drawings, manufacturer's scale drawings, and wiring and control diagrams. Cuts, catalogs, pamphlets, descriptive literature, and performance and test data shall be considered only as support to required shop drawings as defined above.

B. Drawings and schedules shall be checked and coordinated with the work of all trades involved before they are submitted for review by the Engineer. Contractor shall indicate whether the shop drawing complies with or deviates from the requirement of the Contract Documents.

C. If drawings show deviations from Contract requirements because of standard shop practice or for other reasons, the Contractor shall clearly mark and describe such deviation in his letter of transmittal. If the Contractor fails to describe such variations, he shall not be relieved of the responsibility for executing the Work in accordance with the Contract, even though such drawings have been reviewed.

D. Data on materials and equipment include, without limitation, materials and equipment lists, catalog data sheets, cuts, performance curves, diagrams, materials of construction and similar descriptive material. Materials and equipment lists shall give, for each item thereon, the name and location of the supplier or manufacturer, trade name, catalog reference, size, finish and all other pertinent data.

E. Installation List. When requested by the Engineer, manufacturers or equipment suppliers who propose to furnish equipment or products shall submit an installation list to the Engineer along with the required shop drawings. The installation list shall include at least five installations where identical equipment

has been installed for similar purposes and similar applications and ownership and has been in operation for a period of at least 1 year.

F. Color. Only the Engineer will utilize the color "red" in marking shop drawing submittals.

G. Before final payment is made, the Contractor shall furnish to Engineer five sets of record drawings, all clearly revised, complete and up-to-date showing the permanent construction as actually made for all reinforcing and structural steel, miscellaneous metals, process and mechanical equipment, yard piping, electrical system and instrument system.

1.7. SAMPLES

A. Furnish, for the approval of the Engineer, samples required by the Contract Documents or requested by the Engineer. Samples shall be delivered to the Engineer as specified or directed. The Contractor shall prepay all shipping charges on samples. Materials or equipment for which samples are required shall not be used in work until approved by the Engineer.

1.8. SPECIFIC SUBMITTAL REQUIREMENTS

A. Submit coordination drawings where required for integration of different construction elements. Show construction sequences and relationships of separate components where necessary to avoid conflicts in utilization of the space available.

B. Highlight, encircle, or otherwise indicate deviations from the Contract Documents on the shop drawings.

C. Do not permit shop drawing copies without an appropriate final stamp or other marking indicating the action taken by the Engineer to be used in connection with construction.

D. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit shop drawings on sheets at least 8½ by 11 inches but no larger than 30 by 40 inches.

1.9. PRODUCT DATA

A. Collect product data into a single submittal for each element of construction or system. Mark each copy to show which choices and options are applicable to the Project.

B. Where product data have been printed to include information on several similar products, some of which are not required for use on the project, or are not included in this submittal, mark copies to clearly indicate which information is applicable.

C. Where product data must be specially prepared for required products, materials, or systems, because standard printed data are not suitable for use, submit as "shop drawings," not "product data."

D. Include the following information in product data:
   1. Manufacturer's printed recommendations.
   2. Compliance with recognized trade association standards.
   3. Compliance with recognized testing agency standards.
   4. Application of testing agency labels and seals.
   5. Notation of dimensions verified by field measurement.
   6. Notation of coordination requirements.

E. Submittals. Submit two copies of each required product data submittal; submit two additional copies where copies are required for maintenance manuals. The Engineer will retain one copy and will return the other marked with the action taken and corrections or modifications required. Initial submittals shall be made in PDF format and delivered electronically.

F. Distribution. Furnish copies of final product data submittal to manufacturers, subcontractors, suppliers, fabricators, installers, governing authorities and others as required for performance of the construction activities. Show distribution on transmittal forms.

   1. Do not proceed with installation of materials, products and systems until a copy of product data applicable to the installation is in the installer's possession.

   2. Do not permit use of unmarked copies of project data in connection with construction.

1.10. ENGINEER'S ACTION

A. Action Stamp: The Engineer will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, as follows, to indicate the action taken:

   1. Final Unrestricted Release: Where submittals are marked "REVIEWED," that part of the work covered by the submittal may proceed, provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance.

   2. Final-But-Restricted Release: When submittals are marked "REVIEWED EXCEPTIONS AS NOTED," that part of the work covered by the submittal may proceed, provided it complies with both the Engineer's notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.

   3. Returned for Resubmittal: When submittal is marked "REVISE AND RESUBMIT," do not proceed with that part of the work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise

or prepare a new submittal in accordance with the Engineer's notations; resubmit without delay. Repeat if necessary to obtain a different action mark.

a. Do not permit submittals marked "REVISE AND RESUBMIT" to be used at the project site, or elsewhere where construction is in progress.

4. Rejected: When submittal is marked "REJECTED," the materials, equipment, and/or methods identified in the submittal do not comply with the Contract requirements and shall not be incorporated into the work. No resubmittal of the same materials, equipment, and/or methods shall be made.

5. Other Action: Where a submittal is primarily for information or record purposes, for special processing or other Contractor activity, the submittal will be returned, marked "Action Not Required."

2. PRODUCTS (Not Applicable)

3. EXECUTION (Not Applicable)

END OF SECTION

SECTION 01 4213

ABBREVIATIONS

1. GENERAL

1.1. GENERAL

A. Wherever in these Specifications and Contract Documents the abbreviations, or pronouns in place of them are used, the intent and meaning shall be interpreted as specified herein.

1.2. ABBREVIATIONS

AA	Aluminum Association
AAMA	Architectural Aluminum Manufacturer's Association
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
ACPA	American Concrete Pipe Association
AEIC	Association of Edison Illuminating Companies
AFBMA	Anti-Friction Bearing Manufacturers Association
AF&PA	American Forest & Paper Association
AGA	American Gas Association
AGMA	American Gear Manufacturers Association
AIA	American Institute of Architects
AIEE	American Institute of Electrical Engineers
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
ALSC	American Lumber Standard Committee
ANSI	American National Standards Institute
AMCA	Air Moving and Conditioning Association
APA	American Plywood Association
APHA	American Public Health Association
API	American Petroleum Institute
APWA	American Public Works Association
ARC	Appalachian Regional Commission
AREA	American Railroad Engineering Association
ASA	American Standards Association
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigeration, and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWPA	American Wood Preservers' Association

AWS	American Welding Society
AWWA	American Water Works Association
BIA	Brick Institute of America
CFR	Code of Federal Regulations
CRSI	Concrete Reinforcing Steel Institute
CTI	Cooling Tower Institute
DIPRA	Ductile Iron Pipe Research Association
EIA	Electronic Industries Association
EPA	Environmental Protection Agency
EPD	Georgia Environmental Protection Division
FM	Factory Mutual
FmHA	Farmers Home Administration
FS	Federal Specifications
HEI	Heat Exchange Institute
IBC	International Building Code
IEEE	Institute of Electronic and Electrical Engineers
IES	Illuminating Engineering Society
IPCEA	Insulated Power Cable Engineers Association
IPC	Institute of Printed Circuits
ISA	Instrument Society of America
MBMA	Metal Building Manufacturers Association
MSS	Manufacturers Standardization Society of the Valve and Fitting Industry
MUTCD	Manual on Uniform Traffic Control Devices
NAAMM	National Association of Architectural Metal Manufacturers
NACE	National Association of Corrosion Engineers
NAPF	National Association of Piping Fabricators
NBFU	National Board of Fire Underwriters
NBS	National Bureau of Standards
NCMA	National Concrete Masonry Association
NCPI	National Clay Pipe Institute
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NRMA	National Ready-Mix Association
NSF	National Sanitation Foundation
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association
PCI	Prestressed Concrete Institute
SBC	Southern Building Code Congress International, Inc.
SJI	Steel Joist Institute
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SSCRB	Standard Specification Construction of Roads and Bridges, Department of Transportation, State of Georgia
SSPC	SSPC: The Society for Protective Coatings

SSRBC	Standard Specifications for Road and Bridge Construction, Tennessee Department of Transportation
SSRS	Standard Specifications for Roads and Structures, latest edition, North Carolina Department of Transportation, Division of Highways
TCA	Tile Council of America
TDEC	Tennessee Department of Environment and Conservation
TEMA	Tubular Exchangers Manufacturers Association
UBC	Uniform Building Code
UL	Underwriters Laboratories
USDC	United States Department of Commerce
WEF	Water Environment Federation

END OF SECTION

SECTION 01 4219

APPLICABLE CODES AND STANDARDS

1. GENERAL

1.1. GENERAL

A. All materials, equipment, fabrication, and installation practices shall comply with the following applicable codes and standards, unless the Contractor's quality standards establish more stringent quality requirements or as required in drawings and specifications, as determined by the Engineer.

1. Pressure Piping and Tubing

ANSI	American National Standards Institute
API	American Petroleum Institute
ASME	American Society of Mechanical Engineers
AWWA	American Water Works Association
DIPRA	Ductile Iron Pipe Research Association
NAPF	National Association of Piping Fabricators
NSF	NSF International
PPI	Plastic Pipe Institute
Unibell	PVC Pipe Association

2. Materials

AASHTO	American Association of State Highway and Transportation Officials
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials

3. Painting and Surface Preparation

NACE	National Association of Corrosion Engineers
SSPC	SSPC: The Society for Protective Coatings

4. Gear Reducers and Bearings

AFBMA	Anti-Friction Bearing Manufacturers Association
AGMA	American Gear Manufacturers Association

5. Ventilating Fans

AMCA	Air Moving and Conditioning Association
PFMA	Power Fan Manufacturers Association

6. Electrical and Instrumentation

EIA	Electronic Industries Association
IEEE	Institute of Electrical and Electronic Engineers
IPC	Institute of Printed Circuits
IPCEA	Insulated Power Cable Engineers Association
ISA	Instrument Society of America
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
UL	Underwriter's Laboratories

7. Aluminum Structures

AA	Aluminum Association
AAMA	Architectural Aluminum Manufacturers Association

8. Steel Structures

AISC	American Institute of Steel Construction
API	American Petroleum Institute
AWWA	American Water Works Association
SJI	Steel Joist Institute

9. Concrete Structures

ACI	American Concrete Institute

10. Welding

ASME	American Society of Mechanical Engineers
AWS	American Welding Society

11. Safety

OSHA	Occupational Safety and Health Act

12. General Building Construction

FM	Factory Mutual Fire Insurance Corporation
IBC	International Building Code by the International Code Council
NFPA	National Fire Protection Association

13. Subgrades and Pavement

SSCRB	Standard Specification Construction of Roads and Bridges, Department of Transportation, State of Georgia, 1993 Edition, and Supplemental Specifications
SSRBC	Standard Specifications for Road and Bridge Construction, Tennessee Department of Transportation

SSRS	Standard Specifications for Roads and Structures, latest edition, North Carolina Department of Transportation, Division of Highways.

14. Ductwork and Sheet Metal Work

SMACNA	Sheet Metal and Air Conditioning Contractors National Association

15. Plumbing

AGA	American Gas Association
NSF	NSF International
PDI	Plumbing Drainage Institute
SPC	SBCC Standard Plumbing Code

16. Refrigeration, Heating, and Air Conditioning

ARI	American Refrigeration Institute
ASHRAE	American Society of Heating, Refrigeration, and Air Conditioning Engineers

17. Pressure Vessels

ASME	American Society of Mechanical Engineers

18. Wood

AF&PA	American Forest & Paper Association
AWPA	American Wood Preservers' Association

19. Pumps & Pumping Stations

HI	Hydraulic Institute

20. Railroads

AREMA	American Railway Engineering and Maintenance-of-Way Association

21. Miscellaneous

NASSCO	National Association of Sewer Service Companies

In addition, all work shall comply with the applicable requirements of local codes, utilities, and other authorities having jurisdiction.

B. All material and equipment, for which a UL Standard, an AGA approval, or an ASME requirement is established, shall be so approved and labeled or stamped. Label or stamp shall be conspicuous and not covered, painted, or otherwise obscured from visual inspection.

END OF SECTION

SECTION 01 4500

QUALITY CONTROL SERVICES

1. GENERAL

1.1. SCOPE OF WORK

A. This section specifies administrative and procedural requirements for quality control services.

B. Quality control services include inspections and tests and related actions including reports, performed by independent agencies, governing authorities, and the Contractor. They do not include contract enforcement activities performed by the Engineer.

C. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve the Contractor of responsibility for compliance with Contract Document requirements.

1. Specific quality control requirements for individual construction activities are specified in the sections that specify those activities. Those requirements, including inspections and tests, cover production of standard products as well as customized fabrication and installation procedures.

2. Inspections, tests, and related actions specified are not intended to limit the Contractor's quality control procedures that facilitate compliance with Contract Document requirements.

3. Requirements for the Contractor to provide quality control services required by the authorities having jurisdiction are not limited by provisions of this section.

1.2. RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplemental Conditions and other Division 1 specification sections, apply to this section.

1.3. RESPONSIBILITIES

A. Contractor Responsibilities. Provide inspections, tests, and similar quality control services, specified in individual specification sections and required by governing authorities, except where they are specifically indicated to be the Owner's responsibility, or are provided by another identified entity; these services include those specified to be performed by an independent agency and not by the Contractor. Costs for these services shall be included in the contract sum.

1. Employ and pay an independent agency to perform specified quality control services.

2. The Owner will engage and pay for the services of an independent agency to perform inspections and tests specified as the Owner's responsibility.

3. Retesting: The Contractor is responsible for retesting where results of required inspections, tests, or similar services prove unsatisfactory and do not indicate compliance with Contract Document requirements, regardless of whether the original test was the Contractor's responsibility.

    a. Cost of retesting construction revised or replaced by the Contractor is the Contractor's responsibility, where required tests were performed on original construction.

4. Associated Services: Cooperate with agencies performing required inspections, tests, and similar services and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include but are not limited to:

    a. Providing access to the Work and furnishing incidental labor and facilities necessary to facilitate inspections and tests.

    b. Taking adequate quantities of representative samples of materials that require testing or assisting the agency in taking samples.

    c. Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.

    d. Providing the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.

    e. Security and protection of samples and test equipment at the project site.

B. Owner Responsibilities. The Owner will employ and pay for the services of an independent agency, testing laboratory, or other qualified firm to perform services which are the Owner's responsibility.

C. Duties of the Testing Agency. The independent testing agency engaged to perform inspections, sampling, and testing of materials and construction specified in individual specification sections shall cooperate with the Engineer and Contractor in performance of its duties, and shall provide qualified personnel to perform required inspections and tests. The testing agency shall be acceptable to and approved by the Engineer.

    1. The agency shall notify the Engineer and Contractor promptly of irregularities or deficiencies observed in the work during performance of its services.

    2. The agency is not authorized to release, revoke, alter, or enlarge requirements of the Contract Documents, or approve or accept any portion of the work.

    3. The agency shall not perform any duties of the Contractor.

D. Coordination. The Contractor and each agency engaged to perform inspections, tests, and similar services shall coordinate the sequence of activities to accommodate required services with a minimum of delay. In addition, the Contractor and each agency shall coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.

1. The Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities.

1.4. SUBMITTALS

A. The independent testing agency shall submit to the Engineer, in duplicate, a certified written report of each inspection, test, or similar service.

1. Submit additional copies of each written report directly to the governing authority, when the authority so directs.

2. Report Data: Written reports of each inspection, test, or similar service shall include, but not be limited to:

a. Date of issue.
b. Project title and number.
c. Name, address, and telephone number of testing agency.
d. Dates and locations of samples and tests or inspections.
e. Names of individuals making the inspection or test.
f. Designation of the work and test method.
g. Identification of product and specification section.
h. Complete inspection or test data.
i. Test results and an interpretation of test results.
j. Ambient conditions at the time of sample-taking and testing.
k. Comments or professional opinion as to whether inspected or tested work complies with Contract Document requirements.
l. Name and signature of laboratory inspector.
m. Recommendations on retesting.

1.5. QUALITY ASSURANCE

A. Qualification for Service Agencies. Engage inspection and testing service agencies, including independent testing laboratories, which are prequalified as complying with "Recommended Requirements for Independent Laboratory Qualification" by the American Council of Independent Laboratories, and which specialize in the types of inspections and tests to be performed.

1. Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the state in which the project is located.

2. PRODUCTS (Not Applicable)

3. EXECUTION

3.1. REPAIR AND PROTECTION

A. General. Upon completion of inspection, testing, sample-taking, and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes.

B. Protect construction exposed by or for quality control service activities, and protect repaired construction.

C. Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.

END OF SECTION

SECTION 01 5000

TEMPORARY FACILITIES AND CONTROLS

1. GENERAL

1.1. DESCRIPTION OF REQUIREMENTS

A. General Contractor shall provide temporary services and facilities for use by all Prime Contractors and the Engineer except as otherwise herein specified. Do not remove temporary facilities until authorized use of permanent facilities.

1.2. USE CHARGES

A. Usage charges for temporary services or facilities shall be paid by the General Contractor.

1.3. WATER FOR TESTING

A. As an exception to the above, necessary amounts of water for initial flushing and testing piping systems will be furnished by the Owner at no cost to the Contractor, subject to requirements which the Owner may impose.

1.4. REGULATIONS AND LIMITATIONS

A. Comply with requirements of local laws and regulations governing construction and local industry standards, in the installation and maintenance of temporary services and facilities.

B. The Contractor shall be limited to work within the property limits of the site and shall be responsible for and take necessary precautions to avoid damage to all adjacent property.

1.5. TEMPORARY UTILITY INSTALLATION

A. Engage the local utility company to install temporary services. As early as possible change to use of permanent service, to enable removal of the temporary utility and eliminate possible interference with completion of the work.

B. Water Service. Provide temporary potable water supply at the plant site for construction purposes. Use of Owner's hydrants is prohibited for this purpose.

C. Electrical Power Service. Provide weather-tight, grounded temporary electrical service entrance and distribution system, with ground-fault circuit interrupters and ground-fault interrupter features of proper types, sizes, electrical ratings and characteristics to fulfill project requirements. Comply with applicable requirements of NEMA, NECA and UL standards and governing regulations. Install temporary lighting of adequate illumination levels to perform the work specified. Temporary electric service for construction purposes shall be for use by all prime contractors.

D. Temporary Heat. Provide temporary heat where needed for performance of work, for curing or drying of recently installed work or for protection of work in place from adverse effects of low temperatures or high humidity. Provide UL or FM tested and labeled heating units known to be safe and without adverse effect upon work in place or being installed. Maintain a minimum temperature of 45°F (7°C) in permanently enclosed portions of the building and areas where finished work has been installed.

Except where use of the permanent heating system is available and authorized, provide properly vented self-contained LP gas or fuel oil heaters with individual space thermostatic control for temporary heat. Do not use open burning or salamander type heating units.

1.6. STAGING AREAS

A. Space available on site for trailers, materials storage, and staging is limited. The staging area may be shown on the plans and will not be expanded.

B. If additional space is required, the Contractors are responsible for leasing or otherwise securing the necessary space, off-site.

1.7. TEMPORARY ROADS AND PAVING

A. Provide temporary graveled roads and graveled parking facilities during the course of the work. Locate in the same locations as permanent facilities.

B. Coordinate temporary drives with grading and compaction of the sub-grade, installation and stabilization of sub-base, and installation of base and finish courses of permanent paving.

C. Construct and maintain temporary roads to support loading and to withstand exposure to traffic. Provide a graded and well compacted, well drained sub-grade, and a gravel paving course of a well graded sub-base material not less than 3 inches thick, roller compacted to a level, smooth surface.

D. Delay installation of the final course of permanent paving in areas exposed to temporary use, until immediately before substantial completion.

E. Completely remove temporary roadways in areas not to receive permanent paving, prior to seeding.

1.8. SANITARY FACILITIES

A. Sanitary facilities include temporary toilets for construction personnel of all prime contractors.

1. Supply toilet tissue, paper towels, paper cups and similar disposable materials as appropriate for each facility. Provide appropriate covered waste containers for used materials.

2. Toilets: Install single occupant self-contained toilet units of the chemical, aerated recirculation or combustion type, properly vented and fully enclosed with glass fiber reinforced polyester shell. Use of pit-type privies will not be permitted.

3. Provide separate toilet facilities for male and female construction personnel at ground level. Use of plant facilities is prohibited.

B. Drinking Water. Provide tap-dispenser bottled-water type drinking water units for personnel of all prime contractors and subcontractors.

1.9. SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Maintain site in a safe, lawful and publicly acceptable manner. Each prime contractor shall be responsible for security of their own office and storage facilities.

1.10. BARRICADES, WARNING SIGNS, AND LIGHTS

A. Comply with recognized standards and code requirements for erection of substantial barricades, where needed to prevent accidents. Paint with appropriate colors, graphics, and warning signs to inform personnel at the site and the public, of the hazard being protected against. Provide lighting where needed, including flashing red lights were appropriate.

1.11. MAINTENANCE

A. Operate and maintain temporary services and facilities in good operating condition and in a safe and efficient manner until removal is authorized. Do not overload services or facilities. Protect from damage by freezing temperatures and similar elements. Do not allow unsanitary conditions, public nuisances or hazardous conditions to develop or persist on the site.

1.12. TERMINATION AND REMOVAL

A. Remove each temporary service and facility promptly when need has ended, or when replaced by use of a permanent facility, but no later than substantial completion. Complete, or, if necessary, restore permanent work delayed because of interference with the temporary service or facility. Repair damaged work, clean exposed surfaces, and replace work which cannot be repaired.

B. At substantial completion, clean and renovate permanent services and facilities that have been used to provide temporary services and facilities during the construction period.

1.13. SAFETY MEASURES

A. In addition to complying with safety requirements set forth in the General Conditions, the Contractor shall:

1. Inform himself of and fully comply with all applicable requirements of OSHA in the performance of work required under this contract.

2. The Contractor shall adhere to the rules, regulations, and interpretations of the Secretary of the Department of Labor relating to safety and health for construction which are hereby incorporated into these requirements.

END OF SECTION

SECTION 01 5213

FIELD OFFICES AND SHEDS

1. GENERAL

1.1. DESCRIPTION

A. Provide field offices and sheds as described below.

B. Field offices shall be at sites designated by the Owner.

2. PRODUCTS

2.1. CONTRACTOR'S FIELD OFFICE

A. Provide a field office with the following minimum facilities:

1. A weather-sealed structure suitably anchored for bad weather.

2. High-speed internet service.

3. Adequate lighting, heating, air conditioning, and ventilation.

4. Sufficient filing cabinets for the project record documents.

2.2. ENGINEER'S FIELD OFFICE

A. The General Contractor shall provide and maintain a 200-square-foot-minimum field office for the exclusive use of the Engineer.

B. Field Office shall be a separate weather-tight structure with:

1. Suitable anchoring for bad weather.

2. Heating and air conditioning.

3. Outside door with lock.

4. At least two windows, suitably arranged for ventilation.

5. Adequate electric lighting.

6. At least one wall receptacle on each wall.

7. High speed internet service.

8. Contractor shall pay all charges for the following utilities:
   a. Heating
   b. Electricity
   c. Water

d. Internet Service

C. Contractor shall provide the following:

1. One flat-top office desk (2½ by 4½ feet) with drawers on each end.

2. One 3 by 6-foot drawing table.

3. Four straight chairs.

4. Two 4-drawer, steel filing cabinets with lock and keys.

5. One large metal wastebasket.

6. One plan rack.

7. One wall-mounted fire extinguisher.

8. One water cooler/bottled water.

9. One printer/copier/scanner capable of 8½ by 11 to 11 by 17-inch copies. Contractor shall be responsible for maintaining printer/copier/scanner throughout contract period.

10. Continuous inventory of expendable supplies for above items.

11. Extra hard hats for on-site visitors.

D. Provide adequate sanitary facilities.

E. Field Office shall be ready for occupancy within 30 days after notice to proceed with construction, unless an extension of time is granted by the Engineer.

2.3. SHEDS

A. Storage platforms and sheds shall be provided for materials that require protection from the weather.

B. Sheds shall be substantially constructed.

END OF SECTION

SECTION 01 6000

MATERIALS AND EQUIPMENT

1. GENERAL

1.1. SUMMARY

A. This section specifies administrative and procedural requirements governing the Contractor's selection of products for use in the project.

1. Multiple Prime Contracts: Provisions of this section apply to the construction activities of each prime Contractor.

B. The Contractor's Construction Schedule and the Schedule of Submittals are included under Section 01 3200, Schedules and Reports.

C. Standards. Refer to Section 01 4219, Applicable Codes and Standards, for applicability of industry standards to products specified.

1.2. RELATED DOCUMENTS

A. Drawings and general provision of the Contract, including General and Supplemental Conditions or General Provisions and other Division 1 Specification sections, apply to this section.

1.3. DEFINITIONS

A. Definitions used in this Article are not intended to change the meaning of other terms used in the Contract Documents, such as "specialties," "system," "structure," "finishes," "accessories," and similar terms. Such terms are self-explanatory and have well recognized meanings in the construction industry.

1. "Products" are items purchased for incorporation in the work, whether purchased for the project or taken from previously purchased stock. In all cases, products shall be new and unused. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

a. "Named products" are items identified by manufacturer's product name, including make or model designation, indicated in the manufacturer's published product literature, that is current as of the date of the Contract Documents.

2. "Materials" are products that are substantially shaped, cut, worked, mixed, finished, refined, or otherwise fabricated, processed, or installed to form a part of the work.

3. "Equipment" is a product with operational parts, whether motorized or manually operated, that requires service connections such as wiring or piping.

1.4. QUALITY ASSURANCE

A. Source Limitations. To the fullest extent possible, provide products of the same kind, from a single source.

B. Compatibility of Options. When the Contractor is given the option of selecting between two or more products for use on the project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.

1. Each prime Contractor is responsible for providing products and construction methods that are compatible with products and construction methods of other prime or separate Contractors.

2. Equipment Nameplates: Provide a permanent nameplate of each item of service-connected or power-operated equipment. Locate on an easily accessible surface. The nameplate shall contain the following information and other essential operating data:

a. Name of product and manufacturer.
b. Model and serial number.
c. Capacity.
d. Speed.
e. Ratings.

1.5. PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products in accordance with the manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.

1. Schedule delivery to minimize long-term storage at the site and to prevent overcrowding of construction spaces.

2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.

3. Deliver products to the site in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.

4. Inspect products upon delivery to ensure compliance with the Contract Documents, and to ensure that products are undamaged and properly protected.

5. Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.

6. Store heavy materials away from the project structure in a manner that will not endanger the supporting construction.

7. Store products subject to damage by the elements above ground, under cover in a weathertight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

2. PRODUCTS

2.1. PRODUCT SELECTION

A. General Product Requirements. Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, unused at the time of installation.

1. Provide products complete with all accessories, trim, finish, safety guards, and other devices and details needed for a complete installation and for the intended use and effect.

2. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.

B. Product Selection Procedures. Product selection is governed by the Contract Documents and governing regulations. Procedures governing product selection include the following:

1. Proprietary Specification Requirements: Where only a single product or manufacturer is named, provide the product indicated. No substitutions will be permitted.

2. Semi-proprietary Specification Requirements: Where two or more products or manufacturers are named, provide one of the products indicated. No substitutions will be permitted.

a. Where products or manufacturers are specified by name, accompanied by the term "or equal" or "or approved equal," comply with the Contract Document provisions concerning "substitutions" and “or-equals” to obtain approval for use of an unnamed product.

3. Non-Proprietary Specifications: When the Specifications list products or manufacturers that are available and may be incorporated in the Work, but do not restrict the Contractor to use of these products only, the Contractor may propose any available product that complies with Contract requirements. Comply with Contract Document provisions concerning "substitutions" and “or-equals” to obtain approval for use of an unnamed product.

4. Descriptive Specification Requirements: Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.

5. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements, and are recommended by the manufacturer for the application indicated. General overall performance of a product is implied where the product is specified for a specific application.

    a. Manufacturer's recommendations may be contained in published product literature, or by the manufacturer's certification of performance.

6. Compliance with Standards, Codes, and Regulations: Where the Specifications only require compliance with an imposed code, standard, or regulation, select a product that complies with the standards, codes, or regulations specified.

7. Visual Selection: Where specified product requirements include the phrase "...as selected from manufacturer's standard colors, patterns, textures..." or a similar phrase, select a product and manufacturer to comply with other specified requirements. The Engineer will select the color, pattern, and texture from the product line selected.

2.2. SHOP PRIMING AND PAINTING

A. Shop prime and/or shop finish all shop fabricated equipment prior to shipping.

B. Surface preparation, primers, finishes, number of coats, and film thicknesses shall comply with applicable provisions of Section 09 9100, Painting (if included), unless alternative procedures and materials are accepted by the Engineer during shop drawing and product data review.

C. Prepare and finish electrical and mechanical equipment prior to final assembly. Do not sandblast or paint assembled equipment or machined interior surfaces of equipment.

D. Coat interior, inaccessible surfaces of equipment with an epoxy system suitable for the lifetime of the equipment at anticipated operating conditions and temperatures, unless otherwise specified or accepted.

E. Coat exterior and accessible interior surfaces with an appropriate epoxy system, unless otherwise specified or accepted.

3. EXECUTION

3.1. INSTALLATION OF PRODUCTS

A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other work.

1. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

END OF SECTION

SECTION 01 6010

GENERAL EQUIPMENT STIPULATIONS

1. GENERAL

1.1. SCOPE

A. These General Equipment Stipulations apply, in general, to all equipment and piping. They supplement the detailed equipment specifications, but in case of conflict, the detailed equipment specifications shall govern.

1.2. COORDINATION

A. The Contractor shall assume full responsibility for the coordination of the installation of all equipment, materials, and products furnished under these Contract Documents. The Contractor shall be completely responsible for verification that all structures, piping, and equipment components furnished by him and/or his Subcontractors and Suppliers are compatible. The Contractor shall start up each equipment system and shall make all necessary adjustments to place each system in proper operating condition.

1.3. ADAPTATION AND LOCATION OF EQUIPMENT

A. Equipment shall be readily adaptable for installation and operation in the structures to be constructed under other Contracts. No responsibility for alteration of a planned structure to accommodate other types of equipment will be assumed by the Owner. Equipment which requires alteration of the structures will be considered only if the Contractor assumes all responsibility for making and coordinating all necessary alterations. All such alterations shall be made at the Contractor's expense.

B. The Contractor shall install the work in such manner that the equipment, piping, vents, conduit, panels, and ductwork, etc., will be as neatly installed and out-of-the-way as physically possible. All equipment, piping, ductwork, and conduit, etc., shall be installed to provide needed maintenance and passage space.

1.4. PATENT ROYALTIES

A. All patent royalties and fees for patents covering materials, articles, apparatus, devices, or equipment shall be included in prices bid by the Contractor. Attention is directed to the requirements of the Supplemental General Conditions concerning patents.

1.5. EQUIPMENT GUARANTEE

A. The Contractor shall guarantee all equipment against faulty or inadequate design, improper assembly or erection, defective materials, breakage or other failure. The Contractor shall guarantee all equipment against improper assembly

or erection, defective workmanship or other failure. The guarantee period shall be defined in Section 01 7836, Warranties and Bonds.

1.6. WORKMANSHIP AND MATERIALS

A. All equipment shall be designed, fabricated, and assembled in accordance with the best engineering and shop practices. Individual parts shall be manufactured to standard sizes and gauges so that repair parts, furnished at any time, can be installed in the field. Like parts of duplicate units shall be interchangeable. Equipment shall be new and shall not have been in service at any time prior to delivery, except as required by tests. All bolts, nuts, fastenings, pipe, and fittings shall be manufactured in conformance with the United States system of measurement.

B. Materials shall be suitable for service conditions. Iron castings shall be tough, close grained, gray iron free from blowholes, flaws, or excessive shrinkage and shall conform to ASTM A 48, Class 30 minimum. Plugging of defective castings shall not be permitted. Castings shall be annealed to remove internal stresses prior to machining and shall have the mark number and heat number cast on them.

C. Structural and miscellaneous fabricated steel used in items of equipment shall conform to the standards of the American Institute of Steel Construction, except where otherwise specified. All structural members shall be considered as subject to shock or vibratory loads.

D. All replaceable or expendable elements such as filters, screens, drive belts, fuses, and indicator lamps, etc., shall be easily accessible and replaceable without need of dismantling equipment or piping. All such items shall be of a standard type that is readily available from multiple suppliers.

E. Threaded openings for drains or vents in pump volutes, compressor or fan scrolls, air receivers, and heat exchangers which are plugged during normal operation shall be provided with stainless steel plugs.

1.7. LUBRICATION

A. Equipment shall be adequately lubricated by systems which require attention no more frequently than weekly during continuous operation. Lubrication systems shall not require attention during startup or shutdown and shall not waste lubricants.

B. Provide lubricants of the type recommended by the equipment manufacturer in sufficient quantity to fill all lubricant reservoirs and to replace all lubricants consumed during testing, startup, and initial operation. Provide sufficient quantities of lubricants to lubricate all equipment for one year of normal service before final acceptance of the equipment will be made by the Owner.

C. Where special run-in oil or storage lubricants are used, they shall be flushed out and replaced with the required service lubricant by the Contractor.

D. Tag each piece of equipment with cloth tag showing proper type lubricant, period between lubrications, date of lubrication, and worker's initials. Have space for ten lubrication notations.

1.8. ELECTRIC MOTORS

A. Motors furnished with equipment shall comply with the following, unless otherwise required by the detailed equipment specifications

1. Motors shall be designed and applied in compliance with NEMA, ANSI, IEEE, and AFBMA standards and the NEC for the specific duty imposed by the driven equipment.

2. Where frequent starting occurs, motors shall be designed for frequent starting duty equivalent to the duty service required by the driven equipment.

3. Unless recognized and defined by the standards and codes for intermittent duty as a standard industry practice, all motors shall be rated for continuous duty at 40°C ambient. Motor temperature rise above 40°C ambient on continuous operation at nameplate horsepower shall not exceed the NEMA limit for 1.0 service factor and Class B insulation, or Class A insulation if used.

4. Motors shall be designed for full voltage starting. Motors shall operate under a ±10 percent voltage variation and ±5 percent frequency variation.

5. Motor-bearing life shall be based upon the actual operating load conditions imposed by the driven equipment.

6. Motors shall be sized for the altitude at the location where the equipment is to be installed.

7. Motors shall be sized so that, under maximum continuous load imposed by the driven equipment, the motor nameplate horsepower for continuous operation in 40°C ambient is at least 15 percent more than the driven load. Continuous equipment load shall not exceed 87 percent of motor nameplate horsepower, whether motor service factor is 1.0 or higher.

8. Where the detailed specifications call for encapsulated motor windings, the motor shall have a sealed insulation system designed for a more severe environment than usual varnish treatments can withstand. The insulation system shall be General Electric "Polyseal," Allis-Chalmers "Poxeal," U.S. Motors "Everseal," or equal. Motors in this case may be single voltage rated.

9. Motors shall have a clamp-type grounding terminal inside the motor conduit box.

10. Motors with external conduit boxes shall have oversized conduit boxes.

11. Motors in occupied areas shall be quiet rated and so marked.

B. It is the intent of this general specification to allow the manufacturer's standard motor on integrally constructed, motor-driven equipment such as appliances, hand tools, etc., that is specified by model number in which a redesign of the complete unit would be required for a motor with other features as may be specified herein.

C. Motors within the horsepower ranges indicated below shall be rated and constructed as follows, unless otherwise required by the detailed equipment specifications

1. Below ½ horsepower:

    a. 115-volt, 60-hertz, single phase.
    b. Totally enclosed, fan-cooled.
    c. Permanently lubricated, sealed bearings.
    d. Built-in manual-reset thermal protector; or furnished with integrally mounted stainless steel enclosed manual motor-overload switch.

2. ½ to 1 horsepower:

    a. 230/460-volt, 60-hertz, 3-phase.
    b. Totally enclosed, fan-cooled.
    c. Specially insulated for use in damp locations below 20°C.
    d. Grease-lubricated, anti-friction bearings.

3. 1½ horsepower and above:

    a. 230/460-volt, 60-hertz, 3-phase.
    b. Totally enclosed, fan-cooled.
    c. Specially insulated for use in damp locations below 20°C.
    d. Grease-lubricated anti-friction bearings or oil-lubricated sleeve bearings.
    e. Vertical motors shall have 15-year average-life thrust bearings.

1.9. DRIVE UNITS

A. Except when specified otherwise in the detailed equipment specifications, 87 percent of the nameplate horsepower rating of each drive motor shall be at least equal to the theoretical brake horsepower required to drive the equipment under full load, including all losses in speed reducers and power transmission.

B. The nominal input horsepower rating of each gear or speed reducer shall be at least equal to the nameplate horsepower of the drive motor.

C. Drive units shall be designed for 24-hour continuous service and shall be constructed so that oil leakage around shafts is precluded.

D. Gear Motors. Gear motors shall be rated AGMA Class II and shall bear an AGMA nameplate.

E. Gear Reducers. Each gear reducer shall be totally enclosed, oil lubricated, with anti-friction bearings throughout. Worm gear reducers shall have a service factor of at least 1.25. Shaft-mounted gear reducers shall be rated AGMA Class II. Other helical, spiral bevel, and combination bevel-helical gear reducers shall have a service factor of at least 1.40. Each gear reducer shall bear an AGMA nameplate or the manufacturer shall certify that the gear reducer is designed and rated in accordance with AGMA standards.

F. Chain Drives. Chain drives shall utilize roller chain having an ultimate strength of not less than 10 times the maximum working load.

G. V-Belt Drives. Each V-belt drive shall include a sliding base or other suitable tension adjustment. Fixed ratio V-belt drives shall have a service factor of at least 1.5 based on motor nameplate horsepower.

H. Couplings. Couplings between motors and drives or between drives and the driven equipment shall have a service factor of not less than 1.25 based on motor nameplate horsepower. Couplings between drives and the driven equipment shall have a service factor not less than that of the drive based on motor nameplate horsepower. All couplings rotating at speeds less than 900 rpm shall be of all steel construction. In general, couplings shall be of the tapered grid steel spring type or the crowned gear type.

I. Overtorque Protection. All low speed, high torque drives for equipment such as mechanical screens, conveyors, and clarifier and thickener mechanisms shall be protected against excessive torque by means of a suitable overtorque protection device. Acceptable devices shall include torque switches, shear pins, shear keys, and full-release torque couplings. Torque limiting couplings using sliding surfaces or friction to limit torque shall not be used.

1.10. SAFETY GUARDS

A. All belt or chain drives, fan blades, couplings, and other moving or rotating parts shall be covered on all sides by a safety guard. Safety guards shall be fabricated from 16 USS gauge or heavier galvanized or aluminum-clad sheet steel or ½-inch mesh galvanized expanded metal. Each guard shall be designed for easy installation and removal. All necessary supports and accessories shall be provided for each guard. Supports and accessories, including bolts, shall be galvanized. All safety guards in outdoor locations shall be designed to prevent the entrance of rain and dripping water. All safety guards shall comply with OSHA General Industry Standards, Part 1910, Subpart O, “Machinery and Machine Guarding.” Provide tachometer access on shaft ends.

1.11. ANCHOR BOLTS

A. Equipment suppliers shall furnish suitable anchor bolts for each item of equipment unless otherwise noted. Anchor bolts, together with templates or setting drawings, shall be delivered sufficiently early to permit setting the anchor bolts when the structural concrete is placed. Two nuts and two washers shall be furnished for each bolt. Anchor bolts to be embedded in concrete shall be provided with sufficient threads to permit a nut and washer to be installed on the

concrete side of the concrete form or supporting template, but in no case shall bolts be threaded less than 2 inches. Anchor bolts used in anchoring rotating or vibrating equipment shall be provided with suitable lock washers.

B. Anchor bolts for items of equipment mounted on baseplates shall be long enough to permit a minimum of one inch of grout beneath the baseplate and to provide adequate anchorage into structural concrete, unless otherwise shown or specified. Individual, embedded anchor bolts for heavy equipment shall be centered in a steel pipe sleeve having an inside diameter approximately two times the bolt diameter and an embedded length approximately eight times the bolt diameter.

C. Bolts specified to be bent shall be bent cold. Bend radius shall not be less than twice the bolt diameter. Unless otherwise shown or specified, anchor bolts shall be embedded in concrete a minimum distance of 15 times the bolt diameter. Unless otherwise shown or specified, all anchor bolts shall be at least ½ inch in diameter.

D. All embedded anchor bolts or anchor bolt materials shall be ASTM A 193, Grade B8, ASTM A 276, Type 304, or IFI-104, Grade 304 stainless steel threaded per ANSI B1.1. Nuts shall be heavy hex nuts, ANSI B18.2, semifinished pattern, and shall be ASTM A 194, Grade 8 or IFI-104, Grade 304 stainless steel. Flat washers shall be 18-8 stainless steel and shall conform to ANSI B27.2.

E. Chemical anchors shall be used to anchor equipment to existing concrete, EPCON C6, and conform to manufacturers recommendations. Expansion anchors may be used to anchor equipment to existing concrete, Engineer approval required. Expansion anchors shall be stainless steel, Type 304 and shall be of the wedge type for use in bottomless holes. Expansion anchors shall conform to the applicable requirements of Federal Specification FF-S-325. Installation methods shall be in conformance with the manufacturer's recommendations for maximum pullout and shear strength, but in no case shall the depth of the hole be less than 8 bolt diameters or 3 inches, whichever is greater. The minimum distance between the center of any expansion anchor and an edge or exterior corner of concrete shall not be less than five times the diameter of the hole in which it is installed. The minimum distance between adjacent anchors shall not be less than 10 times the diameter of the hole in which it is installed. Expansion anchors shall be "Phillips Red Head" by Phillips Drill Company, "Kwik-Bolt" by Hilti Fastening Systems, "Trubolt" by Ramset Fastening Systems, or equal.

1.12. EQUIPMENT BASES

A. Equipment shall be installed on a raised reinforced concrete base, where shown on the Drawings. The base shall be a minimum of 4 inches in height and shall extend beyond the equipment baseplate approximately 3 inches on all sides.

B. The electrical contractor shall be instructed concerning electrical conduit locations prior to pouring the concrete base.

C. Provide a cast iron or welded steel baseplate for each pump, compressor, and any other item of equipment which is to be installed on a concrete base, unless otherwise specified. Each unit and its drive assembly shall be supported on a single baseplate of neat design. Baseplates shall have pads for anchoring all components and adequate grout holes. Baseplates for pumps shall have a raised lip all around and a threaded drain connection. Baseplates shall be anchored to the concrete base with suitable anchor bolts and the space beneath filled with epoxy or non-shrink grout as specified in the grouting section.

D. On direct coupled equipment, motor and driven equipment shall be doweled to a common base with a minimum of two dowels each.

1.13. ALIGNMENT OF MOTORS AND EQUIPMENT

A. In every case where a drive motor is connected to a driven piece of equipment by a flexible coupling, the coupling halves shall be disconnected and the alignment between the motor and the equipment checked and corrected. Machinery shall first be properly aligned and leveled by means of steel wedges and shims or jacking screws near anchor bolts. Anchor bolts shall be tightened against the shims on wedges or jacking screws and the equipment shall again be checked for level and alignment before placing grout. Wedges shall not be placed between machined surfaces.

B. In general, checking and correcting the alignment shall follow the procedures set up in the Standards of the Hydraulic Institute, “Instructions for Installation, Operation, and Maintenance of Centrifugal Pumps.” Equipment shall be properly leveled and brought into angular and parallel alignment.

C. Equipment shall be installed in such a way that no strain is transmitted to the equipment by piping systems or adjacent equipment.

1.14. LUBRICATION FITTINGS

A. Except for rotating shaft couplings, all lubrication fittings shall be brought to the outside of all equipment so that they are readily accessible from the outside without the necessity of removing covers, plates, housings, or guards. Fittings shall be accessible from safe, permanent platforms or walk areas. Fittings shall be of the bullneck, check type for use with a portable high pressure grease gun. Connection from a remote fitting to the point of use shall be with minimum 3/16 - inch stainless steel tubing, securely mounted parallel to equipment lines and protected where exposed to damage.

1.15. GROUTING

A. A special epoxy, non-shrink, or sand-cement grout shall be used in the placement of all pump, motor, and equipment baseplates or bedplates, column baseplates, other miscellaneous baseplates, and other grouting applications as shown on the Drawings.

1.16. WELDING AND BRAZING

A. All welds shall be sound and free from embedded scale and slag. All butt welds shall be continuous and where exposed to view shall be ground smooth. All continuous welds shall be gas and liquid-tight. Welds in piping shall have full penetration and shall be smooth on the inside of the pipe. Intermittent welds shall have an effective length of at least 2 inches and shall be spaced not more than 6 inches apart.

B. All welding of steel and aluminum, including materials, welding techniques, general safety practices, appearance and quality of welds, and methods of correcting defective work, shall conform to the latest requirements of AWS Specifications. Structural steel welding shall conform to the requirements of the AWS "Structural Welding Code." The general recommendations and requirements of the AWS "Structural Welding Code" shall also apply to welded aluminum structures. The welding process and welding operators shall meet qualification tests and welding performance tests in accordance with the latest provisions of ASME Boiler and Pressure Vessel Code, Section IX, "Welding and Brazing Qualifications." Welding process and qualification procedures for welding of pipe shall conform to the latest requirements of ANSI B31.1, Section 327, "Welding," and Section 328, "Brazing and Soldering." All welding qualification tests shall be witnessed by the Engineer, except as provided herein. All costs associated with the qualification or testing of welders and welding operators shall be borne by the Contractor.

C. Actual welding procedures to be used in field assembly and installation of equipment furnished under this Contract shall be submitted to the Engineer for approval prior to beginning the work. Reports certifying that the welding procedures, welders, and welding operators that the Contractor intends to use are qualified as specified above shall also be submitted to the Engineer prior to beginning the work. In the case of welder qualifications for shop welding and for carbon steel field welding, welders presenting certified qualification papers validated within the preceding 6-month period and acceptable to the Engineer will not be required to take the qualification tests. In the case of field welding of stainless steel or aluminum, all welders shall be required to take the qualification tests regardless of past experience or availability of certified qualification papers.

D. Field welding practices shall conform to OSHA Construction Standards, Part 1926, Subpart J, "Welding and Cutting." Shop welding practices shall conform to OSHA General Industry Standards, Part 1910, Subpart Q, "Welding, Cutting, and Brazing."

E. Welding electrodes for structural steel shall conform to the standard recommendations of the AISC. Welding electrodes for stainless steel shall conform to applicable AWS specifications and shall be as recommended by "Welded Austenitic Chromium-Nickel Stainless Steels, Techniques and Properties," published by the International Nickel Company, New York, New York. Welding electrodes for aluminum shall conform to applicable AWS specifications.

F. Each welder and welding operator must identify his welds with his assigned symbol.

G. Welders performing unsatisfactory work shall be removed from the welding process.

H. The Owner may inspect any weld by radiographic or other means. Welds not in accordance with the requirements specified herein shall be repaired or replaced at the Contractor's expense. Excessive porosity, nonmetallic inclusions, lack of fusion, incomplete penetration, and cracking shall constitute grounds for rejection of welds.

1.17. ERECTION AND SETTING

A. In the erection and setting of all fabricated equipment, the Contractor shall exercise care to ensure that each item of equipment is adequately supported so as not to bend or distort under its own weight until adequate foundation support and anchorage are provided. Where lifting lugs or clips are provided, they shall be used in erecting and setting the equipment. Erection and setting of equipment and structural steel shall conform to the requirements of OSHA Construction Standards, Part 1926, Subpart R, "Steel Erection," Subpart H, "Material Handling, Storage, Use, and Disposal," and Subpart N, "Cranes, Derricks, Hoists, and Conveyors." Erection of structural steel shall conform to the latest requirements of the AISC "Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings."

B. During placement and prior to any grouting or connection of adjacent piping the equipment shall be leveled and aligned true to level, plumb, alignment, and grade with all parts bearing or fitting the structure or equipment accurately and securely. It shall not be permitted to cock out of alignment, re-drill, re-shape, or force fit any fabricated items.

C. The Contractor shall take all measurements necessary to properly fit his work in the field, and he shall be governed by and responsible for these measurements and the proper working out of all details. The Contractor shall be responsible for the correct fitting of all work in the field and the accurate placement of all anchor bolts installed by him.

D. The Contractor shall bring all parts to be erected or assembled into close contact. Before assembly, all surfaces to be in contact with each other shall be thoroughly cleaned. Drift pins may be used only for bringing members into position, never to enlarge or distort holes. Torching or burning of holes or cutting of fabricated items to correct misalignment or shop errors shall not be permitted. Enlargement of holes necessary to make field connections shall be done only with the Engineer's approval by reaming with twist drills and in a manner acceptable to the Engineer.

E. All equipment shall be furnished with suitable eyebolt lifting lugs or lifting angles to facilitate handling.

1.18. SPECIAL TOOLS AND ACCESSORIES

A. Equipment requiring periodic repair and adjustment shall be furnished complete with all special tools, instruments, and accessories required for proper maintenance. Special tools and accessories shall include those tools and accessories not normally available in an industrial hardware or mill supply house. Equipment requiring special devices for lifting or handling shall be furnished complete with those devices.

1.19. SHOP PRIMING AND PAINTING

A. All iron and carbon steel surfaces of shop fabricated equipment and all ferrous and nonferrous surfaces specified to be shop primed or painted shall be painted in the shop with one or more coats of primer. The provisions of Section 09 9100, Painting, shall govern.

B. All surfaces to be primed in the shop shall have all rust, mill scale, grease, oils, mud, dirt, welding flux, slag, weld spatter, and other foreign material removed after fabrication and prior to application of primer. Welds shall be scraped, chipped, and brushed as necessary to remove all embedded slag or weld spatter. Sharp edges of cut or sheared edges shall be dulled by at least one pass of a power grinder to improve paint adherence. Surface preparation prior to shop priming shall conform to that specified in the detailed equipment specifications. Where surface preparation prior to shop priming is not otherwise specified, iron and carbon steel surfaces shall be given a commercial blast cleaning in accordance with Steel Structures Painting Council Specification SP-6, galvanized or aluminum surfaces shall be given a solvent cleaning, copper surfaces shall be cleaned with a mild solution of phosphoric acid and buffed or polished to a bright finish, and stainless steel shall be given a solvent cleaning followed by sanding or light blast cleaning to provide a roughened surface. Cleaned surfaces shall be primed immediately after cleaning. Sandblasting shall not be permitted on electrical or mechanical equipment after assembly. Sandblasting shall achieve an anchor pattern or blast profile of between 30 and 40 percent of the dry film thickness of the first applied coat of primer.

C. Primers shall be applied with suitable brushes, rollers, or spray equipment at a rate of application not to exceed the manufacturer's recommended rate for the surface being painted. Primer shall not be applied in areas where there is an excessive amount of dust present in the air. Primer shall be mixed, stored, and applied in strict adherence to the manufacturer's recommendations. Primed surfaces shall be smooth and free of brush marks, streaks, laps, runs, or skipped or missed areas. Special care shall be taken to ensure that all cracks, corners, and crevices are filled with primer. Shop primed materials shall not be handled or assembled until the shop coating is dry and hard.

D. Primers, number of coats, and minimum dry film thicknesses shall conform to the shop painting systems specified in the detailed equipment specifications. Where shop primers are not otherwise specified, iron and carbon steel surfaces shall be coated with one (1) coat of alkyd system ferrous metal primer to a minimum dry film thickness of 2.0 mils, and galvanized, stainless steel, copper, and aluminum surfaces shall be coated with one (1) coat of galvanized metal wash primer to a minimum dry film thickness of 0.5 mils. Alkyd system ferrous metal primer shall be Glidden "Glid-Guard Tank and Structural Primer No. 585," TNEMEC "37-77

Chem-Prime," Indurall "G-1221 Primer," or equal. Galvanized metal wash primer shall be Glidden "Glid-Guard Metal Conditioning Primer No. 5290," TNEMEC "32-1210 TNEME-Grip," Indurall "H4-1109 Wash Coat Primer," or equal.

E. Miscellaneous iron castings shall be given a commercial blast cleaning and coated in the shop with one (1) coat of bituminous paint applied to a minimum dry film thickness of 10.0 mils, unless otherwise specified. Bituminous paint shall be Glidden "Glid-Guard Top Service Thick Black," TNEMEC "46-449 Heavy Duty Black," Indurall "J-1135 Coal Tar Coating," or equal.

F. Anodizing of aluminum shall be conducted in accordance with Aluminum Association Designation (A41), published by Aluminum Association, Inc., New York, New York. Unless otherwise shown or specified, the process shall provide a clear anodized finish having a minimum thickness of 0.4 mils. Anodizing shall be conducted after the aluminum item is fabricated.

G. Machined, polished, and nonferrous surfaces which are not to be painted shall be coated with a rust preventive compound, Dearborn Chemical "No-Ox-Id 2W," Houghton "Rust Veto 344," Rust Oleum "R-9," or equal.

H. All surfaces which will be inaccessible after assembly or installation shall be protected by two or more coats of shop applied paint suitable for the life of the equipment.

I. All non-machined and nonbearing ferrous surfaces of electric motors, compressors, lubricating oil systems, pumps, blowers, speed reducers, and increasers, motor control centers, transformers, valves, valve operators, controls, and other self-contained, purchased equipment shall be shop cleaned and shop finished with the manufacturer's high-grade, oil-resistant alkyd enamel or epoxy coating system. Non-machined ferrous surfaces on the interior of gear reducer or increaser cases shall be shop finished with a rust inhibiting alkyd enamel specially designed for gear case or transmission service applied to a minimum dry film thickness of 1.5 mils. Where equipment is specified to be field painted as well, shop primer and finishes shall be compatible with the specified field applied finish.

1.20. FIELD PRIMING

A. All iron and carbon steel surfaces not specified to be galvanized or shop primed and all ferrous or nonferrous surfaces specified to be field primed and painted shall be coated in the field with one or more coats of primer in accordance with the requirements of Section 09 9100, Painting.

1.21. FIELD PAINTING

A. All ferrous and nonferrous surfaces of equipment which have received one or more coats of shop or field applied primer shall be field painted after installation in accordance with the requirements of Section 09 9100, Painting, except for interior surfaces of vessels and enclosed equipment not specified to be field painted

1.22. GALVANIZING

A. All galvanizing shall be done by the hot-dip process after fabrication in conformity with requirements of ASTM A 123, A 153, A 384, and A 385. Articles to be galvanized shall be pickled before galvanizing.

B. Where galvanized bolts are specified or required by the Drawings, cadmium or zinc plated bolts will be acceptable provided cadmium plating conforms to ASTM A 165, Type NS, and zinc plating conforms to ASTM A 164, Type GS.

C. Areas of galvanizing damaged by welding or burning or otherwise damaged shall be thoroughly stripped and cleared and recoated with zinc to the required thickness by the hot-dip process.

D. Galvanized articles shall be free from uncoated spots, blisters, flux, black spots, dross, projections, and other defects not consistent with acceptable galvanizing practice.

E. Zinc and cadmium plating shall be subject to visual examination to determine uniformity of coating. The Engineer may require that the coating uniformity be tested in accordance with ASTM A 239.

1.23. PROTECTION AND STORAGE

A. All equipment shall be boxed, crated, or otherwise completely enclosed and protected during shipment, handling, and storage. All equipment shall be protected from exposure to the elements and shall be kept thoroughly dry at all times. Compressors, blowers, pumps, motors, valves, control panels, instrumentation, electrical equipment, and other equipment having anti-friction or sleeve bearings shall be stored in weathertight warehouses which are maintained at a temperature of at least 60°F. Other equipment may be stored outside under cover. All equipment shall be stored above ground level and adequately supported on wood blocking or other approved support material. Printed storage instructions of the manufacturers shall be strictly adhered to.

B. Painted, anodized, or otherwise coated surfaces shall be protected against impact, abrasion, discoloration, and other damage. All coated surfaces which are damaged prior to acceptance of equipment shall be cleaned and coated or painted to the satisfaction of the Engineer with the same or equivalent coating used in the original application.

C. Electrical equipment, motors, controls, and insulation shall be protected against moisture or water damage. All space heaters provided in the equipment shall be kept connected and operating at all times until equipment is placed in service. Electrical equipment stored without space heaters shall be provided with desiccants to protect against moisture damage. Desiccant shall be silica gel in porous bags at not less than one ounce per cubic foot of volume. Desiccant shall be replaced periodically.

D. Electrical equipment and instrumentation shall be stored in a location that is free from excessive or injurious amounts of vibration.

E. Rotating equipment such as pumps, motors, fans, and compressors shall be rotated periodically. In the absence of specific exercising instructions by the equipment manufacturer, each item of rotating equipment shall be rotated a minimum of 10 revolutions at intervals not to exceed 30 days. When shafts are too difficult to rotate by hand, nonmetallic grips shall be used to turn the shafts.

F. Vehicles such as trucks, forklifts, tractors, lawn mowers, and other engine-powered equipment shall be started up and operated at intervals not to exceed 15 days. Equipment shall be run until engine temperatures and pressures are in normal operating ranges. All lifting, lowering, tilting, loading, and unloading accessories shall be operated at least once during the exercise period. Equipment shall be moved under power from the parked position and run a sufficient distance so as to ensure proper lubrication of drive train and suspension components. All operators employed to exercise the vehicles shall be qualified and thoroughly familiar with the proper operation of the equipment. Forklifts, tractors, lawn mowers, and other small engine-powered equipment shall be stored indoors in garages or other suitable structures. Trucks stored outdoors shall be washed using approved materials at intervals not to exceed 15 days. All exercising and storage of vehicular equipment shall be conducted in a manner acceptable to the Engineer.

G. Interiors of gear and bearing cases housing oil-lubricated gears and bearings shall be filled with a rust inhibiting oil prior to storage or, if extended storage is anticipated, coated periodically with a rust inhibiting oil mist at intervals of time acceptable to the Engineer. Interiors of large pumps and compressors shall be protected using vapor phase inhibitor paper or porous bags of rust inhibiting, vapor emitting crystals. Exposed shafts shall be coated with rust preventative compound when wrapped with oil-impregnated paper and polyethylene film and sealed with waterproof tape.

H. Individually packaged, unpainted steel parts shall be protected by a wrapping of vapor phase inhibiting or oil-impregnated paper and polyethylene film.

I. Parts and equipment not requiring periodic inspection or maintenance shall be stored unopened in their original packaging until used.

J. Parts, instruments, controls, and small items of equipment shall be stored above ground or floor level on suitable shelves or racks in a heated, watertight warehouse.

K. Flanged openings on equipment shall be covered with suitable solid wooden or metal blanks securely bolted to the flange using a minimum of four bolts and a suitable rubber gasket. Ends of threaded pipe and fittings shall be sealed watertight with metal or plastic caps. Threaded openings shall be sealed watertight with metal or plastic plugs. Other openings shall be sealed with two layers of 6-mil polyethylene securely taped in place with waterproof tape.

L. A maintenance log on each item of mechanical and electrical equipment requiring periodic attention in storage shall be maintained by the Contractor. Oil and grease changes, exercising, desiccant replacement, nitrogen purge checks, heater checks, insulation checks, and other periodic maintenance shall be entered in the log. The maintenance log shall be made available to the Engineer on request.

M. A resistance test shall be performed on all motor windings and heater elements following storage and prior to installation as a check for insulation deterioration or moisture damage during storage. Insulation tests shall be performed in accordance with the requirements of Section 26 0500, Basic Electrical Requirements.

N. Immediately prior to installation, equipment shall be cleaned of any protective coatings used during storage and any rust, dirt, grit, or other foreign material shall be removed.

O. All grease-lubricated joints, shaft couplings, and bearings shall be flushed out and re-greased after installation and prior to start-up. All oil reservoirs and sumps shall be completely drained and flushed and refilled with the proper lubricant. Screens and filters shall be checked for contamination and replaced if necessary. The equipment shall then be tagged, signed, and dated, indicating that the equipment has been properly lubricated for start-up.

P. After storage, rubber parts such as valve seats, diaphragms, expansion joints, gaskets, hoses, and shaft couplings shall be checked for hardening or cracking. Deteriorated parts shall be replaced prior to start-up by the Contractor at his own expense.

1.24. VIBRATION TESTING

A. Each pump, blower, compressor, motor, or similar item of stationary rotating equipment having a rated power in excess of 20 hp shall be tested in the field for acceptable vibration levels, unless specified otherwise in the detailed equipment specifications. Vibration testing shall be performed by an experienced, factory-trained and authorized vibration analysis expert (not a sales representative) retained by the Contractor for this work. Each unit or pump system shall be tested separately without duplicate equipment running. All field testing shall be done in the presence of the Engineer. The Engineer shall be furnished with four (4) certified copies of vibration test data for each test performed.

B. Equipment which is assembled and tested on the manufacturer's floor shall also be checked triaxially for vibration by the manufacturer where specified in the detailed equipment specifications. The results of these tests, along with location of vibration check points, shall be submitted to the Engineer. All readings shall be made on an X-Y recorder with appropriate scales indicated and an explanation thereon of any recordings exceeding specified limits. The field tests shall include substantiation of the manufacturer's test data.

C. Tests shall be conducted at various speeds between maximum and minimum for systems with variable speed drives. For systems with two-speed drives, tests

shall be conducted at both speeds. For systems with constant-speed drives, tests shall be conducted under various loading conditions as determined by the Engineer.

D. Rotating equipment shall be tested for vibration in the field after installation by the following method. Equipment, complete with drive systems, in place at the job site, shall not vibrate more than the values allowed herein, unless otherwise specified in the detailed equipment specifications. All field tests shall be running tests with the equipment operating on the product for which it is intended, or a substitute acceptable to the Engineer. The term displacement, as used herein, shall mean total peak-to-peak movement of vibrating equipment, in mils; velocity shall mean the peak velocity or speed of the vibrating equipment, in inches per second (in/sec); acceleration shall mean the maximum acceleration which occurs during a vibration cycle, measured in G's. Displacement and velocity shall be measured by an IRD Mechanalysis Vibration Meter Model 306, Bently Nevada Model TK-8, or equal. Acceleration shall be measured by suitable IRD Mechanalysis, Bently-Nevada, or equal, equipment, subject to approval of the Engineer. Frequency of vibration, in cycles per minute (cpm), shall be determined when vibration exceeds specified levels or as otherwise necessary. Vibration shall be measured on the bearing housing, unless other locations are deemed necessary by the vibration analysis expert and Engineer.

E. Vibration shall be checked in the radial and axial directions for all equipment tested. For pumps, axial vibration shall not exceed 0.1 in/sec; and radial vibration shall not exceed that permitted by the Hydraulic Institute Standards except that, at vibration frequencies in excess of 8,000 cpm, the velocity shall not exceed 0.2 in/sec.

F. For gear boxes, gear reducers, speed increasers, etc., vibration shall be tested by either velocity or acceleration measurements, as deemed appropriate by the Engineer and the vibration analysis expert. Unless otherwise specified in the detailed equipment specifications, radial vibration shall not exceed 0.2 in/sec; axial vibration shall not exceed 0.1 in/sec.

G. For all fans, radial and axial vibration shall not exceed 0.1 in/sec in accordance with GSA PBS 15-15. For all other equipment, radial vibration shall not exceed 0.2 in/sec, and axial vibration shall not exceed 0.1 in/sec.

H. All rotating assemblies of high speed equipment shall be statically and dynamically balanced. The dynamic balance data must be certified and results submitted to the Engineer.

I. Critical speeds of all rotating equipment shall meet the following:

    1. For stiff shaft designs, the first critical speed of the rotating equipment shall be at least 25 percent above the maximum design operating speed.

    2. For flexible shaft designs, critical speeds shall be at least 25 percent above or below normal design operating speeds.

J. The Contractor shall be responsible for unit and system assembly vibration testing and their results, which shall be within the specified limits. Copies of test results shall be submitted to the Engineer for review. Should the vibration field test results exceed shop test results or the limits specified herein, the Contractor shall correct the deficiencies within thirty (30) days. After corrections have been completed, the vibration testing shall be rerun and the results resubmitted to the Engineer for review.

K. The vibration test meter shall become the property of the Owner following completion of field vibration testing. The unit shall be delivered to the Owner in perfect working order, complete with case and all necessary probes or pickups. Operating instructions shall be included, and the Owner's personnel trained in its use by the Contractor.

L. Noise or vibration in any rotating equipment which the Engineer judges to be excessive or damaging, shall be cause for rejection.

1.25. HYDRAULIC SYSTEMS

A. All pipes, tubes, and hoses for hydraulic fluid shall be securely restrained against movement.

B. All hydraulic fluid reservoirs for hydraulic power packs shall be equipped with a low level shut-off mechanism which shall stop operation of the power pack when the level of fluid in the reservoir reaches a predetermined low level.

C. All hydraulic systems shall be equipped with an alarm to notify the operator of system malfunction.

1.26. PRESSURE AND TEMPERATURE GAUGES

A. The Contractor shall furnish a compound pressure/vacuum gauge on the suction and a pressure gauge on the discharge of each pump, compressor, and blower, unless otherwise specified. Gauges shall be 4 to 5 inches in diameter with phenolic cases and clear shatter-proof lenses. Gauges shall be suitable for use in harsh, vibrating environments and be glycerin filled. Gauges shall have a white background and black pointers and characters. Maximum scale reading shall be approximately twice the maximum operating pressure of the fluid being measured. Accuracy shall be ±2 percent. The operating mechanism shall be of the Bourdon type with positive protection against any solids contamination of the operating mechanism provided. Pressure gauges shall be provided with NPT connections and shall be isolated from piping by gauge cocks. Pressure gauges on rotary or reciprocating equipment shall be provided with pressure snubbers.

B. The Contractor shall furnish a bi-metallic temperature gauge on the discharge of each air compressor or blower, unless otherwise specified. Temperature gauges shall be approximately 5 inches in diameter with stainless steel case and white background and black pointers and characters. All temperature gauges shall have a range of 0 to 250°F unless otherwise required for process conditions. Accuracy shall be ±1 percent. Temperature gauges shall be furnished with stainless steel thermowells and NPT connections.

C. Pressure gauges for steam service shall have stainless steel case and shall be equipped with pigtail siphon.

1.27. LIMIT SWITCHES AND SENSORS

A. Limit switches on equipment shall be of the heavy-duty, precision type with NEMA 4 steel enclosure and standard pre-travel lever or plunger operator as required, unless otherwise specified. Limit switches shall have SPDT or DPDT contacts rated not less than 5 amps inductive, 10 amps resistance at 120 volts AC. Limit switches in hazardous locations shall be enclosed in a cast aluminum, explosion-proof enclosure.

B. Pressure switches shall be of the snap-acting type with internal adjustment and shock-resistant, cast, waterproof enclosure, unless otherwise specified. Contacts shall be SPDT or DPDT rated minimum 15 amps at 125 volts AC. Switch operation shall be by means of a PTFE diaphragm or a Type 316 stainless steel bellows, depending on pressure range. All wetted parts shall be of brass or stainless steel. Switch shall have a repeatability of ±1 percent of range or better. Switch shall be UL listed.

C. Temperature switches shall be of the non-indicating, snap-acting type with internal adjustment, oil-filled stainless steel sensing bulb, and shock resistant, cast watertight enclosure, unless otherwise specified. Contacts shall be SPDT or DPDT rated minimum 15 amps at 125 volts AC. Switch shall be furnished with a separable stainless steel well. Switch shall be UL listed.

1.28. EQUIPMENT SPEEDS

A. Maximum rotative speeds on mechanical and electrical equipment shall be as follows, Unless otherwise permitted in the detailed equipment specifications or specified on the Drawings:

1. All centrifugal, axial, and vortex pumps - 1,800 rpm
2. Progressing cavity pumps in wastewater, scum, sludge, or abrasive slurry - 300 rpm
3. Centrifugal, axial, and vortex pumps in wastewater, scum, sludge, or abrasive slurry - 1,800 rpm
4. Propeller fans (direct drive) - 1,200 rpm
5. Propeller fans (V-belt drive) - 700 rpm
6. Centrifugal fans and vent sets - 900 rpm
7. Rotary lobe compressors - 2,500 fpm pitch line velocity
8. Centrifugal compressors - 3,600 rpm

1.29. NOISE CRITERIA

A. Noise levels for all operating equipment shall not exceed 90 dB at 5 feet from the equipment when measured on the A scale of a calibrated sound level meter at slow response, unless otherwise specified

B. Noise criteria shall be met without the use of special external barriers or enclosures.

1.30. INSTALLATION CHECK

A. An experienced, competent, and authorized service representative of the manufacturer of each item of equipment or other person acceptable to the Engineer shall visit the site of the work and inspect, check, adjust if necessary, and approve the equipment installation. In each case, the equipment manufacturer's representative or other person authorized by the Engineer to perform the installation check shall be present when the equipment is placed in operation and shall revisit the jobsite as often as necessary until all trouble is corrected and the equipment installation and operation are satisfactory in the opinion of the Engineer.

B. Each equipment manufacturer's representative or other person authorized by the Engineer to perform the installation check shall furnish to the Owner, through the Engineer, a written report certifying that the equipment (1) has been properly installed and lubricated; (2) is in accurate alignment; (3) is free from any undue stress imposed by connecting piping or anchor bolts; and (4) has been operated under full load conditions and that it operated satisfactorily. The work described under these Contract Documents will not be accepted as complete until satisfactory installation certifications have been submitted in accordance with the requirements of this section.

C. The Contractor shall properly coordinate the visits by the manufacturer's representatives, particularly where the operation of an item of equipment is dependent on the operation of other equipment. Prior to calling the manufacturer's representative, the Contractor shall ensure that all necessary related equipment, structures, piping, and electrical work is complete. The Contractor shall pay for any revisits to the site by the manufacturer's representative made necessary due to the Contractor's failure to properly coordinate the visits.

D. The Contractor shall secure the services of the manufacturer's representative at the site of the work for as long as is necessary to check the installation and place the equipment in satisfactory operation.

E. Electrical connections to equipment shall be made only upon approval of the manufacturer's representative.

F. All costs for this work shall be included in the contract price(s) and no separate payment will be made.

1.31. FIELD TESTING

A. After installation and checkout, all equipment shall be field tested in the presence of the Engineer and in a manner satisfactory to him. During the field tests, the equipment shall be subjected to various full load and partial load conditions and emergency operating and shutdown conditions. The ability of the equipment to operate in the prescribed manner without overheating, jamming, excessive noise

or vibration, or evidence of excessive wear shall be demonstrated to the satisfaction of the Engineer.

B. All equipment shall be tested before it is covered or insulated. All accessory equipment which may be damaged by conditions during the test shall be isolated or otherwise protected.

C. All testing instruments and gauges necessary for conducting the tests shall be furnished by the Contractor. Installed instruments and gauges shall be used whenever possible if calibrated and approved for the purpose. Calibrate all installed instruments and gauges and attach a cloth tag showing date of calibration. Portable test equipment used in field testing shall be calibrated in the presence of the Engineer or suitable written evidence attesting to the accuracy of the equipment shall be submitted.

D. A record shall be made of each field test showing operating temperatures and pressures, motor current and voltage, speed, flow rate, and other pertinent data. Information recorded for fans, blowers, compressors, and pumps shall include static pressures entering and leaving the equipment, fluid temperature entering and leaving the equipment, ambient temperature, barometric pressure and relative humidity, rpm, and discharge flow rate. Four (4) copies of all recorded test data and information shall be submitted to the Engineer for approval.

E. Field test all equipment handling or operating in water, wastewater, sludge, or corrosive or toxic materials using clean water at normal operating temperatures. Water used shall be potable water unless other sources are approved in writing by the Engineer.

F. Furnish all labor, materials, water, air, oil, power, fuel, chemicals, test equipment, and other items required to conduct the field tests, including any retests, unless otherwise specified in the detailed equipment stipulations.

G. Should the results of the tests indicate that the equipment has failed to perform in accordance with the requirements of the applicable detailed equipment specification, in the opinion of the Engineer, the Contractor shall make at his own expense such modifications or adjustments as required for satisfactory operation, including replacement of any or all components, if necessary. Following the modifications or adjustments, the Contractor shall repeat the field tests as specified herein. This procedure shall be repeated until the results of the field tests indicate that the equipment has satisfied the requirements of the applicable specification section.

H. The cost of all field testing shall be included in the contract price(s) and no separate payment will be made.

1.32. IDENTIFICATION OF PIPING AND EQUIPMENT

A. All piping and equipment shall be identified as follows: All equipment and piping specified to be painted shall be color coded. The colors shall be as specified in Section 09 9100, Painting. Insulated piping shall be identified using plastic

bands, arrows, and letters, colored and sized in accordance with Section 09 9100.

B. All major items of equipment shall have an identification nameplate. The Contractor shall submit a suitable list of all items of major equipment to the Engineer, who will furnish the Contractor with an identification numbering system. The nameplates shall be of Type 304 stainless steel, No. 6 finish, and not less than No. 16 gauge with indented stamped lettering. Nameplates shall be attached to equipment bases in easily visible and accessible locations. Nameplates shall be fastened in a permanent manner, arranged not to damage the equipment, with not less than four stainless steel fasteners. All nameplates shall contain as a minimum the following information, where applicable:

1. Name of equipment (from equipment specifications)
2. Manufacturer
3. Model designation
4. Rated horsepower
5. Service factor
6. Electrical and insulation specifications
7. Speed (rpm)
8. Capacity and head (discharge pressure)
9. Net weight

Lettering shall be upper case, block style in size and spacing to suit the nameplate. A sample nameplate including fastenings shall be submitted to the Engineer for approval prior to manufacture of any of the nameplates. The identification nameplates shall not be painted.

C. Piping shall be identified with a designation and directional flow arrows as described in Section 09 9100, Painting.

D. All valves shall be identified with a round brass disc, approximately 1½ inches in diameter and not less than No. 14 gauge, coated with a clear lacquer. Discs shall be fastened to valves in a permanent manner; however, attachment by chain to handwheels or other operators shall not be acceptable. Discs shall be stamped using indented numerals and/or letters with a valve number corresponding to its identification number in the valve schedule to be included in the Operation and Maintenance Manual.

E. All push-button stations, switches, motor controllers, transmitters, and other control equipment shall have identification nameplates of the engraved, laminated plastic type affixed to or adjacent to the switch, push-button station, etc.

F. All manufacturer's nameplates, identification nameplates, and ASME code plates located on areas of equipment to be insulated shall be removed and reattached on uninsulated areas in a manner acceptable to the Engineer and in his presence.

1.33. WARNING SIGNS

A. Permanent warning signs shall be furnished and installed on all mechanical and electrical equipment where a hazard exists as specified herein. Signs shall be made in accordance with OSHA requirements and shall be suitable for exterior use. Mounting details shall be in accordance with manufacturer's recommendations; location as approved by the Engineer. Fasteners shall be stainless steel.

B. Warning signs shall be approximately 10 inches high by 14 inches wide, colored yellow and black, on minimum 0.080-inch aluminum stock.

C. Warning signs shall be furnished as follows

1. The following sign shall be affixed to all equipment which may be started automatically from a remote location:

CAUTION

THIS EQUIPMENT MAY START
AUTOMATICALLY
BY REMOTE CONTROL

2. The following sign shall be affixed to all electrical equipment or instrument panels, as applicable:

CAUTION - SHOCK HAZARD

THIS EQUIPMENT IS POWERED BY MULTIPLE SOURCES
CONTACTS MAY BE ENERGIZED AFTER
LOCAL POWER IS DISCONNECTED

3. The following sign shall be provided at all areas where oxygen or flammable materials are stored or used (colored red, white, and black):

DANGER

NO SMOKING, MATCHES OR OPEN FLAMES

4. The following sign shall be affixed to all entrance hatches or access manways on covered tanks and vessels:

CAUTION

OXYGEN DEFICIENT OR TOXIC CONDITIONS MAY EXST
FOLLOW PRESCRIBED PROCEDURES BEFORE ENTRY

5. The following sign shall be provided at all compressor vents and equipment blowoffs:

CAUTION

LOUD BLOWDOWN MAY OCCUR
WITHOUT WARNING

END OF SECTION

SECTION 01 6500

TRANSPORTATION AND HANDLING

1. GENERAL

1.1. SCOPE

A. Provide transportation of all equipment, materials, and products furnished under these Contract Documents to the site of the work. In addition, provide preparation for shipment and storage, unloading, handling and re-handling, short-term storage, extended storage, storage facilities, maintenance and protection during storage, preparation for installation, and all other work and incidental items necessary or convenient to the Contractor for the satisfactory prosecution and completion of the work.

1.2. TRANSPORTATION

A. Suitably box, crate, or otherwise protect all equipment during transportation.

B. Ship and deliver all equipment in the largest assembled sections practical or permitted by carrier regulations to minimize the number of field connections.

C. Ensure that the equipment is assembled and transported in such a manner so as to clear buildings, power lines, bridges, and similar structures encountered during shipment or delivery to the site of the work.

D. Ensure that the weights of the assembled sections do not exceed the capacity of the cranes or hoisting equipment where equipment will be installed using existing cranes or hoisting equipment.

E. Small items and appurtenances such as gauges, valves, switches, instruments, and probes which could be damaged during shipment shall be removed from the equipment prior to shipment and packaged and shipped separately. All openings shall be plugged or sealed to prevent the entrance of water or dirt.

F. Paint temporary shipping braces and supports orange or yellow for easy identification.

1.3. HANDLING

A. Carefully handle all equipment, materials, and products to prevent damage or excessive deflections during unloading or transportation. All equipment, materials, and products damaged during transportation or handling shall be repaired or replaced by the Contractor at no additional cost to the Owner prior to being incorporated into the work.

B. Strictly follow lifting and handling drawings and instructions furnished by the manufacturer or supplier. Eyebolts or lifting lugs furnished on the equipment shall be used in handling the equipment. Shafts and operating mechanisms shall not be used as lifting points. Spreader bars or lifting beams shall be used when

the distance between lifting points exceeds that permitted by standard industry practice. Slings and chains shall be padded as required to prevent damage to protective coatings and finishes.

C. Under no circumstances shall equipment or products such as pipe, structural steel, casting, reinforcement, lumber, piles, poles, etc., be thrown or rolled off of trucks onto the ground.

D. Handle items such as nonmetallic pipe, nonmetallic conduit, flagpoles, and lighting poles using nonmetallic slings or straps.

END OF SECTION

SECTION 01 6600

STORAGE AND PROTECTION

1. GENERAL

1.1. SCOPE

A. Equipment shall be received, inspected, unloaded, handled, stored, maintained, and protected by the Contractor in a suitable location on or off site, if necessary, until such time as installation is required.

B. Storage and protection of Contractor-furnished equipment shall be in strict conformance with the requirements of the applicable provisions of the General Conditions of these Specifications.

1.2. STORAGE

A. Provide satisfactory storage facilities which are acceptable to the Engineer. In the event that satisfactory facilities cannot be provided on site, satisfactory warehouse, acceptable to the Engineer, will be provided by the Contractor for such time until the equipment, materials, and products can be accommodated at the site.

B. Equipment, materials, and products which are stored in a satisfactory warehouse acceptable to the Engineer will be eligible for progress payments as though they had been delivered to the job site.

C. Maintain and protect all equipment, materials, and products placed in storage and bear all costs of storage, preparation for transportation, transportation, re-handling, and preparation for installation.

D. Equipment and products stored outdoors shall be supported above the ground on suitable wooden blocks or braces arranged to prevent excessive deflection or bending between supports. Items such as pipe, structural steel, and sheet construction products shall be stored with one end elevated to facilitate drainage.

E. Building products and materials such as cement, grout, plaster, gypsum-board, particleboard, resilient flooring, acoustical tile, paneling, finish lumber, insulation, wiring, etc., shall be stored indoors in a dry location, unless otherwise permitted in writing by the Engineer. Building products such as rough lumber, plywood, concrete block, and structural tile may be stored outdoors under a properly secured waterproof covering.

F. Tarps and other coverings shall be supported above the stored equipment or materials on wooden strips to provide ventilation under the cover and minimize condensation. Tarps and covers shall be arranged to prevent ponding of water.

1.3. EXTENDED STORAGE

A. In the event that certain items of major equipment have to be stored for an extended period of time, the Contractor shall provide satisfactory long-term storage facilities which are acceptable to the Engineer. The Contractor shall provide all special packaging, protective coverings, protective coatings, power, nitrogen purge, desiccants, lubricants, and exercising necessary or recommended by the manufacturer to properly maintain and protect the equipment during the period of extended storage.

END OF SECTION

SECTION 01 7329

CUTTING AND PATCHING

1. GENERAL

1.1. DEFINITIONS

A. Cutting and patching includes cutting into existing construction to provide for the installation or performance of other work and subsequent fitting and patching required to restore surfaces to their original condition.

B. Refer to other sections of these specifications for specific cutting and patching requirements and limitations applicable to individual units of work.

1.2. STRUCTURAL WORK

A. Do not cut-and-patch structural work in a manner resulting in a reduction of load-carrying capacity or load/deflection ratio. Submit proposal and request and obtain Engineer's approval before proceeding with cut-and-patch of structural work.

1.3. OPERATIONAL/SAFETY LIMITATIONS

A. Do not cut-and-patch operational elements and safety components in a manner resulting in decreased performance, shortened useful life, or increased maintenance. Submit proposals and requests and obtain Engineer's approvals before proceeding with cut-and-patches.

1.4. VISUAL/QUALITY LIMITATIONS

A. Do not cut-and-patch work exposed to view (exterior and interior) in a manner resulting in noticeable reduction of aesthetic qualities, as judged by Engineer.

B. Engage qualified personnel skilled in cutting, patching, removal, and replacement of specialized equipment and finish surfaces.

1.5. LIMITATIONS ON APPROVALS

A. Engineer's approval to proceed with cutting and patching does not waive right to later require removal/replacement of work found to be cut-and-patched in an unsatisfactory manner, as determined by the Engineer.

2. PRODUCTS

2.1. GENERAL

A. Use materials for cutting and patching that are identical to existing materials. If identical materials are not available or cannot be used, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual

effect. Use materials for cutting and patching that will result in equal-or-better performance characteristics.

3. EXECUTION

3.1. INSPECTION

A. Before cutting, examine surfaces to be cut and patched and conditions under which the work is to be performed. If unsafe or otherwise unsatisfactory conditions are encountered, take corrective action before proceeding with the work.

3.2. TEMPORARY SUPPORT

A. To prevent failure, provide temporary support of work to be cut.

3.3. PROTECTION

A. Protect other work during cutting and patching to prevent damage. Provide protection from adverse weather conditions for that part of the project that may be exposed during cutting and patching operations.

B. Avoid interference with use of adjoining areas or interruption of free passage to adjoining area.

C. Take precautions not to cut existing pipe, conduit, or duct serving existing building or equipment but scheduled to be relocated until provisions have been made to bypass them.

3.4. CUTTING

A. Use the cutting methods that are least likely to damage work to be retained or adjoining work. Where possible, review proposed procedures with the original installer; comply with original installer's recommendations.

B. Where cutting is required, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut through concrete and masonry using a cutting machine such as a carborundum saw or core drill. Cut holes and slots neatly to size required with minimum disturbance of adjacent work. To avoid marring existing finished surfaces, cut and drill from the exposed or finished side into concealed surfaces. Temporarily cover openings when not in use.

3.5. PATCHING

A. Patch with seams which are durable and as invisible as possible. Comply with specified tolerances for the work.

B. Restore exposed finish of patched areas, and where necessary extend finish restoration into retained adjoining work in a manner which will eliminate evidence of patching and refinishing.

3.6. REPAIR OF DAMAGE

A. Repair equipment and finish surfaces damaged as the result of the work of this contract to the satisfaction of the Owner or replace with new material at no additional cost to the Owner.

END OF SECTION

SECTION 01 7423

FINAL CLEANING

1. GENERAL

1.1. SUMMARY

A. This section specifies administrative and procedural requirements for final cleaning at Substantial Completion.

1. Special cleaning requirements for specific elements of the work are included in appropriate sections of Divisions 2 through 48.

B. General project closeout requirements are included in Section 01 7800, Project Closeout.

C. Multiple Prime Contracts. Except as otherwise indicated, each prime Contractor is responsible for final cleaning his own work.

D. Environmental Requirements. Conduct cleaning and waste disposal operations in compliance with local laws and ordinances. Comply fully with federal and local environmental and anti-pollution regulations.

1. Do not dispose of volatile wastes such as mineral spirits, oil or paint thinner in storm or sanitary drains.

2. Burning or burying of debris, rubbish or other waste material on the premises will not be permitted without the owner's permission. If allowed, all required permits shall be the responsibility of the Contractor.

1.2. RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplemental Conditions or General Provisions and other Division 1 Specification sections, apply to this section.

2. PRODUCTS

2.1. MATERIALS

A. Cleaning Agents. Use cleaning materials and agents recommended by the 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.

3. EXECUTION

3.1. FINAL CLEANING

A. General. Provide final cleaning operations when indicated. Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit of work to the condition expected from a commercial building cleaning and maintenance program. Comply with manufacturer's instructions.

B. Complete the following cleaning operations before requesting inspection for Certification of Substantial Completion for the entire project or a portion of the project.

1. Clean the project site, yard and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste materials, litter and foreign substances. Sweep paved areas broom clean. Remove petrochemical spills, stains and other foreign deposits. Rake grounds that are neither planted nor paved, to a smooth even-textured surface.

2. Remove tools, construction equipment, machinery and surplus material from the site.

3. 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.

4. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics and similar spaces.

5. Broom clean concrete floors in unoccupied spaces.

6. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.

7. Remove labels that are not permanent labels.

8. Touch-up and otherwise repair and restore marred exposed finishes and surfaces. Replace finishes and surfaces that can not be satisfactorily repaired or restored, or that show evidence of repair or restoration. Do not paint over "UL" and similar labels, including mechanical and electrical name plates.

9. Wipe surfaces of mechanical and electrical equipment, elevator equipment and similar equipment. Remove excess lubrication, paint and mortar droppings and other foreign substances.

10. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.

11. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills. Clean ducts, blowers, and coils if units were operated without filters during construction.

12. Clean light fixtures, lamps, globes and reflectors to function with full efficiency. Replace burned out bulbs, and defective and noisy starters in fluorescent and mercury vapor fixtures.

13. Leave the project clean and ready for occupancy.

C. Compliances. Comply with governing regulations and safety standards for cleaning operations. Remove waste materials from the site and dispose of in a lawful manner.

1. Where extra materials of value remain after completion of associated construction have become the Owner's property, dispose of these materials as directed.

END OF SECTION

SECTION 01 7800

PROJECT CLOSEOUT

1. GENERAL

1.1. SUMMARY

A. This section specifies administrative and procedural requirements for project closeout, including but not limited to:

1. Inspection procedures.
2. Project record document submittal.
3. Operating and maintenance manual submittal.
4. Submittal of warranties.
5. Final cleaning.

B. Closeout requirements for specific construction activities are included in the appropriate sections in Divisions 2 through 49.

1.2. RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplemental Conditions and other Division 1 specification sections, apply to this section.

1.3. SUBSTANTIAL COMPLETION

A. Preliminary Procedures. Before requesting inspection for certification of substantial completion, complete the following. List exceptions in the request.

1. Advise Owner of pending insurance change-over requirements.

2. Complete start-up testing of systems, and instruction of the Owner's operating and maintenance personnel. Discontinue or change over and remove temporary facilities from the site, along with construction tools, mock-ups, and similar elements

3. Complete final clean up requirements, including touch-up painting. Touch-up and otherwise repair and restore marred exposed finishes.

B. Inspection Procedures. On receipt of a request for inspection, the Engineer will either proceed with inspection or advise the Contractor of unfulfilled requirements. The Engineer will prepare the Certificate of Substantial Completion following inspection, or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.

1. The Engineer will repeat inspection when requested and assured that the work has been substantially completed.

2. Results of the completed inspection will form the basis of requirements for substantial completion.

C. Reinspection Procedure. The Engineer will reinspect the work upon receipt of notice that the work, including inspection list items from earlier inspections, has been completed, except items whose completion has been delayed because of circumstances acceptable to the Engineer.

1. Upon completion of reinspection, the Engineer will prepare a certificate of final acceptance or advise the Contractor of work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.

2. If necessary, reinspection will be repeated.

1.4. FINAL ACCEPTANCE

A. Preliminary Procedures. Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.

1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.

2. Submit an updated final statement, accounting for final additional changes to the contract sum.

3. Submit a certified copy of the Engineer's final inspection list of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, and the list has been endorsed and dated by the Engineer.

4. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.

5. Obtain and submit releases enabling the Owner unrestricted use of the work and access to services and utilities; include occupancy permits, operating certificates, and similar releases.

6. Submit record drawings, final project photographs, damage or settlement survey, property survey, and similar final record information.

7. Deliver any specified tools, spare parts, extra stock, and similar items.

8. Make final change-over of permanent locks and transmit keys to the Owner. Advise the Owner's personnel of change-over in security provisions.

9. Submit all project close out forms completed and executed.

10. Submit operation and maintenance data.

11. Submit spare parts list.

12. Submit project record drawings (mark-up of plans showing revisions during construction).

13. Submit a final liquidated damages settlement statement, if required.

14. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

15. Drawings: Provide specially prepared drawings where necessary to supplement manufacturer's printed data to illustrate the relationship of component parts of equipment or systems, or to provide control or flow diagrams. Coordinate these drawings with information contained in project record drawings to ensure correct illustration of the completed installation.

2. PRODUCTS (Not Applicable)

3. EXECUTION

3.1. CLOSEOUT PROCEDURES

A. Operating and Maintenance Instructions. Arrange for each installer of equipment that requires regular maintenance to meet with the Owner's personnel to provide instruction in proper operation and maintenance. If installers are not experienced in procedures, provide instruction by manufacturer's representatives. Include a detailed review of the following items:

1. Maintenance manuals.
2. Record documents.
3. Spare parts and materials.
4. Tools.
5. Lubricants.
6. Fuels.
7. Identification systems.
8. Control sequences.
9. Hazards.
10. Cleaning.
11. Warranties and bonds.
12. Maintenance agreements and similar continuing commitments

B. A list of available instruction dates shall be submitted to the Owner through the Engineer at least two weeks in advance of the earliest proposed date for each instruction program. The Engineer will, within three business days, notify the Contractor of the Owner’s preferred date. To the maximum extent possible, instruction of related equipment systems will be conducted concurrently. The final coordination of the instruction is the sole responsibility of the Contractor.

C. Demonstrate the following procedures as part of instruction for operating equipment.

1. Start-up.

2. Shutdown.
3. Emergency operations.
4. Noise and vibration adjustments.
5. Safety procedures.
6. Economy and efficiency adjustments.
7. Effective energy utilization.

3.2. FINAL CLEANING

A. General. General cleaning during construction is required by the General Conditions.

B. Cleaning. Employ experienced workers or professional cleaners for final cleaning. Clean all work areas to original condition or to satisfaction of Owner and Engineer.

1. Complete the following cleaning operations before requesting inspection for Certification of Substantial Completion.

2. Clean the site, including landscape development areas, of rubbish, litter, and other foreign substances. Sweep paved areas broom clean; remove stains, spills, and other foreign deposits. Rake grounds that are neither paved nor planted, to a smooth even-textured surface.

C. Removal of Protection. Remove temporary protection and facilities installed for protection of the work during construction.

D. Compliance. Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from the site and dispose of in a lawful manner.

1. Where extra materials of value remaining after completion of associated work have become the Owner's property, arrange for disposition of these materials as directed.

END OF SECTION

SECTION 01 7823

OPERATING AND MAINTENANCE DATA

1. GENERAL

1.1. SUMMARY

A. This section specifies administrative and procedural requirements for operating and maintenance manuals including the following:

1. Preparation and submittal of operating and maintenance manuals for building operating systems or equipment.

2. Preparation and submittal of instruction manuals covering the care, preservation, and maintenance of architectural products and finishes.

3. Instruction of the Owner's operating personnel in operation and maintenance of building systems and equipment.

B. Special operating and maintenance data requirements for specific pieces of equipment or building operating systems are included in the appropriate sections of Divisions 2 through 49.

C. Preparation of shop drawings and product data are included in Section 01 3323, Shop Drawings, Product Data and Samples.

D. General closeout requirements are included in Section 01 7800, Project Closeout.

E. General requirements for submittal of project record documents are included in Section 01 7839, Project Record Documents.

1.2. RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplemental Conditions and other Division 1 specification sections, apply to this section

1.3. QUALITY ASSURANCE

A. Operation and Maintenance Manual Preparation. In preparation of operation and maintenance manuals, use personnel thoroughly trained and experienced in operation and maintenance of the equipment or system involved.

1. Where written instructions are required, use personnel skilled in technical writing to the extent necessary for communication of essential data.

2. Where Drawings or diagrams are required, use drafters capable of preparing Drawings clearly in an understandable format.

B. Instructions for the Owner's Personnel. For instruction of the Owner's operating and maintenance personnel, use experienced instructors thoroughly trained and experienced in the operation and maintenance of the building equipment or system involve

1.4. SUBMITTALS

A. Submittal Schedule. Comply with the following schedule for submittal of operating and maintenance manuals.

1. Prior to the 80 percent completion point on the work, submit two draft copies of each manual to the Engineer for review. Include a complete index or table of contents of each manual. Draft submittal shall be in PDF format, and transmittal shall be electronic.

2. Prior to substantial completion, make corrections or modifications to comply with the Engineer's comments and submit the specified number of copies of each approved manual to the Engineer.

3. Number: Four final copies of each manual.

B. Form of Submittal. Prepare operating and maintenance manuals in the form of an instructional manual for use by the Owner's operating personnel. Organize into suitable sets of manageable size. Where possible, assemble instructions for similar equipment into a single binder.

1. Binders: For each manual, provide heavy-duty, commercial quality, 3-ring, vinyl-covered loose-leaf binders, in thickness necessary to accommodate contents, sized to receive 8½- by 11-inch paper. Provide a clear plastic sleeve on the spine to hold labels describing the contents. Provide pockets in the covers to receive folded sheets.

   a. Where two or more binders are necessary to accommodate data, correlate data in each binder into related groupings in accordance with the project manual Table of Contents. Cross-reference other binders where necessary to provide essential information for proper operation or maintenance of the piece of equipment or system.

   b. Identify each binder on the front and spine, with the typed or printed title "OPERATION AND MAINTENANCE MANUAL," project title or name, and subject matter covered. Indicate the volume number for multiple-volume sets of manuals.

2. Dividers: Provide heavy paper dividers with celluloid covered tabs for each separate section. Mark each tab to indicate contents. Provide a typed description of the product and major parts of equipment included in the section on each divider.

3. Protective Plastic Jackets: Provide protective transparent plastic jackets designed to enclose diagnostic software for computerized electronic equipment.

4. Text Material: Where written material is required as part of the manual, use the manufacturer's standard printed material, or if it is not available, specially prepared data, neatly typewritten, on 8½- by 11-inch, 20-pound white bond paper.

5. Drawings: Where drawings or diagrams are required as part of the manual, provide reinforced, punched binder tabs on the drawings and bind in with the text.

    a. Where oversized drawings are necessary, fold the drawings to the same size as the text pages and use as a fold-out.

    b. If drawings are too large to be used practically as a fold-out, place the drawing, neatly folded, in the front or rear pocket of the binder. Insert a typewritten page indicating the drawing title, description of contents, and drawing location at the appropriate location in the manual.

1.5. MANUAL CONTENT

A. In each manual include information specified in the individual specification section, and the following information for each major component of building equipment and its controls:

1. General system or equipment description.
2. Design factors and assumptions.
3. Copies of applicable shop drawings and product data.
4. System or equipment identification, including:
    a. Name of manufacturer.
    b. Model number.
    c. Serial number of each component.
5. Operating instructions.
6. Emergency instructions.
7. Wiring diagrams.
8. Inspection and test procedures.
9. Maintenance procedures and schedules.
10. Precautions against improper use and maintenance.
11. Copies of warranties.
12. Repair instructions including spare parts listing.
13. Sources of required maintenance materials and related services.
14. Manual index.

B. Organize each manual into separate sections for each piece of related equipment. As a minimum, each manual shall contain a title page, a table of contents, copies of product data supplemented by drawings and written text, and copies of each warranty, bond, and service contract issued.

1. Title Page: Provide a title page in a transparent plastic envelope as the first sheet of each manual. Provide the following information:

a. Subject matter covered by the manual.
b. Name and address of the project.
c. Date of submittal.
d. Name, address, and telephone number of the Contractor.
e. Name and address of the Engineer.
f. Cross reference to related systems in other operating and maintenance manuals.

2. Table of Contents: After the Title Page, include a typewritten table of contents for each volume, arranged systematically according to the project manual format. Include a list of each product included, identified by product name or other appropriate identifying symbol and indexed to the content of the volume.

    a. Where more than one volume is required to accommodate data for a particular system, provide a comprehensive table of contents for all volumes in each volume of the set.

3. General Information: Provide a general information section immediately following the Table of Contents, listing each product included in the manual, identified by product name. Under each product, list the name, address, and telephone number of the subcontractor or installer, and the maintenance contractor. Clearly delineate the extent of responsibility of each of these entities. In addition, list a local source for replacement parts and equipment.

4. Product Data: Where manufacturer's standard printed data is included in the manuals, include only sheets that are pertinent to the part or product installed. Mark each sheet to identify each part or product included in the installation. Where more than one item in a tabular format is included, identify each item, using appropriate references from the Contract Documents. Identify data applicable to the installation and delete references to information that is not applicable.

5. Written Text: Where manufacturer's standard printed data is not available, and information is necessary for proper operation and maintenance of equipment or systems, or it is necessary to provide additional information to supplement data included in the manual, prepare written text to provide necessary information. Organize the text in a consistent format under separate headings for different procedures. Where necessary, provide a logical sequence of instruction for each operating or maintenance procedure.

6. Drawings: Provide specially prepared drawings where necessary to supplement manufacturer's printed data to illustrate the relationship of component parts of equipment or systems, or to provide control or flow diagrams. Coordinate these drawings with information contained in project record drawings to ensure correct illustration of the completed installation.

7. Do not use original record documents as part of the operating and Maintenance Manuals.

8. Warranties, Bonds, and Service Contracts: Provide a copy of each warranty, bond, or service contract in the appropriate manual for the information of the Owner's operating personnel. Provide written data outlining procedures to be followed in the event of product failure. List circumstances and conditions that would affect validity of the warranty or bond.

1.6. INSTRUCTION OF THE OWNER'S PERSONNEL

A. Prior to substantial completion, instruct the Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Provide instruction at mutually agreed upon times.

1. For equipment that requires seasonal operation, provide similar instruction during other seasons.

2. Use operation and maintenance manuals as the basis of instruction for each piece of equipment or system. Review contents in detail to explain all aspects of operation and maintenance.

B. Training shall be conducted by an experienced, authorized service representative of the manufacturer.

2. PRODUCTS (Not Applicable).

3. EXECUTION (Not Applicable).

END OF SECTION

SECTION 01 7836

WARRANTIES AND BONDS

1. GENERAL

1.1. SUMMARY

A. This section specifies general administrative and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturer's standard warranties on products and special warranties.

1. General closeout requirements are included in Section 01 7800, Project Closeout.

2. 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 49.

B. 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.

C. Separate Prime Contracts: Each Prime Contractor is responsible for warranties related to its own contract.

1.2. RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplemental Conditions and other Division 1 specification sections, apply to this section

1.3. DEFINITIONS

A. Standard product warranties are preprinted 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.

1.4. WARRANTY REQUIREMENTS

A. Standard Warranty: Warrant all equipment, materials, products, and workmanship provided under these Contract Documents for a period of 12 months after the date of substantial completion established by the Engineer.

B. 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.

C. 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.

D. 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. Complete warranty work as soon as possible after receipt of notice from the Owner for a warranty claim. The Contractor is responsible for the cost of replacing or rebuilding defective work regardless of whether the Owner has benefitted from use of the work through a portion of its anticipated useful service life.

E. 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.

1. 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.

2. If the required repairs or replacements have not been completed or if positive and good faith efforts have not been made to complete the repairs or replacements within 30 consecutive calendar days after receipt of notice from the Owner of the warranty claim, the Owner shall be authorized to proceed with the repairs or replacements and the cost thereof shall be assessed against the Contractor's Performance Bond. Evidence of positive and good faith efforts shall include, as a minimum, joint visits by the Contractor and affected equipment vendors and manufacturers, and certified copies of purchase orders or invoices.

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. Multiple Equipment Failures. In the event of multiple equipment failures of major consequence prior to the expiration of the one-year warranty described above, disassemble, inspect, and modify or replace the affected equipment as necessary to prevent further occurrences. As used herein, "multiple equipment failures" shall be interpreted to mean two or more successive failures of the same kind in the same item of equipment or failures of the same kind in two or more items of similar equipment. Major equipment failures may include, but are not limited to, cracked or broken housings, piping, or vessels, excessive deflections, bent or broken shafts or structural members, broken or chipped gear teeth,

overheating, premature bearing failure, excessive wear, or excessive leakage around seals. Should multiple equipment failures occur in a given item or type of equipment, disassemble, inspect, modify or replace, as necessary, all equipment of the same size and type, and re-warrant for 12 months.

1.5. SUBMITTALS

A. Submit written warranties to the Engineer prior to the date certified for substantial completion. If the Engineer's Certificate of Substantial Completion designates a commencement date for warranties other than the date of substantial completion for the work, or a designated portion of the work, submit written warranties upon request

1. 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 Engineer within 15 days of completion of that designated portion of the work.

B. 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 Owner through the Engineer for approval prior to final execution.

1. Refer to individual sections of Divisions 2 through 49 for specific content requirements, and particular requirements for submittal of special warranties.

C. Form of Submittal. At final completion, compile 2 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 Contract Documents.

1. 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.

2. PRODUCTS (Not Applicable).

3. EXECUTION (Not Applicable).

END OF SECTION

SECTION 01 7839

PROJECT RECORD DOCUMENTS

1. GENERAL

1.1. SUMMARY

A. This section specifies administrative and procedural requirements for project record documents.

B. Project record documents required include:

1. Marked-up copies of Contract Drawings.
2. Marked-up copies of approved shop drawings.
3. Newly prepared drawings
4. Marked-up copies of Specifications, Addenda, and Change Orders.
5. Marked-up product data submittals.
6. Construction photographs.
7. Field records for variable and concealed conditions.

C. Specific record copy requirements that expand requirements of this section are included in the individual sections of Division 2 through 49.

D. General project closeout requirements are included in Section 01 7800, Project Closeout.

E. Maintenance of Documents and Samples. Store record documents and samples in the field office apart from Contract Documents used for construction. Do not permit project record documents to be used for construction purposes. Maintain record documents in good order, and in a clean, dry, legible condition. Make documents and samples available at all times for inspection by the Engineer.

1.2. RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplemental Conditions and other Division 1 specification sections, apply to this section.

1.3. RECORD DRAWINGS

A. Mark-up Procedure. During the construction period, maintain a set of black-line prints of Contract Drawings and shop drawings for project record document purposes.

1. Mark these Drawings to indicate the actual installation where the installation varies appreciably from the installation shown originally. Give particular attention to information on concealed elements which would be difficult to identify or measure and record later. Items required to be marked include but are not limited to:

a. Dimensional changes to the Drawings.
b. Revisions to details shown on the Drawings
c. Depth of rock.
d. Locations and depths of underground utilities.
e. Revisions to routing of piping and conduits.
f. Revisions to electrical circuitry.
g. Actual equipment locations.
h. Locations of concealed internal utilities.
i. Changes made by Change Order.
j. Details not on original Contract Drawings.

2. Mark completely and accurately record prints of Contract Drawings or shop drawings, whichever is most capable of showing actual physical conditions. Where shop drawings are marked, show cross-reference on Contract Drawings location.

3. Mark record sets with red erasable colored pencil; use other colors to distinguish between changes for different categories of the work at the same location.

4. Mark important additional information which was either shown schematically or omitted from original Drawings.

5. Note construction change directive numbers, alternate numbers, Change Order numbers, and similar identification.

6. Responsibility for Markup: Where feasible, the individual or entity who obtained record data, whether the individual or entity is the installer, subcontractor, or similar entity, is required to prepare the mark-up on record drawings.

   a. Accurately record information in an understandable drawing technique.

   b. Record data as soon as possible after it has been obtained. In the case of concealed installations, record and check the mark-up prior to concealment.

7. At time of final acceptance, submit record drawings to Engineer for Owner's records. Organize into sets, bind, and label sets for Owner's continued use.

1.4. RECORD SPECIFICATIONS

A. Maintain one copy of the project Specifications, including addenda and modifications issued, for project record document purposes during the construction period.

1. Mark the Specifications to indicate the actual installation where the installation varies substantially from that indicated in Specifications and modifications issued. Note related project record drawings information, where applicable. Give particular attention to substitutions, selection of

product options, and information on concealed installations that would be difficult to identify or measure and record later.

1.5. RECORD PRODUCT DATA

A. Maintain one copy of each product data submittal for project record document purposes during the construction period.

1. Mark project data to indicate the actual product installation where the installation varies substantially from that indicated in product data submitted. Include significant changes in the product delivered to the site, and changes in manufacturer's instructions and recommendations for installation.

2. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

3. Note related Change Orders and mark-up of record drawings, where applicable.

4. Upon completion of mark-up, submit a complete set of record product data to the Engineer for the Owner's records.

5. Where record product data are required as part of maintenance manuals, submit marked-up product data as an insert in the manual, instead of submittal as record product data.

1.6. MISCELLANEOUS RECORD SUBMITTALS

A. Refer to other specification sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Immediately prior to final acceptance, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for use and reference. Submit to the Engineer for the Owner's records.

1. Categories of requirements resulting in miscellaneous records include, but are not limited to the following:

a. Field records on excavations and foundations.
b. Field records on underground construction and similar work.
c. Survey showing locations and elevations of underground lines.
d. Invert elevations of drainage piping.
e. Surveys establishing building lines and levels.
f. Authorized measurements utilizing unit prices or allowances.
g. Inspections and certifications by governing authorities.
h. Leakage and pressure test.
i. Disinfection test results.
j. Final inspection and correction procedures.

2. PRODUCTS (Not Applicable)

3. EXECUTION

3.1. RECORDING

A. Post changes and modifications to the documents as they occur. Contractor shall wait until the end of the project. The Engineer will periodically review record documents to ensure compliance with this requirement.

END OF SECTION

SECTION 01 7843

SPARE PARTS

1. GENERAL

1.1. SUMMARY

A. This section specifies administrative, procedural, and storage requirements for spare parts for the various systems specified under these Contract Documents.

1.2. DEFINITIONS

A. "Spare parts" are products that are finished, refined, or otherwise fabricated to be used as direct replacements of parts or whole units of the finished project (i.e., installed in equipment, electrical or mechanical, etc.).

1.3. DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products in accordance with the manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.

1. Schedule delivery to minimize long-term storage at the site and to prevent overcrowding of construction spaces.

2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.

3. Deliver products to the site in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.

4. Inspect products upon delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.

5. Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.

6. Store heavy materials away from the project structure in a manner that will not endanger the supporting construction.

7. Store products subject to damage by the elements above ground, under cover in a weathertight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

1.4. EXTENDED STORAGE

A. In the event items of major equipment must be stored for an extended period of time, provide satisfactory long-term storage facilities which are acceptable to the Engineer. Provide all special packaging, protective coverings, protective coatings, power, nitrogen purge, desiccants, and lubricants necessary or recommended by the manufacturer to properly maintain and protect the equipment during the period of extended storage.

1.5. IDENTIFICATION

A. Clearly mark and identify all parts with manufacturer's name and number and the equipment to which it belongs. Each part or box shall be separately identified.

1.6. TURNOVER OF SPARE PARTS TO OWNER

A. Provide Owner's representative with a complete inventory of all spare parts specified for installed systems. This inventory shall show:

1. Specification name and number.
2. Item number.
3. Description of items(s).
4. Quantity specified.
5. Storage location.

1.7. SPARE PARTS SUPPLIED

A. Supply all spare parts specifically listed in the individual equipment specification section and all spare parts that are customarily provided with each specified piece of equipment.

1.8. SPARE PARTS INVENTORY FORM

A. Create an inventory form listing all part numbers. Alternate forms may be used with Engineer's approval.

END OF SECTION

SECTION 01 7900

OPERATOR TRAINING

1. GENERAL

1.1. SCOPE

A. This specification section covers training of the Owner's operators and/or maintenance personnel as required by the individual equipment specification sections.

1.2. TRAINING

A. Training is required under the following specification sections:

1. Package Fixed Film Wastewater Treatment System

2. Drip Dispersal System and Controls

B. Each day of training shall be interpreted to mean a full 8-hour day at the Owner's facilities and project site, UNO.

2. PRODUCTS (Not Applicable)

3. EXECUTION

3.1. COORDINATION

A. Schedule and coordinate the training between the equipment manufacturers and the Owner.

B. Unless otherwise specified, training shall not be scheduled until the equipment has been installed, checked out, and started up by the manufacturer's authorized service representative. Training shall not be scheduled until the Contractor has submitted the final Operations and Maintenance (O&M) Manuals required by these Specifications.

C. Coordinate with the Owner to determine how many operators and/or maintenance personnel will be attending each session.

D. Coordinate with the Owner to determine the audiovisual equipment available in the Owner's classroom facilities.

E. Owner reserves the right to audiotape or videotape the training.

3.2. QUALIFICATIONS

A. Persons providing operator training shall be experienced, factory-trained representatives of the equipment manufacturer (not sales representatives).

B. Submit resumes showing qualifications and experience of the proposed trainers prior to scheduling the training.

3.3. LOCATION

A. On-site training shall be conducted at the project site using the actual installed equipment.

3.4. MATERIALS AND EQUIPMENT

A. The equipment representative shall provide copies of all course handouts and other materials needed for all of the Owner's personnel attending the training (up to a maximum of ten people). Where the training makes reference to the O&M manuals, it is not necessary to provide additional copies of the manuals above the number specified in these Specifications.

B. The equipment representative shall provide all necessary audiovisual equipment that is not available in the Owner's facilities.

3.5. CONTENT

A. Submit a proposed agenda and course outline for each training session at least 15 days prior to scheduling the training.

B. The training shall include both classroom and hands-on training (lecture and demonstration) with the equipment. In general, training time specified should be divided equally between classroom and the field.

C. As a minimum, the training shall cover the following items (as applicable):

1. Equipment Overview

    a. Review of equipment supplied

        1. Submitted data.

    b. Safety Issues

        1. Review safety cautions and warnings as contained in the manual.

        2. Observe normal common sense safety precautions.

            a. Danger, warning, and caution tags and symbols.
            b. Good housekeeping procedures.
            c. Factory installed safety features.
            d. Equipment manuals.

2. Operation

    a. Review of Operating Conditions

1. Performance curve.

b. Review of Operating Procedures

1. Start-up
2. Normal operation
3. Shut-down

c. Troubleshooting

1. Loss of operating performance.
2. Alarms or faults.
3. Excessive power consumption.
4. Vibration or noise.
5. Overheating.

3. Maintenance

a. Review submitted data contained in the job O&M manual.

1. Assembly drawing and parts list.
2. Technical data.

b. Preventive Maintenance Procedures

1. Periodic

a) Adjustment
b) Lubrication
c) Calibration

2. Records

a) Initial measurement and recording
a) Periodic checks
b) Maintenance log

c. Corrective Maintenance Procedures

1. Disassembly

a) Tools and equipment required
b) Procedures
c) Parts inspection

2. Assembly procedure

3. Program modifications

a) Initialization
b) Programming

c) Program modifications

4. Service and Repair Parts

a. How to Obtain

1. Service

a) Local
b) Factory

2. Repair parts

a) Local
b) Factory

b. Emergency Service

1. Local
2. Factory

c. Repair Parts Inventory

1. Normal
2. Emergency

5. Review

a. Questions and Answers

END OF SECTION

SECTION 07 2100

BUILDING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes the following:

1. Insulation under slabs-on-grade.
2. Foam cavity wall insulation.
3. Building insulation in batt form.

1.2 DEFINITIONS

A. Thermal Resistivity. Where the thermal resistivities of insulation products are designated by "r-values," they represent the reciprocal of thermal conductivity (k-values). Thermal conductivity is the rate of heat flow through a homogenous material exactly 1 inch thick. Thermal resistivities are expressed by the temperature difference in degrees Fahrenheit between the two exposed faces required to cause 1 BTU to flow through 1 square foot per hour at mean temperatures indicated.

1.3 SUBMITTALS

A. General. Submit the following in accordance with conditions of contract and Division 1 Specification sections.

B. Product data for each type of insulation product specified.

C. Product test reports from and based on tests performed by qualified independent testing laboratory evidencing compliance of insulation products with requirements including r-values (aged values for plastic foam insulations), fire performance characteristics, perm ratings, water absorption ratings, and other properties, based on comprehensive testing of current products.

D. Research reports or evaluation reports of the model code organization acceptable to authorities having jurisdiction that evidence compliance of plastic foam insulations with building code in effect for project.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's recommendations for handling, storage, and protection during installation.

PART 2 - PRODUCTS

2.1 INSULATING MATERIALS

A. General. Provide insulating materials that comply with requirements and with referenced standards.

B. Faced Mineral Fiber Blanket/Batt Insulation. Thermal insulation produced by combining mineral fibers of type described below with thermosetting resins to comply with ASTM C 665 for Type III, Class A (blankets with reflective vapor-retarder membrane facing with flame spread of 25 or less); foil-scrim-kraft or foil-scrim-polyethylene vapor-retarder membrane on one face, and as follows:

1. Mineral Fiber Type: Fibers manufactured from glass.
2. Surface Burning Characteristics: Maximum flame spread, and smoke developed values of 25 and 50, respectively.

C. Foamed-In-Place Masonry Insulation. Two component thermal insulation produced by combining a plastic resin and catalyst foaming agent surfactant which, when properly ratioed and mixed, together with compressed air produce a cold-setting foam insulation in the hollow cores of hollow unit masonry walls.

1. Fire-Resistance Ratings: Minimum 4-hour fire resistance wall rating (ASTM E-119) for 8- and 12-inch concrete masonry units when used in standard 2-hour rated CMUs.
2. Surface Burning Characteristics: Maximum flame spread, smoke developed and fuel contributed of 0, 5 and 0 respectively.
3. Combustion Characteristics: Must be noncombustible, Class A building material.
4. Thermal Values: “R” value of 4.91/inch at 32°F mean; ASTM C-177.
5. Sound Abatement: Minimum Sound Transmission Class (“STC”) rating of 53 and a minimum Outdoor Indoor Transmission Class (“OITC”) rating of 44 for 8-inch wall assembly (ASTM E 90).
6. Shrinkage less than 2%.

2.2 VAPOR RETARDERS

A. Polyethylene Vapor Retarder. ASTM D 4397, 6.0 mils thick, with a maximum permeance rating of 0.13 perm.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean substrates of substances harmful to insulations or vapor retarders, including removal of projections that might puncture vapor retarders.

B. Close off openings in cavities receiving poured-in-place insulation to prevent the escape of insulation. Provide bronze or stainless-steel screen (inside) where openings must be maintained for drainage or ventilation.

3.2 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's instructions applicable to products and application indicated. If printed instructions are not available or do not apply to project conditions, consult manufacturer's technical representative for specific recommendations before proceeding with installation of insulation.

B. Extend insulation full thickness as indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

C. Apply a single layer of insulation of required thickness, unless otherwise shown or required to make up total thickness.

3.3 INSTALLATION OF CAVITY-WALL AND MASONRY-CELL INSULATION

A. Install foamed-in-place insulation from interior, or as specified, prior to installation of interior finish work and after all masonry and structural concrete work is in place. Comply with manufacturer's instructions.

3.4 INSTALLATION OF GENERAL BUILDING INSULATION

A. Set vapor retarder-faced units with vapor retarder to warm side of construction, except as otherwise indicated. Do not obstruct ventilation spaces, except for firestopping.

1. Tape joints and ruptures in vapor retarder and seal each continuous area of insulation to surrounding construction to ensure airtight installation.

B. Set reflective, foil-faced units accurately with not less than 0.75-inch air space in front of foil as indicated.

3.5 INSTALLATION OF VAPOR RETARDERS

A. General. Extend vapor retarder to extremities of areas to be protected from vapor transmission.

B. Seal overlapping joints in vapor retarders with adhesives or tape per vapor retarder manufacturer's printed directions. Seal butt joints and fastener penetrations with tape of type recommended by vapor retarder manufacturer. Locate all joints over framing members or other solid substrates.

C. Firmly attach vapor retarders to substrates with mechanical fasteners or adhesives as recommended by vapor retarder manufacturer.

D. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with tape of type recommended by vapor retarder manufacturer to create an airtight seal between penetrating objects and vapor retarder.

E. Repair any tears or punctures in vapor retarders immediately before concealment by other work. Cover with tape or another layer of vapor retarder.

3.6 PROTECTION

A. General. Protect installed insulation and vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation will be subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION

SECTION 07 4000

PREFORMED METAL ROOF AND WALL PANELS

PART 1 - GENERAL

1.1 SCOPE

A. The work covered by this section consists of furnishing all labor, equipment, and material required to furnish and install all metal roof and wall panels and related work as described herein and/or shown on the Drawings.

1.2 SHOP DRAWINGS AND ENGINEERING DATA

A. Submit complete shop drawings and engineering data in accordance with requirements described in Section 01 3323, Shop Drawing, Product Data, and Samples.

B. Submit samples of roof panels, concealed clips and manufacturer's descriptive literature.

C. Detail shop drawings must be submitted for approval prior to fabrication. Shop drawings shall indicate the factory coating and finish specifications and other data as necessary to clearly describe gauges, profiles, fastener types and locations, and flashing details.

1.3 STORAGE AND PROTECTION

A. Ship preformed roof and wall panels and system components in the manufacturer's standard sealed containers. Packaging shall be of sufficient strength to prevent damage to the materials during shipment.

B. Handle panels and other components in strict accordance with the manufacturer's instructions and recommendations.

C. Store panels and other components in accordance with applicable provisions of Section 01 6600, Storage and Protection.

1.4 GUARANTEE AND WARRANTIES

A. Provide a guarantee for the installation of the preformed roof and wall panels against defective or deficient products and workmanship in accordance with the requirements of Section 01 7836, Warranties and Bonds.

B. Provide the Owner with the following manufacturer's warranties:

1. Manufacturer's standard warranty for 20 years following installation that under normal usage the panels will not rupture, fail structurally, or perforate due to corrosion or normally anticipated environmental exposures.
2. Manufacturer's standard warranty for 20 years following installation, that the panel finish will not peel, blister, or discolor excessively under the anticipated exposure.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Preformed Roof and Wall Panels

1. Roof and wall panels shall be Series 2000 architectural roofing panels as manufactured by Englert, Inc., or equal.
2. The panels shall have a 14-inch coverage width and be fabricated with 1¾-inch-tall standing seams (“snap-lock” system).
3. The panels shall be fabricated from 24-gauge ASTM A 568, Grade 50B, steel with a minimum yield point of 50,000 psi, coated in accordance with ASTM A 792, coating designation AZ50.
4. Panel shall be finished with a minimum 0.8-mil-thick Polyvinylidene Fluoride (Knyar-500) 70 percent resin finish over a baked-on epoxy base coat. Total dry film thickness shall not be less than 1.0 mil.
5. Panel color shall be selected by the Engineer from the manufacturer's standard color list.
6. Provide prefinished accessories, knee covers, flat sheet, closures, etc., required for complete finished installation.

B. Clip Fasteners

1. Clip fasteners for anchoring the roof and wall panels shall be concealed suitable for use on plywood decking.
2. Fasteners shall be fabricated from heavy gauge, galvanized sheet steel.

C. Felt. Perforated asphalt saturated and coated fiberglass felt base sheet, ASTM D 3378, Type I (one ply).

D. Continuous Ridge Vent

1. Provide a continuous ridge vent on all horizontal roof ridge lines. Provide vent at other locations as shown on the Drawings.
2. Continuous ridge vent shall be Air Vent, Inc., "Filtervent" or approved equal.
3. Outside surface of continuous ridge vent shall be finished to match the color of the adjoining roof.

PART 3 - EXECUTION

3.1 INSPECTION

A. Install metal panels only when the substrate and/or subframe is installed and aligned to acceptable tolerances as recommended by the panel manufacturer.

3.2 INSTALLATION

A. Install roofing felt beginning at the eave and working toward the ridge. Over-lap all joints a minimum 6 inches.

B. Install per approved submittal drawings only.

C. Remove any strippable protective coating on the panels and flashings prior to installation and in any case do not allow the strippable coating to remain on the panels in extreme heat, cold, or in direct sunlight or other UV source.

D. Caulk, seal, and fasten so as to provide a complete weather-tight installation.

E. Discrepancies between job site conditions and drawings as approved shall be brought to the attention of the Engineer for resolution.

F. Continuous Ridge Vent

1. Begin and end ridge vent installation 12 inches from the eave at gables or 12 inches from the point of the hip-on-hip roofs.
2. Install ridge vent in accordance with the manufacturer's instructions and recommendations.
3. Provide closure and seal strips as necessary.

3.3 CLEAN UP AND CLOSE OUT

A. As work progresses, remove excess scrap and keep working surface free from debris on a daily basis.

B. Touch up areas as required or directed with manufacturer's standard touch-up paint. Carefully follow instructions for application.

C. Leave project at completion free from stains and scrap. Wash panel surface with water if necessary.

END OF SECTION

SECTION 08 1100

METAL DOORS

PART 1 GENERAL

1 .1 WORK INCLUDED

A. Standard and pressed steel hollow metal doors with flush faces.

B. Install Hardware.

1 .2 RELATED REQUIREMENTS

A. Section 08 1110: Metal Frames.

B. Section 08 7000: Hardware.

C. Section 08 8000: Glass and Glazing.

1 .3 REFERENCES

A. SDI-100 - Recommended Specifications - Standard Steel Doors and Frames of Steel Door Institute.

B. ASTM A525 - Steel Sheet, Zinc Coated (galvanized) by the Hot Dip Process, General Requirements.

C. ASTM A569 - Steel, Carbon, Hot-Rolled Sheet and Strip, Commercial Quality.

D. ASTM A 366 - Steel, Carbon, Cold-Rolled Sheet, Commercial Quality.

1 .4 SHOP DRAWING AND PRODUCT DATA

A. Submit shop drawings and product data in accordance with Section 01 3323.

B. Indicate general construction, configurations, jointing methods, reinforcements and locations of cut-outs for glass and louvers.

PART 2 PRODUCTS

2 .1 ACCEPTABLE MANUFACTURERS

A. Acceptable manufacturers follow:

1. Steelcraft.
2. Bymoco Metal Fabricators, Inc.
3. Amweld Building Products, Inc.
4. CECO Door Products.

B. Manufacturers of products with equal function and performance are acceptable.

2 .2 HOLLOW METAL DOORS

A. Materials and Fabrication: SDI-100 except as amended in this Section.

B. 1-3/4" Thick Doors: Flush Type, seamless, 18 gage ASTM A366 steel. Vertical stiffeners of channel-shaped steel 6" on centers, welded to both faces.

2 .3 FABRICATION

A. Mechanically interlock longitudinal seams of honeycomb core type doors. Leave seams invisible, or weld, fill and grind smooth.

B. Doors to have G-60 zinc coating conforming to A525 and ASTM A526.

C. Reinforce and prepare doors to receive specified hardware. Refer to Section 08700 for hardware requirements.

D. Provide astragals for double doors. Provide in accordance with UL requirements for labeled doors and panels.

E. Fill surface depressions with metallic paste filler and grind to a smooth uniform finish.

PART 3 EXECUTION

3 .1 INSTALLATION

A. Install hollow metal doors in accordance with SDI-100 except as amended in this Section.

B. Install hollow metal doors plum and square, and with maximum diagonal distortion of 1/16". Install hardware in accordance with requirements of Section 08700.

C. Coordinate installation of glass and glazing in doors.

D. After installation, touch-up scratched or damaged surfaces. Use type of primer identical to that used for shop coat.

END OF SECTION

SECTION 08 1110

METAL FRAMES

PART 1 GENERAL

1 .1 WORK INCLUDED

A. Standard type pressed steel hollow metal door frames.

1 .2 RELATED REQUIREMENTS

A. Section 08 1100: Metal Doors.

B. Section 07 9000: Sealants.

C. Section 08 7000: Hardware.

1 .3 REFERENCES

A. SDI-100 - Recommended Specifications - Standard Steel Doors and Frames.

B. SDI-105 - Recommended Erection Instructions for Steel Frames.

C. ASTM A 366 - Steel, Carbon, Cold-Rolled Sheet, Commercial Quality.

1 .4 SHOP DRAWING AND PRODUCT DATA

A. Submit shop drawings and product data in accordance with Section 01 3323.

B. Indicate general construction, configurations, jointing methods, reinforcements, anchorage methods, hardware locations and installation details.

PART 2 PRODUCTS

2 .1 ACCEPTABLE MANUFACTURERS

A. Acceptable manufacturers follow:

1. Steelcraft.
2. Bymoco Metal Fabricators, Inc.
3. CECO Door Products.
4. Amweld Building Products, Inc.

B. Manufacturers of products with equal function and performance are acceptable.

2 .2 HOLLOW METAL FRAMES

A. Materials and Fabrication: SDI-100 except as amended in this Section.

B. Types: Welded construction of cold-rolled steel conforming to ASTM A366 for metal

doors. Frames to have G-60 zinc coating conforming to A525 and ASTM A526.

C. Gage: Exterior 16, Interior 18.

D. Mortar Guard Boxes: Minimum 22 gage thick welded in place.

2 .3 FABRICATION

A. Accurately form and cut mitered corners of welded type frames. Weld on inside surfaces. Grind welded joints to smooth uniform finish.

B. Reinforce frames wider than 4' with 12 gage formed steel channels welded in place, flush with top of frames.

C. Reinforce and prepare frames to receive hardware. Refer to Section 08700 for hardware requirements.

D. Place minimum of 3 single silencers on single door frames. Space equally along strike.

E. Place minimum of 2 single silencers on double door frames. Place on frame heads.

F. Jamb Anchors: Galvanized clip angles welded to jamb bottoms. For masonry walls, use 3-18 gage galvanized anchors at each jamb.

G. Fill surface depressions of hollow metal frames with metallic paste filler and grind to smooth finish.

H. Chemically treat surfaces and apply 1 coat of bonderized zinc-chromate rust-inhibitive primer.

PART 3 EXECUTION

3 .1 INSTALLATION

A. Install hollow metal frames in accordance with SDI-105 except as amended in this Section.

B. Install hollow metal frames plum and square, in correct locations shown on the Drawings and with maximum diagonal distortion of 1/16".

C. Ensure frames are securely and Rigidly anchored to adjacent construction.

D. Install hardware in accordance with requirements of Section 08700.

E. After installation, touch-up scratched or damaged surfaces. Use type of primer identical to that used for shop coat.

END OF SECTION

SECTION 08 7000

HARDWARE

PART 1 GENERAL

1 .1 WORK INCLUDED

A. Hardware for interior and exterior doors.

B. Threshold and weatherstripping for exterior doors.

1 .2 RELATED REQUIREMENTS

A. Section 06 2000: Finish Carpentry.

B. Section 08 1100: Metal Doors.

C. Section 08 1110: Metal Frames.

1 .3 REFERENCES

A. ANSI A156.13 - Series 1000 Operational Grade 1 Mortised Door with Frame Preparation for 1-3/4" Doors.

B. ANSI A156.1 - Butts and Hinges.

1 .4 KEYING

A. Door locks: Keyed differently, keyed alike and master keyed to existing, as directed. Stamp all keyed alike keys with group number and stamp keyed differently keys with door numbers.

B. Supply 2 keys for each lock and 4 master keys.

1 .5 SHOP DRAWINGS

A. Submit in accordance with Section 01 3323.

PART 2 PRODUCTS

2 .1 HARDWARE

A. Provide items as listed in the hardware schedule complete to function as intended.

B. Similar items of same function and performance by other manufacturers will be acceptable.

C. Promptly furnish templates to avoid delays.

Hardware Group A: Door 100A, 105B, 106B, 112A, 113A (single exterior)

1. Exterior ball bearing hinges: Hagar BB1193SH, Stanley FBB193 or McKinney

TB3313-NRP - 4½" × 4½", 3/door (satin stainless steel US32D)
2. Entrance exit device-lever: Narrow rim type mortised exit device: Sargent 8300 Series with 700-4 series ET lever control (satin stainless steel US32D)
3. H/C Closer: LCN 4010 Series Smoothee, Norton Series 7500BF or Yale 4400BF (aluminum paint)
4. Floor stop: Baldwin 4006, Ives 438 or Hagar 243F (satin stainless steel US32D)
5. Silencer: Hagar 307D, Ives 20 or Glynn-Johnson GJ64 - 3/door
6. H/C threshold: Zero 564, National Guard 896 or Pemko 2005AS (Aluminum US28)
7. Weatherstripping: Zero 328A, National Guard 137N or Pemko 319CN (Aluminum US28)

D. Hardware Group B: Doors 105C, 106C, 111A, 113C (single interior)

1. Interior ball bearing hinges: Hagar BB1191, Stanley FBB179 or McKinney TB2714 - 4½" × 4½", 3/door (satin stainless steel US32D)
2. Entrance/office lockset-lever: Sargent 8200-LNL, Schlage L9000-OLY or Yale 8800-AU (satin stainless steel US32D)
3. H/C Closer: LCN 4010 Series Smoothee, Norton Series 7500BF or Yale 4400BF (aluminum paint)
4. Wall stop: Baldwin 4275, Ives 407½ or Hagar 236W (satin stainless steel US32D)
5. Silencer: Hagar 307D, Ives 20 or Glynn-Johnson GJ64 - 3/door

E. Hardware Group C: Door 111B (pair interior)

1. Interior standard hinges: Hagar 1279, Stanley F179 or McKinney T2714 - 4½" × 4½", 3/door (satin stainless steel US32D)
2. Entrance/office lockset-lever: Sargent 8200-LNL, Schlage L9000-OLY or Yale 8800-AU (satin stainless steel US32D)
3. H/C Closer: LCN 4010 Series Smoothee, Norton Series 7500BF or Yale 4400BF (aluminum paint)
4. Flush bolts: Ives 258, Hagar 282D/283D or Glynn-Johnson FB6 (satin chrome US26D)
5. Floor stop: Baldwin 4006, Ives 438 or Hagar 243F (satin stainless steel US32D)
6. Silencer: Hagar 307D, Ives 20 or Glynn-Johnson GJ64 - 3/door

PART 3 EXECUTION

3 .1 INSTALLATION

A. Install hardware in accordance with manufacturer's recommendations, using proper templates. Install in standard locations unless detailed otherwise.

B. Cut thresholds to suite jambs. Attach with stainless steel machine bolts into expansion shields in bed of caulk.

C. Adjust hardware so that hinges do not bind, doors latch without special effort and there is no play between the latch and strike when doors are closed.

D. Coordinate with painters for a timely installation. Insure door paint is dry before installing silencers.

END OF SECTION

SECTION 09 9100

PAINTING

1 GENERAL

1.1 SUMMARY

A. This section includes furnishing all materials, equipment, and labor to accomplish all surface preparation and painting necessary for the satisfactory completion of the work included under these Contract Documents.

B. In general, the work included under this section shall include the surface preparation, shop priming, field priming, and/or field painting of all surfaces identified in Part 3.5 of this section. These surfaces include, but are not limited to, the following:

1. Wood

2. Ferrous metals (except stainless steel, galvanized, or pre-finished surfaces)

3. Concrete and masonry

C. Aluminum, bronze, copper, stainless steel, and/or other corrosion-resistant metal surfaces shall not be painted unless specifically called for on the Drawings or in these Contract Documents.

D. Factory finish coated equipment shall not be painted unless specifically called for on the Drawings or in Specifications.

E. Shop primed equipment and fabrications shall be inspected and tested prior to finish coating(s).

1.2 REFERENCES

The publications listed below from a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

A. American National Scientific Institute (ANSI)

1. ANSI Z535.1 Safety Color

B. American Society for Testing and Materials (ASTM)

1. ASTM D 16-08 Terminology Relating to Paint, Varnish, Lacquer, and Related Products

2. ASTM D 4417-03 Standard Test Methods for field Measurement of Surface Profile of Blast Cleaned Steel

3. ASTM D 5402-06 Standard Practice for Assessing solvent Resistance of Organic Coatings Using Solvent Rubs

C. Code of federal Regulations (CFR) and Occupational Safety and Health Administration (OSHA)

1. 20 CFR 1910 Occupational Safety and Health Standards – Respiratory Protection

2. 29 CFR 1910.1000 Subpart Z – Toxic and Hazardous Substances – 1500

3. 29 CFR 1910.1200 Hazard Communications

4. 29 CFR Part 1926 Safety and Health Regulations for Construction

D. SSPC: The Society for Protective Coatings (SSPC) and National Association of Corrosion Engineering (NACE)

1. SSPC-AB 1 Mineral and Slag Abrasives

2. SSPC-Guide 6 Guide for Containing Surface Preparation Debris Generated During Paint Removal Operations

3. SSPC-PA 1 Shop, filed, and Maintenance Painting of Steel

4. SSPC-PA 2 Measurement of Dry Paint Thickness with Magnetic Gages

5. SSPC-PA Guide 3 Guide to Safety in Paint Application

6. SSPC-SP COM Surface Preparation Commentary for Steel and Concrete Substrates

7. SSPC-SP 1 Solvent Cleaning

8. SSPC-SP 2 Hand Tool Cleaning

9. SSPC-SP 3 Power Tool cleaning

10. SSPC-SP 5 White Metal Blast Cleaning

11. SSPC-SP 6/NACE 3 Commercial Blast Cleaning

12. SSPC-SP 7 Brush-Off Blast Cleaning

13. SSPC-SP 10/NACE 2 Near-White Metal Blast Cleaning

14. SSPC-SP 11 Power Tool Cleaning to Bare Metal

15. SSPC-SP 13/NACE 6 Surface Preparation of Concrete

16. SSPC-VIS 1 Visual Standard for Abrasive Blast Cleaned Steel (Standard Reference Photographs)

E. National Association of Pipe Fabricators (NAPF)

1. NAPF 500-03-01 Solvent Cleaning

2. NAPF 500-03-04 Abrasive Blast Cleaning of Ductile Iron Pipe

F. International Concrete Repair Institute (ICRI)

1. Guideline No. 301.2 Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays (formerly No. 03732 and Concrete Surface Profile (CSP) Chips.

1.3 DEFINITIONS

A. Definition of Painting Terms: ASTM D 16, unless otherwise specified.

B. Dry Film Thickness (DFT): thickness of a coat of cured paint measured in mils.

C. Wet Film Thickness (WFT): Thickness of a coat of uncured paint as measure in mils by a notched gage.

1.4 SUBMITTALS

A. Submit to the Engineer for his review the following information concerning the materials the Contractor proposes to use in work covered by this item:

1. A list of all components (paints or other materials) to be used in each painting system required herein.

2. A complete descriptive specification of each component.

B. All products submitted shall be lead- and chromate-free formulations and comply with current VOC emission regulations. Manufacturers technical data sheets must contain the following information:

1. Manufacturer's name

2. Type of paint or other generic identification

3. Manufacturer's stock number

4. Color (if any)

5. Type of gloss

6. Minimum flash point

7. Percent solids by volume

8. Recommended dry film thickness per coat

9. Theoretical coverage rates

10. Instructions for mixing, thinning, or reducing (as applicable)

11. Manufacturer's application recommendations

12. Safety and storage information

13. Viscosity at ambient temperature

14. Average dry times (dry to touch, dry to recoat) at ambient temperature.

15. Recommended thinners and maximum thinning permissible to meet current VOC regulations.

16. Recommended primer if applicable

17. Application method (brush, roll, conventional or airless spray)

18. VOC level of coating

19. Instructions for mixing multiple component materials

C. An authorized representative of the coating’s manufacturer shall be present at the start-up and periodically during painting operations. Such representative shall observe the Contractor's workmanship and shall report to the Engineer any known deviations from the manufacturer's application recommendations. The coatings manufacturer shall provide the Engineer, upon request, a written certification of quantities and types of materials provided for use on this project.

D. Contractor Qualification. Contractor must provide documentation that he has previously performed this type of work and provide job references as required by the Engineer. Provide a written guarantee against defective materials and workmanship in accordance with these Specifications.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver all paint, primers, varnishes, and sealers to the job site in their original, unopened containers not exceeding 5-gallon capacity each, unless otherwise specified herein or prior approved. Paint containers

shall not be opened until they have been inspected and approved by the Engineer. All empty and partially used containers shall be retained and stored on the project site and made available for the Engineer’s inspection upon request.

B. Store paint and related materials and equipment in a suitable location on the project site away from work areas and other storage areas. Strictly adhere to all applicable health, safety, and fire regulations controlling the storage of paint and related materials. Store and handle all materials in accordance with the manufacturer's recommendations.

C. Each container shall be marked with the manufacturer's name, product number, and batch number. The labels shall also show mixing and thinning instructions and recommended dry film thickness of each product. Use thinner recommended by the manufacturer. The Engineer must approve the use of accelerators. The Engineer must approve any substitutions of generic thinners.

D. Where shop priming is performed, the shop-primed material shall be delivered with a certification of date, ambient conditions, type of surface preparation and type of coating applied. Failure to provide certification and/or site testing that indicates non-conformance with contract requirements shall result in removal of material from project site for additional surface preparation and painting to achieve contract requirements.

1.6 JOB CONDITIONS

A. Strictly follow the manufacturer's recommendations concerning environmental conditions under which a material can be applied. No finishes shall be applied in areas where dust is being generated.

B. Cover or otherwise protect the finished work of other trades, surfaces not being painted concurrently, and/or surfaces that are not to be painted. Any injury or damage to such surfaces shall be remedied at Contractor's expense to the satisfaction of the Engineer before final acceptance, and no separate payment therefore will be made.

1.7 TESTING EQUIPMENT

A. Furnish and make available to the Engineer the following items of testing equipment for use in determining if the requirements of this Specification section are being satisfied. The specified items of equipment shall be available for the Engineer's use at all times when field painting or surface preparation is in progress.

1. Wet film gauge

2. Surface thermometer

3. Spring micrometer with surface profile tape

4. Sling-psychrometer and psychrometric tables

5. Magnetic dry film gauge (Type 1 or Type 2) with appropriate calibration shims or plates.

2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. The specific products and manufacturers listed for each general product classification in Part 2.2, Materials List, of this section are given identify the type, quality, and composition required for each product. Similar products of other manufacturers are subject to the review and approval of the Engineer in accordance with the provisions of Part 1.4, Submittals, of this section and the Contract Documents.

B. The same manufacturer shall produce all materials used in successive field coats. Material used in the first field coat over shop painted or previously painted surfaces shall cause no wrinkling, lifting, or other damage to underlying paint.

2.2 MATERIAL LIST

Primers and Finishes. Subject to compliance with requirements, provide one of the following:

TYPE

A. Fillers, Sealers, and Surfacers

FS-5 Concrete Masonry, Block and Brick Sealer
"Series 662 Prime-A-Pell Plus," Chemprobe/TNEMEC
"Loxon 7% Siloxane," Sherwin Williams

FS-6 Concrete Floors
"Series 629 CT Densifier," TNEMEC
"Shercrete Concrete Hardner," Sherwin Williams

B. Finishes

F-1 Exterior / Interior Wood
"Emerald Acrylic" Sherwin Williams

F-5 Exterior / Interior / Non-immersion - Epoxy
"Series N69 Hi-Build Epoxoline II," TNEMEC
"Macropoxy 646 Fast Cure," Sherwin Williams

F-6 Exterior - Urethane
"Series 1074 Endura-Shield II," TNEMEC
"Hi-Solids Polyurethane," Sherwin Williams

F-20 Metal Doors - Acrylic Polymer
"Series 1029 Enduratone," TNEMEC

"Shercryl HPA S/G," Sherwin Williams

F-22 Masonry or CMU – Amine Epoxy
"H.S. Epoxy," TNEMEC
"Macropoxy 646 FC," Sherwin Williams

2.3 COLORS

A. Color Cards. Submit color cards for all paints, stains, or other materials to the Engineer for review and color selection.

2.4 PIPE AND EQUIPMENT IDENTIFICATION

A. Pipe Labels

1. Legends: Label all pipe work with prefabricated, professionally stenciled, wrap around plastic labels. Labels shall meet ANSI A131. Legends shall be descriptive of the function of the pipe, such as "ACID." Provide two labels, one label on each side of the pipe, at a suitable location along each pipe run. For long runs of pipe, provide labels at intervals not exceeding 20 feet. Locate the label on the pipe so that it will be in direct line of vision. Label may be omitted from one side if view is obstructed from that side. Where the flow in a pipe shall be at all times in one direction only, then a flow arrow shall be placed in front of each label on the pipe. Labels shall be manufactured by Brady, Panduit, or Engineer approved equal. The lettering and arrows shall be of same height. The size of lettering shall be as follows:

Outside Diameter of Pipe or Covering	Size of Letters Letters
¾" to 1¼"	½"
1½" to 2"	¾"
2½" to 6"	1¼"
8" to 10"	2½"
Over 10"	3½"

2. Tag: For pipes smaller than ¾ inch in outside diameter, use a laminated plastic or aluminum tag with the lettering etched or stamped and filled in with black or contrasting enamel.

3. Legends and Flow Arrows: Label background colors shall be white. Legends shall be all capital, block lettering and black in color. Flow arrows shall be black in color. The above outline of intent designates the general extent of the identification work and is not exclusive of other similar work such as identification of pumps and other equipment as may be required by the Specifications.

4. Equipment Labels: Where specified in these Contract Documents or directed by the Engineer, paint stencil legends, in the same manner as a pipe of appropriate size on the individual units of equipment such as blowers, pumps, collector drives, compressors, silencers etc. All push buttons, starters, switches, etc., when remote from the equipment controlled and/or power packs, shall have labels of the engraved plastic type affixed to or adjacent to the remote switch, push button, starter, etc.

2.5 MIXING AND TINTING

A. All paints and other materials shall be mixed and tinted by the paint manufacturer prior to delivery to the job site, when possible.

B. Strictly adhere to the manufacturer's recommendations when job site mixing and/or tinting is required. The Contractor shall be solely responsible for the proper conduct of all on-site mixing and/or tinting.

3 EXECUTION

3.1 CONTRACTOR'S INSPECTION

A. Examine all surfaces scheduled to receive paint or other finishes for conditions that will adversely affect execution, permanence, or quality of work covered by this item. Surfaces which cannot be put into an acceptable condition through preparatory work as included in Part 3.2, Preparation of Surfaces, shall be immediately brought to the attention of the Engineer.

B. Do not proceed with surface preparation or coating application until surface conditions are suitable.

3.2 PREPARATION OF SURFACES

A. General. Where abrasive blasting is specified, a low free silica abrasive with a silica content of <5% shall be used. Mineral slag by-products may not be used. Abrasive blasting shall produce a surface profile of not less than 1.5 mils or greater than 3.5 mils or as specified by the manufacturer for the appropriate exposure condition.

B. Wood surfaces to be primed and/or painted shall be prepared in accordance with the following requirements prior to application of primer or paint:

1. Exterior or Interior, Painted: Surface must be dry, clean, and free of contaminants. Rough areas shall be sanded to a smooth, even surface and then vacuum cleaned. Knots, pitch pockets, and/or resinous sapwood shall be sealed with shellac, not over 2 pounds cut, prior to the application of primer. Holes, cracks, open joints, and other defects shall be puttied smooth following the application of the primer. Putty used shall be compatible in all respects with the primer and finish coating.

2. Interior, Stained: Surface shall be thoroughly cleaned, sanded, and dusted. Final sanding shall be in the direction of the grain only. Dust shall be removed by vacuuming.

C. Shop Priming and Painting

1. Coat interior, inaccessible surfaces of equipment with an epoxy system suitable for the lifetime of the equipment at anticipated operating conditions and temperatures, unless otherwise specified or accepted.

2. Coat exterior and accessible interior surfaces with an appropriate epoxy system unless otherwise specified or accepted.

D. Concrete and Masonry (includes CMUs)

1. Existing Concrete and Masonry Walls

a. Concrete and masonry surfaces shall be prepared in accordance with SSPC-SP 13/NACE 6 to achieve ICRI CSP specified in 3.5, Protective Coating Schedule.

b. To minimize damage to substrate and subsequent repair, non-toxic chemical strippers may be used to remove previous paint.

c. Surfaces shall be cleaned of all dust, dirt, form oil, curing compounds, previous paint, filler, and other foreign matter.

d. Repair cracks, voids, bugholes, and honeycombed areas in accordance with coating manufacturer's recommendations unless otherwise specified herein.

2. Concrete Floors

a. Concrete floors shall be prepared in accordance with SSPC-SP 13/NACE 6 to achieve ICRI CSP specified in 3.5, Protective Coating Schedule.

b. All surfaces shall be cleaned of all dust, dirt, form oil, curing compounds, previous paint, and other foreign matter.

c. Repair cracks, voids, bugholes, and honeycombed areas in accordance with coating manufacturer's recommendations unless otherwise specified herein.

E. Ferrous Metal (Excluding Stainless Steel)

1. Immersion Surfaces: "Near-White Blast Cleaning" in accordance with SSPC-SP 10/NACE 2. Abrasive blasting shall achieve an anchor pattern or blast profile of between 30 and 40 percent of the dry film thickness of the first applied coat of primer or paint.

2. Non-Immersion Surfaces: "Commercial Blast Cleaning" in accordance with SSPC-SP 6/NACE 3). Abrasive blasting shall achieve an anchor pattern or blast profile of between 30 and 40 percent of the dry film thickness of the first applied coat of primer or paint.

3. Field Preparation of Shop Primed Surfaces: "Solvent Cleaning" in accordance with SSPC-SP 1. Shop primed ferrous metal surfaces that have been damaged, or which show signs of corrosion shall be abrasive blasted cleaned in accordance with the specification given above for the particular finish coating to be applied prior to the application of the field primer or finish coating.

F. Ductile and Cast Iron

1. Immersion, Interior and Exterior Exposed: "Solvent Cleaning" and "Abrasive Blast Cleaning of Ductile Iron Pipe" in accordance with NAPF 500-03-01 and -04, respectively. Abrasive blasting shall achieve an anchor pattern or blast profile as recommended by the coating's manufacturer.

2. Field Preparation of Shop Primed Surfaces: "Solvent Cleaning" in accordance with NAPF 500-04-01. Shop primed iron surfaces that have been damaged, or which show signs of corrosion shall be abrasive blasted and/or cleaned in accordance with the specifications given above for both asphaltic and non-asphaltic coating systems.

3.3 APPLICATION

A. Apply finish coatings with suitable brushes, rollers, or spray equipment per manufacturer’s instructions.

1. Rate of application shall not exceed the paint manufacturer's recommendation for the surface being coated.

2. Brushes, rollers, and spraying equipment shall be kept clean, dry, and free of contaminants at all times.

3. Stain shall be applied by brush or clean, dry cloth. Wipe or dry brush until desired toning is achieved. If deeper tone is required, repeat application after first coat is thoroughly dry.

4. Coatings shall be applied in accordance with paint manufacturer's recommendations and may be subject to inspection at all times by representatives of the Owner or manufacturer.

5. A moisture trap shall be placed in airline supply between the compressor and the pressure pot, airless pump, and/or blow down hoses.

6. Operational regulators and gauges shall be provided for pressure tanks or airless pumps.

7. All spent abrasive and dust from blasting operations shall be removed from surfaces prior to painting application.

8. Blasted surfaces shall be coated with one coat of primer during the same day that blasting is done.

9. Priming shall not be applied closer than 6 inches to a non-blasted area. Any subsequent blasting operation shall not result in abrasive particles embedded in the paint film.

10. No painting shall take place when the temperature is below 50˚ F, or when the surface temperature is within 5˚ F of the dewpoint, or when the relative humidity is above 85%, unless approved by the Engineer.

11. Spray gun must be held perpendicular to the surface being coated and handled in such a manner that dry over spray is held to a minimum.

12. When paint is being applied to the interior of tanks or confined areas, sufficient explosion proof blowers or fans shall be installed to provide adequate ventilation. Adhere to the paint manufacturer's recommendations for forced air ventilation during application and curing. When isocyanate catalyzed coatings are

being applied, positive pressure air supplied respirators must be used.

13. Cover or otherwise protect the finished work of other trades and surfaces that are not to be painted. Any injury or damage to such surfaces shall be remedied to the satisfaction of the Engineer at the expense of the Contractor before final acceptance and payment will be made.

14. The same manufacturer shall produce all materials used in successive field coats.

B. Field painting shall be in the number of coats specified in Part 3.5, Protective Coating Schedule, of this section. Shop or field-applied priming coats shall not be considered as one of the required field finish coats.

1. Individual field finish coats shall be tinted differently in order to distinguish each coat from preceding or succeeding coats.

2. Strictly comply with the coating manufacturer's recommendation for drying time between coats.

3. The Engineer shall inspect each coat before additional coats are applied. Only inspected coats will be considered in determining the number of coats applied.

C. Finish Coats. Finish coats shall be smooth, free of brush marks, streaks, runs, laps or pile-up of paint, and skipped or missed areas. Moldings, trim, and other ornaments shall be left clean and true to details with no undue amount of paint in corners and depressions. The edges of paint adjoining other materials or colors shall be clean and sharp with no overlapping. Where any portion of the finish of a wall has been damaged or is not acceptable, the entire wall shall be refinished.

3.4 TESTING AND INSPECTION

A. Ambient Conditions. Prior to and during paint application, the following ambient conditions shall be measured to confirm that all conditions are within specified limits:

1. Air temperature and relative humidity to be measured with a sling or battery operated psychrometer. The dew point shall be determined from approved psychrometric tables using measured wet- and dry- bulb thermometer readings.

2. Surface temperature to be measured with a surface temperature thermometer.

B. Surface Profile. Prior to paint application and after abrasive blasting, the surface to be painted shall be checked with surface profile tape to determine if the depth of profile specified has been achieved.

C. Film Thickness

1. Wet Film Thickness. The wet film thickness of each coat of paint shall be verified by measuring with an approved wet film thickness gauge as it is applied.

2. Dry Film Thickness. The dry film thickness (DFT) of each coat of paint and the entire system shall be measured with a Type 1 or Type 2 magnetic dry film thickness gauge in accordance with SSPC-PA 2. Five spot measurements (3 readings constitute 1 spot measurement) shall be taken for each 100 square feet area as outlined in SSPC-PA 2, Section 3.

3.5 PROTECTIVE COATING SCHEDULE

A. Primers and finishes shall be applied in accordance with the following protective coating schedule for the surface and exposure specified.

3.6 JOB SPECIFIC COATING REQUIREMENTS

A. The following project elements are to be prepared and coated in accordance with the requirements listed above:

1. Interior and exterior CMU (note CMU are colored block, sealer only required on exterior surfaces. Coat interior CMU in accordance with above)
2. Concrete floors
3. Metal doors
4. Wood ceilings
5. Ferrous metal fabrications, columns, and shapes
6. Touch-up on factory finish-coated equipment (with compatible materials, see equipment specific specifications, shop drawings, and manufacturer’s instructions)

PROTECTIVE COATING SCHEDULE											
Item Description	**Generic Type**		**Surface Preparation**	**First Coat (Primer)**	**DFT Mils**	**Second Coat**	**DFT Mils**	**Third Coat**	**DFT Mils**	**Total DFT Mils (min)**	**Total Coats**
Wood											
Interior or Exterior Exposed	Acrylic		Clean and Dry	F-1	2-3	F-1	2-3	F-1	2-3	6	3
Ferrous Metal[1]											
Exterior Exposed	Epoxy/Polyurethane		SSPC-SP6	F-5	3-5	F-5	4-6	F-6	2-3	9	3
Interior Exposed	Epoxy		SSPC-SP6	F-5	3-5	F-5	4-6			7	2
Metal Doors	Acrylic Polymer		Clean, Dry, & Scarify	Shop		F-20	2-3	F-20	2-3	4	2
Masonry/CMU											
Exterior Exposed	Water-Based Sealer		Clean and Dry	FS-5	50-75[6] (ft^2/gal)						1
Interior Exposed	Amine Epoxy		SSPC-SP13, CSP 3-5	F-22	75-100[6] (ft^2-gal)	F-22	6-8				2
Concrete Floors											
Interior Exposed	Silicate Blend		Clean and Dry	FS-6	300-350[6] (ft^2-gal)						1

NOTES:

[1]Field priming of shop-primed ferrous metal surfaces is required only where the shop primer has been removed because of damage or apparent corrosion and the surface has been re-prepared in accordance with Part 3.2, Preparation of Surfaces, of this section.

[2,3,4,5]Not used.

[6]The spreading rate will depend on the porosity of the surface. Follow manufacturer recommendations for test applications prior to starting work to confirm coverage rates. The function of CMU sealing is for water repellency. Following test application, a 5 ml Rilem tube shall lose no more than 20% or 1 ml liquid to the masonry in a 20-minute period.

Some film thickness ranges listed are only achievable by spray applications. Roller applications may require additional coats.

END OF SECTION

SECTION 26 05 00

BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplemental Conditions and Division-1 Specification sections, apply to work of this section and all following Division 26, Electrical Specifications.

1.2 SCOPE

A. Furnish all labor, materials, equipment and services necessary for and reasonably incidental to the complete installation of all electrical as shown on the drawings and as specified herein to result in a finished and operating facility.

B. Principal features of the installation are as follows:

1. A complete system of conduit and conductors to supply electrical energy throughout the WWTP site.
2. Service entrance, branch panelboards, wiring devices, etc.
3. Lighting fixtures.
4. Wiring in connection with process equipment.
5. Control systems.
6. Control wiring provisions.
7. Electrical unit heaters.
8. Underground system installation.
9. Connection of equipment.
10. Emergency power distribution system.
11. SCADA system wiring.

1.3 CODES AND STANDARDS

A. The entire electrical installation shall be made in strict accordance with the requirements of any and all City, County, State or Federal codes of Law having jurisdiction, the requirements and recommendations of the Board of Fire Underwriters, including all amendments and/or additions to the said codes, laws, requirements, and recommendations, the requirements and recommendations of the local utility, and the International Building Code.

B. Should any work shown on the drawings or herein specified be construed as being contrary to or not conforming to the previously mentioned codes, laws,

etc., the same shall be brought to the attention of the Engineer to be reviewed, approved, and/or corrected prior to final bid date.

C. Should any work shown on the drawings or herein specified be more rigid as to requirements than the requirements of the various codes, the drawings and specifications shall be followed in executing the work.

D. The Contractor shall file with proper authorities all necessary drawings as required by various codes, laws, ordinances and/or other requirements.

E. Permits, inspections and fees: The Contractor shall obtain all permits and inspections required for the work, and shall pay all costs and fees thereof including the Power Company's contribution to construction costs.

1.4 RELATED PROJECT DOCUMENTS

A. The complete set of project documents contain requirements that relate to the electrical construction work specified by the Division 26 electrical specifications and illustrated by the electrical design drawings. All project documents shall be referenced and conformed with for the required electrical installation work. Each specification section or subsection relates to all other sections or subsections. No specification section may be used as stand alone requirements.

1.5 QUALITY ASSURANCE

A. Manufacturers: Firms regularly engaged in manufacture of electrical construction products of types required for this project whose products have been in satisfactory use in similar service for not less than 5 years.

B. Installer: A firm with not less than 5 years of successful experience in installation of products similar to those required for this project.

C. UL Compliance: Comply with applicable portions of UL safety standards pertaining to electrical equipment and installation required for this project.

D. NEC Compliance: Comply with NEC and NESC as applicable to installation of equipment required for this project.

E. Comply with all current work safety rules and regulations.

PART 2 - GENERAL ELECTRICAL REQUIREMENTS

2.1 REQUIREMENTS

A. Drawings indicate the general character, scope, and arrangements of the electrical installation. Approval of any change or departure from the drawings must be obtained from the Engineer.

B. Equal Products: Those items on the drawings or in these specifications designating particular product numbers limit their use only as to design, workmanship and quality, not manufacturer. Approval for alternate or substitute items shall be secured from the Engineer, and submittals for approval must be accompanied by all necessary descriptions, catalog sheets, etc. Authority over such submittals shall rest with the Engineer.

C. Workmanship: All work shall be performed by skilled workmen in a manner reflecting the best modern construction practices. It shall present, upon completion, a neat, orderly, finished appearance. All evidence of debris associated with the work shall be removed from the premises. All work shall conform to all OSHA workplace requirements.

D. Coordination with other trades to the fullest of ability in relation with others to result in a professional installation shall be complete, and more specifically, as follows:

1. The drawings and specifications are based on the best information available when prepared. Frequently minor changes occur with respect to the architectural plans, constructions, and the requirements of equipment furnished by others. The electrical contractor shall recognize this in bidding, supervising, and in planning construction.

2. Before locating conduit runs, boxes, etc., the drawings shall be carefully checked to see that they are in accord with the electrical drawings. Required adjustments shall be made with the General Contractor's superintendent and with the Engineer.

3. Before proceeding with the wiring for mechanical and equipment trades, each item requiring electrical work shall be reviewed with those responsible for their installation. The electrical contractor shall become well acquainted with their characteristics, location and arrangement for mounting. Changes in wiring arrangements and other adjustments, necessary or desirable, shall be reviewed with the Engineer for authorization.

E. Allowances for Contingencies: No change in contract price will be allowed for alternate work which requires approximately the same work to adjust or relocate electrical components or devices as part of the construction coordination work. An adequate allowance shall be included in the bid price for such coordination contingencies and for the additional work required by these coordination adjustments.

F. Allowances for Contingencies: No change in contract price will be allowed for alternate work which requires approximately the same work to adjust or relocate electrical components or devices as part of the construction coordination work. An adequate allowance shall be included in the bid price for such coordination contingencies and for the additional work required by these coordination

adjustments.

G. Coordinate the proposed locations of major raceway systems, equipment, and materials. Include the following:

1. Clearances for servicing equipment, including space for equipment disassembly required for periodic maintenance. Comply with code requirements for working space about electrical equipment.

2. Exterior wall and foundation penetrations.

3. Coordinate installation of required supporting devices and set sleeve in cast-in-place concrete, masonry, walls, and other structural components as they are constructed.

4. Equipment connections and support details.

5. Sizes and locations of required concrete pads and bases.

6. Scheduling, sequencing, movement, and positioning of large equipment into the building during construction.

7. Penetrations in floors, walls and ceilings, and their relationship to other penetrations and installations.

H. Materials shall be new and unused, and shall bear the Underwriter's Seal where applicable.

I. Deliver products to the project properly identified with names, model numbers, types, grades, compliance labels, and other information needed for identification.

J. Retain two sets of all equipment or device installation instructions and submit to the Engineer prior to project completion.

PART 3 - EXECUTION

3.1 ROUGH-IN

A. Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be connected. Refer to individual equipment shop drawings prior to rough-in installation work.

B. Refer to equipment specifications in Divisions 2 through 26 and the complete project drawing set for rough-in requirements.

3.2 ELECTRICAL INSTALLATIONS

A. Sequence, coordinate, and integrate the various elements of electrical systems, materials, and equipment.

B. Coordinate electrical systems, equipment, and materials installation with other building components.

C. Verify all dimensions by field measurements.

D. Arrange for chases, slots, and openings in other building components during progress of construction, to allow for electrical installations.

E. Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components, as they are constructed.

F. Sequence, coordinate, and integrate installations of electrical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing in the building.

G. Where mounting heights are detailed or dimensioned, install systems, materials, and equipment to provide the maximum amount of headroom possible.

H. Coordinate connection of electrical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.

I. Install systems, materials, and equipment to conform with approved submittal data, including coordination drawings, to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the Work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the Engineer.

J. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components, where installed exposed in finished spaces.

K. Install electrical equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations.

L. Install systems, materials, and equipment giving right-of-way priority to systems required to be installed at a specified slope.

3.3 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Electrical penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Cut sleeves to length for mounting flush with both surfaces of walls.

E. Extend sleeves installed in floors **2 inches** above finished floor level.

F. Size pipe sleeves to provide **1/4-inch** annular clear space between sleeve and raceway or cable, unless indicated otherwise.

G. Seal space outside of sleeves with grout for penetrations of concrete and masonry.

1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.

H. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

I. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch annular clear space between raceway or cable and sleeve for installing mechanical sleeve seals.

3.4 SLEEVE-SEAL INSTALLATION

A. Install to seal exterior wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.5 CUTTING AND PATCHING

A. General: Perform cutting and patching in accordance with Division 1 Section "CUTTING AND PATCHING." In addition to the requirements specified in Division 1, the following requirements apply:

1. Perform cutting, fitting, and patching of electrical equipment and materials required to:

   a. Uncover Work to provide for installation of ill-timed Work.

   b. Remove and replace defective work.

   c. Remove and replace work not conforming to the requirements of the Contract Documents.

   d. Remove samples of installed work as specified for testing.

   e. Install equipment and materials in existing structures.

   f. Upon written instructions from the Engineer, uncover and restore Work to provide for Engineer observation of concealed Work.

2. Cut, remove, and legally dispose of selected electrical equipment, components, and materials as indicated, including but not limited to removal of electrical items indicated to be removed and items made obsolete by the new Work.

3. Protect the structure, furnishings, finishes, and adjacent materials not indicated or scheduled to be removed.

4. Provide and maintain temporary partitions or dust barriers adequate to prevent the spread of dust and dirt to adjacent areas.

5. Protection of Installed Work: During cutting and patching operations, protect adjacent installations.

B. Patch existing finished and disturbed new finished surfaces and building components using new materials matching existing materials and experienced Installers. Installers' qualifications refer to the materials and methods required or the surface and building components being patched.

3.6 TEST AND GUARANTEES

A. The Contractor shall perform, prior to final acceptance, an operations test to all electrical equipment. The entire installation shall be free from grounds and short circuits. Before the Owner operates the equipment for the first time, the Contractor shall furnish a person familiar with the equipment to instruct and assist the Owner's personnel in the proper operation and maintenance of said

equipment.

B. Warranty-Guarantee: The electrical contractor shall warrant and the General Contractor shall guarantee that all work executed under this Division of the specifications will be free from defects in materials and workmanship for a period of one year from the date of final acceptance of the building. The above parties agree that they will, at their own expense, repair and replace all such defective work, and all other work damaged thereby, which becomes defective during the term of the warranty-guarantee.

3.7 PROTECTION OF MATERIALS

A. All work, fixtures, and materials shall be protected at all times. Fixtures and equipment shall be tightly covered and protected against dirt, water, chemical, or mechanical injury. At final completion, all work shall be thoroughly cleaned and delivered in an unblemished condition.

B. The Contractor shall defer the installation of all electrical fixtures liable to damage until authorized by the Engineer. After fixtures are permanently installed, they shall be completely protected against breaking, damage, or the depositing of any waste or materials therein or thereon until the system is accepted.

C. Touch up all damaged painted surfaces on equipment to match original paint.

3.8 SHOP DRAWING AND MAINTENANCE MANUALS

A. Submit shop drawings in accordance with Division 1 requirements, shop drawings and wiring diagrams for the following:

1. Panelboards

B. Materials and Equipment Submittals: Furnish catalog sheets or cuts for all items above, and submit catalog data of the following:

1. Lighting fixtures
2. Panelboards
3. Wiring devices
4. Control devices
5. Disconnect switches
6. Conduit systems
7. Communication wiring
8. Distribution system wiring

C. Furnish all equipment submittals in one package to Engineer for approval. All

partial submittals will be rejected, or will be held unchecked until submittals are complete.

D. Maintenance Manuals: Upon completion of the work, deliver to the Engineer for the Owner's use, two copies each of complete operation and maintenance instructions and data for the electrical equipment furnished under the electrical contract work. Data shall include catalog pages or data sheets for each piece of equipment, wiring diagrams showing the internal and external elements and their connections, manufacturer's maintenance manuals, bills of materials showing necessary data for ordering repair parts, and approved shop drawings. This information shall be furnished for the following systems and items.

1. Lighting fixtures
2. Exit signs
3. Motor starters
4. Panelboards
5. Emergency lighting system

3.9 WORK IN CONNECTION WITH EQUIPMENT FURNISHED BY OTHERS

A. Mechanical: Furnish and install all necessary wiring for the supply and control of all mechanical work, including plumbing, heating, air conditioning, and ventilation. Furnish and install disconnect switches for motors where required by the codes. The contractor shall make provisions for variations in the mechanical equipment and make connections as required by the actual equipment furnished.

B. Motor wiring:

1. Services to equipment shall be checked out against that required by the equipment prior to service connection. Should the equipment require service different to that provided, the contractor shall call that fact to the attention of the Engineer prior to connection of the service. Check equipment to determine whether proper control and safety devices are provided to insure proper operation. Assist Owner in the initial operation of the equipment, and make any necessary adjustments to the service for proper operation.

2. Motor and Motor Controls: Where required, the manual motor starters shall be suitable for the application, Square D Co., Type F, K, M or T with proper overload protection, mounted in an appropriate box with a 120-volt pilot light. Disconnect switches shall be the heavy-duty type with "Dual Element" fuses, with an enclosure suitable for the application. Provide accessories necessary for the application.

3. Equipment shall be controlled by manual and automatic systems as required by the control documents, shown on the drawings and specified

in this section of the specifications.

4. Air Conditioning and Heating Equipment: All air conditioning and heating equipment shall have fused disconnect switches or breakers installed at the unit. These switches or breakers shall be sized and be of the type as it appears on the label of the equipment.

5. Install and connect all package control equipment and control devices furnished under other divisions of these specifications including all interconnecting control wiring.

C. Work in Connection with Motors:

1. Rotation: All motors shall be checked for proper rotation just as soon as power is available. Should any motor rotate in the wrong direction, it shall be re-connected for proper operation.

2. Overload Heaters: Check all motor starters overload heater elements for the proper size to conform to the name plate rating of the motor. Should an improper size unit be installed, the attention of the Engineer and the starter supplier shall be called to that fact.

3. Connection: The raceway connection to the individual motors shall be by means of a short length of flexible conduit. All pump motors shall be connected with type "UA" liquid tight flexible conduit. Connectors used with liquid tight flexible conduit shall be of a type made for the purpose and that will establish a continuous ground. All motors and all controls therewith shall be connected up completely as required for proper operation of the system involved.

D. Owner Furnished: Furnish power wiring and connections to all equipment furnished by others and shown on the plans.

3.10 TEMPORARY WIRING

A. As soon as practicable after the roof is closed over, install temporary wiring and lighting throughout the building as specified in Division 1. Temporary wire may, if acceptable to the local code authority, consist of plastic type non-metallic sheathed cable having a ground wire to which all the receptacle ground poles shall be connected. The installation of the temporary wiring shall comply with the current codes and rulings of the local inspector. All breakers serving receptacle outlets shall have ground fault protection.

END OF SECTION

SECTION 26 05 19

WIRES AND CABLES

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Extent of electrical wire and electrical cable work is indicated by drawings and schedules.

B. Types of wire, cable and connectors in this section include, but are not limited to, the following and requirements of the service application:

1. Copper conductors
2. Fixture wires
3. Switchboard wires
4. Tap type connectors
5. Split-bolt connectors

C. Applications for wire, cable and connectors required for project are as follows:

1. Power distribution circuitry
2. Lighting circuitry
3. Appliance and equipment circuitry
4. Motor-branch circuitry
5. Control circuitry

D. All wire and cable shall conform to the latest requirements of the NEC and shall meet all ASTM/UL specifications. Wire and cable shall be new; shall have size, grade of insulation, voltage rating and manufacturer's name permanently marked on the outer covering at regular intervals. Complete descriptive literature shall be submitted to the Engineer for review and acceptance prior to installation.

E. Building wire #12 - #1 shall be applied based on 60 degree Celsius temperature rise. Building wire larger than #1 may be applied at its 75 degree Celsius temperature rise.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include,

but are not limited to, the following:

1. Wire and Cable:

    a. Advance Wire and Cable, Inc.
    b. General Cable Corp.
    c. Rome Cable Corp.
    d. Southwire

2. Connectors:

    a. AMP, Inc.
    b. Burndy Corp.
    c. Ideal Industries, Inc.

2.2 WIRE, CABLE, AND CONNECTORS

A. General: Except as otherwise indicated, provide wire, cable and connectors of manufacturer's standard materials, as indicated by published product information; designed and constructed as recommended by manufacturer, and as required for the installation.

B. Wire: Provide factory-fabricated copper conductor, wire of sizes, ratings, materials, and types indicated for each service. Where type is not indicated, provide proper selection as determined by Installer to comply with project's installation requirements and NEC standards.

C. Connectors: Provide factory-fabricated, metal connectors of sizes, ratings, materials, types and classes as indicated for each service. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements and NEC standards. All wiring nuts shall be twist-on type. Non-twist-on type wire nuts shall not be allowed.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install electrical cables, wires and connectors as indicated, in compliance with manufacturer's written instructions, applicable requirements of NEC and NECA's "Standard of Installation", and in accordance with recognized industry practices.

B. Coordinate cable and wire installation work with electrical raceway and equipment installation work, as necessary for proper interface.

C. Pull conductors together where more than one is being installed in a raceway.

D. Use pulling compound or lubricant, where necessary; compound must not deteriorate conductor or insulation.

E. Use pulling means, including fish tape, cable or rope which cannot damage raceway.

F. Install exposed cable, parallel and perpendicular to surfaces or exposed structural members and follow surface contours, where possible.

G. Keep conductor splices to a minimum.

H. Install splices and taps which have mechanical strength. Current and insulation rating shall be equivalent-or-better than conductor. All splices shall be compression type with 3M cold shrink and taped.

I. Use splice and tap connectors which are compatible with conductor material.

J. Identify and color-code conductors and cable according to Division 26 Section "Electrical Identification."

K. Wiring at Outlets: Install conductors at each outlet with at least 6 inches of slack.

L. Underground Exterior-Wall Penetrations: Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between cable and sleeves for installing mechanical sleeve seals.

M. Install to seal underground exterior-wall penetrations.

N. Use type and number of sealing elements recommended by manufacturer for cable material and size. Position cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.2 FIELD QUALITY CONTROL

A. Prior to energization, test cable and wire for continuity of circuitry, and also for short circuits. Correct malfunctions when detected.

B. Subsequent to wire and cable hook-ups, energize circuitry and demonstrate functioning in accordance with requirements.

C. Use THHN/THWN stranded for all field motor and control work. Use solid copper only for building branch wiring circuits at size No. 12 and No. 10. All other wiring shall be class and type approved for the applications. Minimum conductor size shall be AWG number 12 except branch circuits in excess of 75 feet from panel to first outlet not smaller than No. 10 AWG.

D. Control cable:

1. Control cable shall be the size and have the number of conductors shown on the control system drawings. Control cable shall be used for motor controls and monitoring only. Color coding shall be ICEA, Method 1. Control cables between buildings shall be underground in conduit of the size shown in the control system schematic. Cabling shall provide a minimum of 25 percent spare conductors. Voltage rating shall be 600 volts.

E. Instrument cable:

1. All signal lines should be constructed of individually twisted pairs (6 to 10 twists per foot), including thermocouple extension leads. Cables should be made of twisted pairs, with all lays and pairs twisted in the same direction for maximum flexibility.

2. Wire size #16 AWG minimum for single pair runs under 5,000 feet in length. Wire size shall be #16 AWG for multi-pair cable runs under 5,000 feet in length.

3. Stranded tinned copper conductor shall be used for all wiring other than thermocouple extension leads.

4. Insulation resistance at 68 degrees Fahrenheit between conductors and between conductors and ground should be at least 500 megohms per 1,000 feet.

5. Multi-pair cable should be jacketed with poly-vinyl-chloride, polyethylene or Teflon at least 0.045" thick. Voltage rating shall be 600 volts. Cable shall be rated for wet location underground use.

F. Signal wiring

1. Low level analog (less than 500 millivolt d-c). Use twisted pairs which may be cabled with other pairs carrying similar voltage levels. Foil wraps or equivalent shielding is required for each cable withe the shield insulated from ground.

2. High level analog (greater than 500 millivolts d-c). Use twisted pairs which may be cabled with other pairs carrying similar voltage levels and current levels less than 100 ma. Shielding is required.

3. Analog outputs (normally 0-4-d-c or 4-20 ma) - same as 1.

4. Contact inputs - use twisted pairs and run in separate conduit.

5. Contact outputs - same as 4.

6. Pulse inputs - same as 4.

G. Signal and shield grounding:

1. All shields must be grounded at one point only as close as possible to the signal source.

2. Thermocouples may be grounded or ungrounded.

3. Analog signals, if grounded, should be grounded as near the signal source as possible.

4. Resistance bulbs should not be grounded.

H. Signal and wiring separation:

1. High level analog signals may share the same conduit or run with contact or pulse signals.

2. Thermocouple and low level signals should be run in a separate conduit.

3. A minimum separation of 12 inches between analog signal leads and a-c power leads should be maintained. For a-c power leads carrying 100 amps or greater, a 24 inch separation should be maintained. Parallel runs should be limited to less than 500 feet. Perpendicular runs may be as close as 6 inches.

END OF SECTION

SECTION 26 05 20

ELECTRICAL CONNECTIONS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Extent of electrical connections for equipment is indicated by drawings and schedules. Electric connections are hereby defined to include, but not necessarily limited to, connections for providing electrical power to equipment, control wiring connections, communication connections.

B. Types of electrical power and electrical system connections specified in this section includes, but is not limited to the following:

1. To motors
2. To equipment
3. To resistance heaters
4. To motor starters
5. To motor control equipment
6. From motor starters to motors
7. To plumbing equipment
8. To lighting fixtures
9. To transformers, inverters, rheostats, and similar current adjustment features of equipment
10. To ground
11. To master units of communication, signal and alarm

C. Motor starters and controls not furnished integrally with equipment are specified in applicable Electrical work sections along with installation specifications.

D. Refer to other specifications sections for motor starters and controls furnished with equipment; not work of this section.

E. Junction boxes and disconnect switches required for motors and other electrical units of equipment are specified in applicable Electrical work sections.

F. Refer to other specifications sections and the drawings for control system wiring work described and installed under Electrical work.

G. Refer to specification sections and plans of other work Divisions for specific individual equipment power requirements.

H. Furnish all labor and material and making power connections to all electric equipment furnished under the Architectural, Plumbing, Heating, Air Conditioning and equipment sections of the specifications and plans.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

1. AMP Products Corp.
2. Appleton Electric Co.
3. Burndy Corp.
4. Ideal Industries, Inc.
5. T and B - Thomas and Betts Corp.

2.2 MATERIALS AND COMPONENTS

A. General: For each electrical connection indicated, provide complete assembly of materials, including but not necessarily limited to, pressure connectors, terminals (lugs), electrical insulating tape, electrical solder, electrical soldering flux, heat-shrinkable insulating tubing, cable ties, solderless wire nuts, and other items and accessories as needed to complete splices and terminations of types indicated.

B. Metal Conduit, Tubing and Fittings: Provide metal conduit, tubing and fittings of types, grades, sizes and weights (wall thicknesses) indicated for each type service. Where types and grades are not indicated, provide proper selection as determined by Installer to fulfill wiring requirements; comply with NEC requirements for raceways. Provide products complying with Electrical Work basic materials and methods section "Raceways", and in accordance with the raceway material required for the project.

C. Wire, Cable, and Connectors: Provide wires, cables, and connectors complying with Electrical Work basic materials and methods section "Wires and Cables".

D. Wire: Unless otherwise indicated, provide wires/conductors for electrical connections which match wires/conductors of wiring supplying power.

E. Connectors and Terminals: Provide electrical connectors and terminals as recommended by connector and terminal manufacturer for intended applications.

F. Electrical Connection Accessories: Provide electrical insulating tape, heat-shrinkable insulating tubing and boots, solder, electrical soldering flux, wire nuts and cable ties as recommended for use by accessories manufacturers for type services indicated. Only twist-on type wire nuts will be permitted for branch

circuit wiring.

PART 3 - EXECUTION

3.1 INSTALLATION OF ELECTRICAL CONNECTIONS

A. Install electrical connections as indicated; in accordance with connector manufacturer's written instructions and with recognized industry practices, and complying with requirements of NEC and NECA's "Standard of Installation" to ensure that products fulfill requirements.

B. Connect electrical power supply conductors to equipment conductors in accordance with equipment manufacturer's written instructions and wiring diagrams. Wherever possible, mate and match conductors of electrical connections for proper interface between electrical power supplies and installed equipment.

C. Coordinate installation of electrical connections for equipment with equipment installation work.

D. Cover splices with electrical insulation equivalent to, or of higher rating, than insulation on conductors being spliced.

E. Prepare cables and wires by cutting and stripping covering armor, jacket, and insulation properly to ensure uniform and neat appearance where cables and wires are terminated.

F. Trim cables and wires as short as practicable and arrange routing to facilitate inspection, testing and maintenance.

G. Tighten wire-binding connector screws firmly.

H. Provide flexible conduit for motor connections, and for other electrical equipment connections where subject to movement and vibration.

I. Provide liquid-tight metallic flexible conduit for connection of motors and for other electrical equipment where subject to movement and vibration, and also where subjected to one or more of the following conditions:

1. Exterior location
2. Moist or humid atmosphere where condensate can be expected to accumulate
3. Corrosive atmosphere
4. Subjected to water spray
5. Subjected to dripping oil, grease, or water

J. Refer to basic materials and methods section for identification of electrical power

supply conductor terminations with markers approved as to types, colors, letter and marker sizes, by Engineer. Affix markers at each point of termination, as close as possible to each point of connection.

END OF SECTION

SECTION 26 05 24

SUPPORTING DEVICES

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Extent of supports, anchors, sleeves and seals is indicated by drawings and schedules and/or specified in other Electrical work sections.

B. Types of supports, anchors, sleeves and seals specified in this section include but are not limited to the following:

1. Clevis hangers
2. Riser clamps
3. C-clamps
4. I-beam clamps
5. One-hole conduit straps
6. Two-hole conduit straps
7. Round steel rods
8. Lead expansion anchors
9. Toggle bolts
10. Wall and floor seals

C. Furnish and install supports, anchors, sleeves and seals for factory-fabricated equipment as required to properly and securely mount the equipment.

D. Furnish and install supports, braces, anchors and fasteners to meet seismic code requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURED SUPPORTING DEVICES

A. General: Provide supporting devices; complying with manufacturer's standard materials, design and construction in accordance with published product information, and as required for a complete installation; and as herein specified. Where more than one type of device meets indicated requirements, selection is Installer's option. All support devices and hardware shall be hot dipped galvanized steel.

B. Supports: Provide supporting devices of types, sizes and materials indicated; and having the following construction features:

1. Clevis Hangers: For supporting 2" rigid metal conduit; galvanized steel; with ½" dia. hole for round steel rod; approx. 54 pounds per 100 units.

2. Riser Clamps: For supporting 5" rigid metal conduit; galvanized steel; with 2 bolts and nuts, and 4" ears; approx. 510 pounds per 100 units.

3. Reducing Couplings: Steel rod reducing coupling, ½" X 5/8"; galvanized steel; approx. 16 pounds per 100 units.

4. C-Clamps: Black malleable iron; ½" rod size; approx. 70 pounds per 100 units.

5. I-Beam Clamps: 1-1/4" X 3/16" stock; 3/8" cross bolt; flange width 2"; approx. 52 pounds per 100 units.

C. One-Hole Conduit Straps: For supporting 3/4" rigid metal conduit; galvanized steel; approx. 7 pounds per 100 units.

1. Two-Hole Conduit Straps: For supporting 3/4" rigid metal conduit, ga;vaniozed steel; 3/4" strap width; and 2-1/8" between center of screw holes.

2. Hexagon Nuts: For ½" rod size; galvanized steel; approx. 4 pounds per 100 units.

3. Round Steel Rod: galvanized steel; ½" dia.; approx. 67 pounds per 100 feet.

4. Offset Conduit Clamps: For supporting 2" rigid metal conduit; approx. 200 pounds per 100 units.

D. Anchors: Provide anchors of types, sizes and materials indicated; and having the following construction features:

1. Expansion Anchors: ½"; approx. 38 pounds per 100 units.

2. Toggle Bolts: Springhead; 3/16" X 4"; approx. 5 pounds per 100 units.

E. Available Manufacturers: Subject to compliance with requirements, manufacturers offering anchors which may be incorporated in the work include, but are not limited to, the following:

1. Ackerman Johnson Fastening Systems, Inc.
2. Ideal Industries, Inc.
3. Star Expansion Co.
4. U.S. Expansion Bolt Co.

F. Sleeves and Seals: Provide sleeves and seals, of types, sizes and materials

indicated; and having the following construction features:

1. Wall and Floor Seals: Provide factory-assembled watertight wall and floor seals, of types and sizes indicated; suitable for sealing around conduit, pipe, or tubing passing through concrete floors and walls. Construct with steel sleeves, malleable iron body, neoprene sealing grommets and rings, metal pressure rings, pressure clamps, and cap screws. Floor sleeves and seals shall match the fire rating of the assembly being penetrated.

G. Conduit Cable Supports: Provide cable supports with insulating wedging plug for non-armored type electrical cables in risers; construct for 2" rigid metal conduit; 3-wires, type wire as indicated; construct body of malleable iron casting with hot dip galvanized finish.

H. U-Channel Strut Systems: Provide U-channel strut system for supporting electrical equipment, 16-gauge galvanized steel, of types and sizes indicated; construct with 9/16" dia. holes, 8" o.c. on top surface, and with the following fittings which mate and match with U-channel:

1. Fixture hangers
2. Channel hangers
3. End caps
4. Beam clamps
5. Wiring stud
6. Thinwall conduit clamps
7. Rigid conduit clamps
8. Conduit hangers
9. U-bolts

I. Available Manufacturers: Subject to compliance with requirements, manufacturers offering channel systems which may be incorporated in the work include, but are not limited to, the following:

1. Greenfield Mfg. Co., Inc.
2. Midland-Ross Corp.
3. Unistrut Div; GTE Products Corp.

J. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

2.2 FABRICATED SUPPORTING DEVICES

A. Pipe Sleeves: Provide pipe sleeves, suitable for the application, of one of the

following:

1. Sheet-Metal: Fabricate from galvanized sheet metal; round tube closed with snaplock joint, welded spiral seams, or welded longitudinal joint. Fabricate from the following gauges: 3" and smaller, 20 gauge; 4" to 6", 16 gauge; over 6", 14 gauge.

2. Steel-Pipe: Fabricate from schedule 40 galvanized steel pipe; remove burrs.

3. Iron-Pipe: Fabricate from cast-iron or ductile-iron pipe; remove burrs.

4. Plastic-Pipe: Fabricate from Schedule 80 PVC plastic pipe; remove burrs.

B. Sleeve Seals: Provide sleeve seals for sleeves located in foundation walls below grade, or in exterior walls, of one of the following:

1. LinkSeal stainless steel.

C. Fire Barriers: Provide galvanized steel conduit sleeves through all fire wall, floor ceiling or barrier penetration. Seal sleeve with an approved expanding fire/smoke material. The wall penetration and seal assembly shall equal the fire rating of the barrier penetrated. Refer to Architectural plans for the location and type of fire barrier construction.

PART 3 - EXECUTION

3.1 INSTALLATION OF SUPPORTING DEVICES

A. Install hangers, anchors, sleeves and seals as indicated, in accordance with manufacturer's written instructions and with recognized industry practices to insure supporting devices comply with requirements. Comply with requirements of NECA, NEC, MSS, and ANSI/NEMA for installation of supporting devices.

B. Coordinate with other electrical work, including raceway and wiring work, as necessary to interface installation of supporting devices with other work.

C. Install hangers, supports, clamps and attachments to support piping properly from building structure. Arrange for grouping of parallel runs of horizontal conduits to be supported together on trapeze type hangers where possible. Install supports with maximum spacings indicated.

D. Tighten sleeve seal nuts until sealing grommets have expanded to form watertight seal.

E. Install all supporting devices to meet seismic requirements.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RGS may be supported by openings through structure members, as permitted in NFPA 70.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.

2. To New Concrete: Bolt to concrete inserts.

3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.

4. To Existing Concrete: Expansion anchor fasteners.

5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches (100 mm) thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches (100 mm) thick.

6. To Steel: Beam clamps complying with MSS SP

7. To Light Steel: Sheet metal screws.

8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet seismic-restraint strength and anchorage requirements.

E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Comply with installation requirements in Division 5 Section "Metal Fabrications" for site-fabricated metal supports.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

C. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 CONCRETE BASES

A. Construct concrete bases of dimensions indicated but not less than 4 inches (100 mm) larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.

B. Use **3000-psi**, 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Division 3.

C. Anchor equipment to concrete base as follows:

1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

2. Install anchor bolts to elevations required for proper attachment to supported equipment.

3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.5 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and support. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION

SECTION 26 05 26.1

GROUNDING AND GROUND-FAULT PROTECTION

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Extent of grounding and ground-fault protection work is as directed by the NEC and additional grounding as indicated by the contract documents.

B. Types of grounding and ground-fault protection in this section include but are not limited to the following:

1. Grounding:

a. Underground metal piping
b. Underground metal water piping
c. Underground metal structures
d. Grounding electrodes
e. Grounding rods
f. Separately derived systems
g. Service equipment
h. Enclosures
i. Systems
j. Equipment

2. Ground-Fault Protection

a. Ground-fault circuit interrupters

C. Provide an equipment grounding conductor in all feeder wiring runs. Provide ground bus in all panels, switchboards and equipment enclosures. Bond ground conductor in all metallic enclosures.

D. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 GROUNDING

A. Materials and Components: Except as otherwise indicated, provide each electrical grounding system indicated, with assembly of materials including, but not necessarily limited to, cables/wires, connectors, terminals (solderless lugs), grounding rods/electrodes and plate electrodes, bonding jumper braid, and other

items and accessories needed for complete installation. Where more than one type meets indicated requirements, selection is Installer's option. Where materials or components are otherwise indicated, comply with NEC, NEMA and established industry standards for applications indicated.

B. Equipment Grounding Conductor: Where specified or required by the application, provide code size equipment grounding conductors throughout the raceway system. Bond the equipment grounding conductor at all metal enclosures, equipment frames, housings, racks, etc. entered.

C. Electrical Bonding Jumpers:

1. Bonding Jumper Braid: Copper braided tape, constructed of 30-gauge bare copper wires and properly sized for indicated applications.

2. Flexible Jumper Strap: Flexible flat conductor, 480 strands of 30-gauge bare copper wire; 3/4" wide, 9/1-2" long; 48,250 CM. Protect braid with copper bolt hole ends with holes sized for 3/8" dia. bolts.

D. Electrical Grounding Conductors: Unless otherwise indicated, provide electrical grounding conductors for grounding connections matching power supply wiring materials and sized according to NEC.

E. Ground rods: Steel with copper welded exterior, 3/4" dia. X 10 feet long.

F. Grounding Bus: Rectangular bars of annealed copper, 1/4 by 2 inches, 12 inches in cross section, unless otherwise indicated; with insulators.

G. Electrical Grounding Connections Accessories: Provide electrical insulating tape, heat-shrinkable insulating tubing, thermoweld process, bonding straps, as recommended by accessories manufacturers for type services indicated.

2.2 CONNECTORS

A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.

B. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

2.3 GROUND-FAULT PROTECTION DEVICES

A. General: Except as otherwise indicated, provide ground-fault protection devices and components, of types, sizes, and ratings indicated, which comply with

manufacturer's standard materials, design and construction in accordance with published product information, and as required for complete installation. Where types, sizes, or ratings are not indicated, comply with NEC, UL and established industry standards for applications indicated.

B. Circuit Interrupters/Circuit-Breakers: Provide where required 1" wide module bolt-on panel board circuit breakers, with integral ground-fault circuit interrupters, UL-rated Class A, Group 1; 20-amperes ratings, 1-pole construction, 120-volts, 60 Hz, 22000 AIC. Provide with solid-state ground-fault sensing and signaling, with 5 milliamperes ground-fault sensitivity, plus or minus 1 milliampere. Equip with PUSH-TO-TEST capability. Provide modules which fit panelboards in which they are located.

PART 3 - EXECUTION

3.1 INSTALLATION OF GROUNDING AND GROUND-FAULT PROTECTION SYSTEMS

A. Install electrical grounding systems and ground-fault protection devices as indicated, in accordance with manufacturer's written instructions and with recognized industry practices to ensure grounding and ground-fault protection devices comply with requirements. Comply with requirements of NEC, NESC, and NEMA standards for installation of grounding and ground-fault protection systems and devices. Provide ground fault system where code required.

B. Coordinate with other electrical work as necessary to interface installation of grounding system and ground-fault protection devices with other work.

C. Weld cable connections to ground rods and coat with protective asphaltic paint.

D. Install braided type bonding jumpers with ground clamps on water meter piping to electrically bypass water meter.

E. Install clamp-on connectors only on thoroughly cleaned metal contact surfaces, to ensure electrical conductivity and circuit integrity.

F. Install ground-fault protection devices complying with electrical winding polarities indicated.

G. Set field-adjustable GFP devices for pickup and time sensitivity ranges as indicated, after installation of devices.

H. Where indicated on the drawings, provide additional isolated ground system. Isolated ground systems shall provide electrical isolation from outlet or device continuous to service equipment neutral/ground bonding point.

3.2 APPLICATIONS

A. Conductors:

1. Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger, unless otherwise indicated.

B. Grounding bus:

1. Install in electrical and control equipment rooms, in rooms housing service equipment, and elsewhere as indicated.

2. Install bus on insulated spacers 1 inch minimum, from wall 6 inches above finished floor, unless otherwise indicated.

C. Conductor terminators and connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.

2. Underground Connections: Welded connectors, except at test wells and as otherwise indicated.

3. Connections to Ground Rods at Test Wells: Bolted connectors.

4. Connections to Structural Steel: Welded connectors.

3.3 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:

1. Feeders and branch circuits.

2. Lighting circuits.

3. Receptacle circuits.

4. Single-phase motor and appliance branch circuits.

5. Three-phase motor and appliance branch circuits.

6. Flexible raceway runs.

7. Busway Supply Circuits: Install insulated equipment grounding conductor from grounding bus in the switchgear, switchboard, or

distribution panel to equipment grounding bar terminal on busway.

8. Computer and Rack-Mounted Electronic Equipment Circuits: Install insulated equipment grounding conductor in branch-circuit runs from equipment-area power panels and power-distribution units.

C. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.

D. Signal and Communication Equipment: For telephone, alarm, voice and data, and other communication equipment, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.

1. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-2-by-12-inch (6-by-50-by-300-mm) grounding bus.

2. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.

3.4 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Common Ground Bonding with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor, and install in conduit.

C. Ground Rods: Drive rods until tops are 2 inches (50 mm) below finished floor or final grade, unless otherwise indicated.

1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating, if any.

2. For grounding electrode system, install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding

electrode conductor.

D. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.

2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.

3. Use exothermic-welded connectors for outdoor locations, but if a disconnect-type connection is required, use a bolted clamp.

E. Grounding and Bonding for Piping:

1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes, using a bolted clamp connector or by bolting a lug-type connector to a pipe flange, using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.

2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.

3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

F. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install bonding jumper to bond across flexible duct connections to achieve continuity.

G. Grounding for Steel Building Structure or concrete structure: Install a driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 feet (18 m) apart.

H. Ground Ring: Install a grounding conductor, electrically connected to each building structure ground rod and to each indicated item, extending around the perimeter of each new building or structure.

1. Install copper conductor not less than No. 4/0 AWG for ground ring and for taps to building steel.

2. Bury ground ring not less than 24 inches from building foundation.

3. Bond all handrails on concrete structures with minimum #2 copper.

4. Ufer Ground (Concrete-Encased Grounding Electrode): Fabricate according to NFPA 70, using a minimum of **20 feet** of bare copper conductor not smaller than No. **4** AWG.

5. If concrete foundation is less than **20 feet** long, coil excess conductor within base of foundation.

3.5 FIELD QUALITY CONTROL

A. Upon completion of installation of ground-fault protection devices and after electrical circuitry has been energized, demonstrate capability and compliance with requirements. Where possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units, and proceed with retesting.

B. Upon completion of installation of electrical grounding system, test ground resistance with ground resistance tester. Where tests show resistance-to--ground is over 3 ohms, take appropriate action to reduce resistance to 3 ohms or less by driving additional ground rods. Then retest to demonstrate compliance.

C. Perform resistance-to-ground tests of electrical grounding system one year following time of substantial completion and submit written report indicating results. Where resistance is greater than 3 ohms, chemically treat soil to reduce resistance to 3 ohms or less. Then retest to demonstrate compliance.

3.6 PERSONNEL TRAINING

A. Building Maintenance Personnel Training: Train Owner's building maintenance personnel in procedures for testing and determining resistance-to-ground values fo grounding system. Also instruct maintenance personnel in preparation and application of chemical solution for earth surrounding grounding rods for reducing ohmic resistance to required levels.

END OF SECTION

SECTION 26 05 33.13

RACEWAYS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Extent of raceways is indicated by drawings and application. Provide raceway as required by the application. All exposed conduit shall be rigid galvanized steel. Use schedule 40 PVC under slab or encased. Provide a code size grounding conductor in all nonmetallic conduit. Install an insulated code size grounding conductor in all metallic raceway systems and connect/bond to all electrical system boxes, enclosures, frames and device grounds. Connect this conductor to all equipment frames, metallic boxes, device frames and other metallic components of the electrical distribution and utilization systems.

B. Types of raceways in this section include the following:

1. Flexible metal conduit
2. Liquid-tight flexible metal conduit
3. Rigid Galvanized Steel (RGS) conduit
4. Rigid nonmetallic conduit
5. Surface metal and nonmetallic raceways
6. Electrical nonmetallic tubing

PART 2 - PRODUCTS

2.1 METAL AND NONMETALLIC CONDUIT AND TUBING

A. General: Provide metal and nonmetallic conduit, tubing and fittings of types, grades, sizes and weights (wall thicknesses) for each service indicated. Where types and grades are not indicated, provide proper selection determined by Installer to fulfill wiring requirements, and comply with fire codes and applicable portions of NEC for raceways.

B. Provide connectors, fittings, accessories and installation tools suitable for the product and application.

C. Install conduit systems complying with manufacturers' published product information.

D. Minimum conduit system shall be RGS except as otherwise noted.

E. Minimum conduit shall be 3/4 inch.

2.2 WIREWAYS

A. General: Provide electrical raceways of types, grades, sizes, weights (wall thicknesses), number of channels, for each type service indicated. Provide complete assembly of raceway including, but not necessarily limited to, couplings, offsets, elbows, expansion joints, adapters, holddown straps, end caps, and other components and accessories as needed for complete system. Where types and grades are not indicated, provide proper selection as determined by Installer to fulfill wiring requirements, and comply with applicable provisions of NEC for electrical raceways.

PART 3 - EXECUTION

3.1 INSTALLATION OF ELECTRICAL RACEWAYS

A. Install electrical raceways where indicated; in accordance with manufacturer's written instructions, applicable requirements of NEC and NECA "Standard of Installation", and complying with recognized industry practices.

B. Coordinate with other work including metal and concrete deck work, as necessary to interface installation of electrical raceways and components with other work.

C. Level and square raceway runs, and install at proper elevations/heights.

D. Complete installation of electrical raceways before starting installation of cables/wires within raceways.

E. Install flexible conduit for motor connections, and for other electrical equipment connections where subject to movement and vibration.

F. Install liquid-tight flexible conduit for connection of motors and for other electrical equipment where subject to movement and vibration, and also where subjected to one or more of the following conditions:

1. Exterior location
2. Moist or humid atmosphere where condensate can be expected to accumulate
3. Subjected to water spray
4. Subjected to dripping oil, grease, or water

G. Wherever possible, install horizontal raceway runs above water and steam piping.

H. Provide secure fastening and support of conduit systems from the building structural system using materials manufactured for the intended application.

I. Provide surface metal raceways where surface mounted applications is required in existing buildings, particularly for light switches and receptacle installations.

J. Support conduit runs in accordance to seismic code requirements.

K. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid Galvanized Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.

3.2 INSTALLATION

A. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

B. Complete raceway installation before starting conductor installation.

C. Install temporary closures to prevent foreign matter from entering raceways.

D. Protect stub-ups from damage where conduits rise through floor slabs. Arrange so curved portions of bends are not visible above the finished slab.

E. Make bends and offsets so ID is not reduced. Keep legs of bends in the same plane and keep straight legs of offsets parallel, unless otherwise indicated.

F. Install concealed raceways with a minimum of bends in the shortest practical distance, considering type of building construction and obstructions, unless otherwise indicated.

G. Raceways Embedded in Slabs: Install in middle 1/3 of slab thickness where practical and leave at least 2 inches (50 mm) of concrete cover.

1. Secure raceways to reinforcing rods to prevent sagging or shifting during concrete placement.

2. Space raceways laterally to prevent voids in concrete.

3. Run conduit larger than 1-inch trade size (DN 27) parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.

4. Change from nonmetallic tubing to RGS conduit before rising above the floor.

H. Install exposed raceways parallel or at right angles to nearby surfaces or structural members and follow surface contours as much as possible.

1. Run parallel or banked raceways together on common supports.

2. Make parallel bends in parallel or banked runs. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for parallel raceways.

I. Join raceways with fittings designed and approved for that purpose and make joints tight. Use insulating bushings to protect conductors.

J. Tighten set screws of threadless fittings with suitable tools.

K. Terminations:

1. Where raceways are terminated with locknuts and bushings, align raceways to enter squarely and install locknuts with dished part against box. Use two locknuts, one inside and one outside box.

2. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into hub so end bears against wire protection shoulder. Where chase nipples are used, align raceways so coupling is square to box; tighten chase nipple so no threads are exposed.

L. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire.

M. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with UL-listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.

2. Where otherwise required by NFPA 70 such as Classified Hazardous locations.

N. Stub-up Connections: Extend conduits through concrete floor for connection to freestanding equipment. Install with an adjustable top or coupling threaded inside for plugs set flush with finished floor. Extend conductors to equipment with rigid steel conduit; FMC may be used 6 inches (150 mm) above the floor. Install screwdriver-operated, threaded plugs flush with floor for future equipment connections.

O. Flexible Connections: Use maximum of 72 inches (1830 mm) of flexible conduit for recessed and semirecessed lighting fixtures. Use LFMC in damp or wet locations for equipment subject to vibration, noise transmission, or movement;

and for all motors.

3.3 PROTECTION

A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.

2. Repair damage to PVC or paint finishes with matching touch-up coating recommended by manufacturer.

END OF SECTION

SECTION 26 05 33.16

ELECTRICAL BOXES AND FITTINGS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Extent of electrical box and electrical fitting work is indicated by drawings and schedules.

B. Types of electrical boxes and fittings in this section include, but are not limited to, the following and the requirements of the application:

1. Outlet boxes
2. Junction boxes
3. Pull boxes
4. Conduit bodies
5. Bushings
6. Locknuts
7. Knockout closures
8. Outdoor handholes
9. Outdoor manholes

PART 2 - PRODUCTS

2.1 FABRICATED MATERIALS

A. Outlet Boxes: Provide FS type outlet boxes and accessories where rigid galvanized conduits are used. All exterior pull boxes and junction boxes shall be NEMA 3R. Provide explosion proof boxes in classified locations per NFPA 70.

B. Outlet Box Accessories: Provide outlet box accessories as required for each installation, including mounting brackets, wallboard hangers, extension rings, fixture studs, cable clamps, and metal straps for supporting outlet boxes, which are compatible with outlet boxes being used and fulfilling requirements of individual wiring situations. Choice of accessories is Installer's option.

C. Available Manufacturers: Subject to compliance with requirements, manufacturers offering interior outlet boxes which may be incorporated in the work include, but are not limited to, the following:

1. Appleton Electric Co.
2. Crouse-Hinds Co.
3. RACO, Inc.

4. Steel City/Midland-Ross Corp.

D. Conduit Bodies: Provide galvanized cast-metal threaded conduit bodies, of type, shapes and sizes, to suit respective locations and installation, construct with threaded-conduit-entrance ends, removable covers, and corrosion-resistant screws.

E. Available Manufacturers: Subject to compliance with requirements, manufacturers offering conduit bodies which may be incorporated in the work include, but are not limited to, the following:

1. Appleton Electric Co.
2. Crouse-Hinds Co.
3. Thomas & Betts Co., Inc.

PART 3 - EXECUTION

3.1 INSTALLATION OF ELECTRICAL BOXES AND FITTINGS

A. General: Install electrical boxes and fittings where indicated, complying with manufacturer's written instructions, applicable requirements of NEC and NECA's "Standard of Installation", and in compliance with recognized industry practices to ensure that products fulfill requirements.

B. Coordinate installation of electrical boxes and fittings with wire/cable and raceway installation work.

C. Provide knockout closures to cap unused knockout holes where blanks have been removed.

D. Install boxes and conduit bodies in those locations to ensure ready accessibility of electrical wiring.

E. Avoid using round boxes where conduit must enter box through side of box, which would result in difficult and insecure connections when fastened with locknut or bushing on rounded surface.

F. Fasten boxes rigidly to substrates or structural surfaces to which attached, or solidly embedded electrical boxes in concrete or masonry.

G. Provide electrical connections for installed boxes.

H. Use cast metal outlets and device boxes for all exposed work outside.

I. Ground all metallic junction boxes by bonding to the system raceway grounding conductor. Ground the yoke or frame of all box mounted devices.

END OF SECTION

SECTION 26 05 53

ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Extent and type of electrical identification are indicated herein and as follows:

1. Operational instructions and warnings
2. Danger signs
3. Equipment/system identification signs
4. Conduit identification
5. Power and control wiring identification
6. Terminal marking

1.2 QUALITY ASSURANCE

A. Comply with ANSI A13.1 AND ANSI C2.

B. Comply with NFPA 70.

C. Comply with 29 CFT 1910.145.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering identification products which may be incorporated in the work include, but are not limited to, the following:

1. W. H. Brady Co.
2. Ideal Industries, Inc.
3. Seton Name Plate Co.

2.2 ELECTRICAL IDENTIFICATION MATERIALS

A. General: Except as otherwise indicated, provide manufacturer's standard products of categories and types required for each application. Where more than single type is specified for an application, selection is Installer's option, but provide single selection for each application.

B. Cable/Conductor Identification Bands: Provide manufacturer's standard vinyl-cloth self-adhesive cable/conductor markers of wrap-around type; either prenumbered plastic coated type, or write-on type with clear plastic self-adhesive cover flap; numbered to show circuit identification. Provide markers for all field control wiring.

C. Self-Adhesive Plastic Signs: Provide manufacturer's standard, self-adhesive or pressure-sensitive, pre-printed, flexible vinyl signs for operational instructions or warnings; of sizes suitable for application areas and adequate for visibility, with proper wording for each application (as examples: 208V, EXHAUST FAN).

1. Colors: unless otherwise indicated or required by governing regulations, provide orange signs with black lettering.

2. Mark the identification of all disconnect switches.

D. Engraved Plastic-Laminate Signs: Provide engraving stock melamine plastic Laminate, complying with FS L-P-387, in sizes and thicknesses indicated, engraved with engraver's standard letter style of sizes and wording indicated, black and white core (letter color) except as otherwise indicated, punched for mechanical fastening except where adhesive mounting is necessary because of substrate. Mark all panelboard and equipment panels.

E. Thickness: 1/16", for units up to 20 sq. in. or 8" length; 1/8" for larger units.

F. Fasteners: Self-tapping stainless steel screws, except contact-type permanent adhesive where screws cannot or should not penetrate substrate.

2.3 LETTERING AND GRAPHICS

A. General: Coordinate names, abbreviations and other designations used in electrical identification work, with corresponding designations shown, specified or scheduled. Provide numbers, lettering and working as indicated or, if not otherwise indicated, as recommended by manufacturers or as required for proper identification and operation/maintenance of electrical systems and equipment.

2.4 UNDERGROUND-LINE WARNING TAPE

A. Description: Permanent, bright-colored, continuous-printed, polyethylene tape.

1. Not less than 6 inches (150 mm) wide by 4 mils (0.102 mm) thick
2. Compounded for permanent direct-burial service
3. Embedded continuous metallic strip or core
4. Printed legend shall indicate type of underground line

2.5 WARNING LABELS AND SIGNS

A. Comply with NFPA 70 and 29 CFR 1910.145.

B. Self-Adhesive Warning Labels: Factory printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment, unless otherwise indicated.

C. Baked-Enamel Warning Signs: Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application. 1/4-inch (6.4 mm) grommets in corners for mounting. Nominal size, 7 by 10 inches (180 by 250 mm).

D. Metal-Backed, Butyrate Warning Signs: Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch (1 mm) galvanized-steel backing; and with colors, legend, and size required for application. 1/4-inch (6.4 mm) grommets in corners for mounting. Nominal size, 10 by 14 inches (250 by 360 mm).

E. Warning label and sign shall include, but are not limited to, the following legends:

1. Multiple Power Source Warning: “DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES.”

2. Workspace Clearance Warning: “WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES (915 MM).

PART 3 - EXECUTION

3.1 APPLICATION AND INSTALLATION

A. General installation requirements:

1. Coordination: Where identification is to be applied to surfaces which require finish, install identification after completion of painting.

2. Regulations: Comply with governing regulations and requests of governing authorities for identification of electrical work.

3. Conduit Identification: Where electrical conduit is exposed in spaces with exposed mechanical piping which is identified by a color-coded method, apply color-coded identification on electrical conduit in a manner similar to piping identification. Except as otherwise indicated, use orange as coded color for conduit.

4. Equipment/System Identifications: Install engraved plastic-laminate sign on each major unit of electrical equipment in building; including central or master unit of each electrical system including communication/signal

systems, unless unit is specified with its own self-explanatory identification or signal system. Except as otherwise indicated, provide single line of text, 1/2" high lettering on 1-1/2" high sign (2" high where 2 lines are required), white lettering in black field. Provide text matching terminology and numbering of the contract documents and shop drawings. Provide signs for each unit of the following categories of electrical work.

a. panelboards, electrical cabinets and enclosures, motor contorl centers
b. access panel/doors to electrical facilities
c. transformers
d. control stations
e. motor disconnects
f. telephone and communications switching equipment

5. Power-Circuit Conductor Identification: For primary and secondary conductors No. 6 AWG and larger in vaults, pull and junction boxes, manholes, and handholes use color-coding conductor tape. Identify source and circuit number of each set of conductors. For single conductor cables, identify phase in addition to the above.

6. Branch-Circuit Conductor and Receptacles Identification: Where there are conductors for more than three branch circuits in same junction or pull box, use write-on tags. Identify each ungrounded conductor according to source and circuit number.

7. Conductors to Be Extended in the Future: Attach write-on tags to conductors and list source and circuit number.

8. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, signal, sound, intercommunications, voice, and data connections.

   a. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.

   b. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.

   c. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and Operation and Maintenance Manual.

9. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable. Install underground-line warning tape for both direct-buried

cables and cables in raceway.

10. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Comply with 29 CFR 1910.145 and apply self-adhesive warning labels. Identify system voltage with black letters on an orange background. Apply to exterior of door, cover, or other access.

    a. Equipment with Multiple Power or Control Sources: Apply to door or cover of equipment including, but not limited to, the following:

        (1) power transfer switches
        (2) controls with external control power connections

    b. Equipment Requiring Workspace Clearance According to NFPA 70: Unless otherwise indicated, apply to door or cover of equipment but not on flush panelboards and similar equipment in finished spaces.

11. Instruction signs:

    a. Operating Instructions: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.

    b. Emergency Operating Instructions: Install instruction signs with white legend on a red background with minimum 3/8-inch-(10-mm-) high letters for emergency instructions at equipment used for power transfer.

B. Install signs at locations indicated or, where not otherwise indicated, at location for best convenience of viewing without interference with operation and maintenance of equipment. Secure to substrate with fasteners, except use adhesive where fasteners should not or cannot penetrate the substrate.

3.2 INSTALLATION

A. Verify identity of each item before installing identification products.

B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

C. Apply identification devices to surfaces that require finish after completing finish work.

D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.

E. Attach nonadhesive signs and plastic labels with screws and auxiliary hardware appropriate to the location and substrate.

F. System Identification Color Banding for Raceways and Cables: Each color band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.

G. Color-Coding for Phase and Voltage Level Identification, 600 V and Less: Use the colors listed below for ungrounded service, feeder, and branch-circuit conductors

1. Color shall be factory applied or, for sizes larger than No. 10 AWG if authorities having jurisdiction permit, field applied.

2. Colors for 208/120-V Circuits:

   a. phase A: black
   b. phase B: red
   c. phase C: blue

3. Colors for 480/277-V Circuits:

   a. phase A: brown
   b. phase B: orange
   c. phase C: yellow

4. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches (150 mm) from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

H. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches (150 to 200 mm) below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches (400 mm) overall.

END OF SECTION

SECTION 26 22 00

TRANSFORMERS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Extent of transformer work is indicated by drawings and schedules.

B. Types of transformers specified in this section include the following:

1. Dry-type transformers

1.2 QUALITY ASSURANCE

A. NEC Compliance: Comply with NEC as applicable to installation and construction of electrical power/distribution transformers.

B. NEMA Compliance: Comply with applicable portions of NEMA Std Pub Nos. TR 1 and TR 27 pertaining to power/distribution transformers.

C. ANSI Compliance: Comply with applicable ANSI standards pertaining to power/ distribution transformers.

D. ANSI/IEEE Compliance: Comply with applicable ANSI/IEEE standards pertaining to power/distribution transformers.

E. ANSI/NEMA Compliance: Comply with NEMA Std ST 20; "Dry-Type Transformers for General Applications".

F. ANSI/UL Compliance: Comply with applicable portions of ANSI/UL 506; "Safety Standard for Specialty Transformers".

G. UL Labels: Provide distribution transformers which have been UL-listed and labelled.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's technical product data including rated KVA, frequency, primary and secondary voltages, percent taps, polarity, impedance and certification of transformer performance efficiency at indicated loads, percentage regulation at 100% and 80% power factor, no-load and full-load losses in watts, % impedance at 75 degrees C hot-spot and average

temperature rise above 40 degrees C ambient, sound level in decibels, and standard published data.

B. Shop Drawings: Submit manufacturer's drawings indicating above data, dimensions, and weight loadings for transformer installations, showing layout, mountings and supports, spatial relationship to associated equipment, and transformer connections to electrical equipment.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

1. ACME Electric
2. Siemen
3. General Electric Company
4. Hevi-Duty Electric Div., General Signal Corp.
5. Square D Company
6. Sorgel Electric Div./Square D Co.
7. Westinghouse Electric Corp.

2.2 POWER/DISTRIBUTION TRANSFORMERS

A. General: Except as otherwise indicated, provide manufacturer's standard materials and components as indicated by published product information, designed and constructed as recommended by manufacturer, and as required for complete installation.

B. Dry-Type Distribution Transformers (below 45 KVA): Provide factory-assembled, general-purpose, ventilated, dry-type distribution transformers where shown; of sizes, characteristics, and rated capacities indicated; 3-phase, 60-hertz, 5.75% impedance insulation per NEMA ST20; with 480-volt delta-connected primaries; and 208/120 volt, 4 wires wye-connected secondaries with grounded neutral. Provide primary windings with 6 taps; two 2-1/2% increments above full-rated voltage and four 2-1/2% increments below full-rated voltage for de-energized tap-changing operation. Insulate with Class 220°C insulation. Rate transformer for continuous operation at rated KVA; limit transformer surface temperature rise to maximum of 115 degrees C. Provide terminal enclosure, with cover, to accommodate primary and secondary coil wiring connections and electrical supply raceway terminal connector. Provide terminal board with clamp type connectors. Limit terminal compartment temperature to 75 degrees C when transformer is operating continuously at rated load with ambient temperature of 40 degrees C. Provide wiring connections suitable for copper or aluminum

wiring. Integrally mount vibration isolation supports between core and coil assembly and transformer enclosure; electrically ground core and coils to transformer enclosure by means of flexible metal grounding strap. Do not exceed maximum sound-level rating of 45 db as determined in accordance with ANSI/NEMA standards. Provide transformers with fully-enclosed weather-resistant steel enclosures, and lifting lugs. Apply manufacturer's standard light grey outdoor enamel over cleaned and phosphatized steel enclosure. Provide transformers suitable for floor mounting. Install nonventilated NEMA 4XSS transformers as indicated on drawings.

C. Dry-Type Distribution Transformers (above 45 KVA): Provide factory-assembled, general-purpose, ventilated, dry-type distribution transformers where shown; of sizes, characteristics, and rated capacities indicated; 3-phase, 60-hertz, 5.75% impedance insulation per NEMA ST20; with 480-volt delta-connected primaries; and 208/120 volt, 4 wires wye-connected secondaries with grounded neutral. Provide primary windings with 6 taps; two 2-1/2% increments above full-rated voltage and four 2-1/2% increments below full-rated voltage for de-energized tap-changing operation. Insulate with Class 220°C insulation. Rate transformer for continuous operation at rated KVA; limit transformer winding temperature rise to maximum of 115 degrees C. Provide terminal enclosure, with cover, to accommodate primary and secondary coil wiring connections and electrical supply raceway terminal connector. Provide terminal board with clamp type connectors. Limit terminal compartment temperature to 75 degrees C when transformer is operating continuously at rated load with ambient temperature of 40 degrees C. Provide wiring connections suitable for copper or aluminum wiring. Integrally mount vibration isolation supports between core and coil assembly and transformer enclosure; electrically ground core and coils to transformer enclosure by means of flexible metal grounding strap. Provide transformers with fully-enclosed weather-resistant steel enclosures, and lifting lugs. Apply manufacturer's standard light grey outdoor enamel over cleaned and phosphatized steel enclosure. Provide transformers suitable for floor mounting.

D. Low-Sound-Level Requirements: Minimum of 3 dBA less than NEMA ST 20 standard sound levels when factory tested according to IEEE C57.12.91.

E. Transformers shall be compliant with NEMA TP-1 energy efficiency requirements per EPACT 2005/CFR 10 Part 431.

PART 3 - EXECUTION

3.1 INSTALLATION OF TRANSFORMERS

A. Install transformers as indicated, complying with manufacturer's written instructions, applicable requirements of NEC, NEMA, ANSI and IEEE standards, and in accordance with recognized industry practices to ensure that products

fulfill requirements.

B. Coordinate transformer installation work with electrical raceway and wire/cable work, as necessary for proper interface.

C. Install units on vibration mounts; comply with manufacturer's indicated installation method if any.

D. Connect transformer units to electrical wiring system; comply with requirements of other Electrical Work sections.

E. Verify that field measurements are as needed to maintain working clearances required by NFPA 70 and manufacturer's written instructions.

F. Examine walls and floors for suitable mounting conditions where transformers will be installed.

G. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install wall-mounting transformers level and plumb with wall brackets fabricated by transformer manufacturer.

1. Brace wall-mounting transformers as specified in Division 26 "Seismic Controls for Electrical Work."

B. Install floor-mounting transformers level on concrete bases. Construct concrete bases of dimensions indicated, but not less than 4 inches (100 mm) larger in both directors than supported unit and 4 inches (100 mm) high.

1. Anchor transformers to concrete bases according to manufacturer's written instructions, seismic codes at Project, and requirements in Division 26 Section "Seismic Controls for Electrical Work."

3.3 GROUNDING

A. Provide equipment grounding connections, sufficiently tight to assure permanent and effective ground. Provide a separately derived grounding point for each transformer. Extend grounding conductor to an earth electrode and building steel. Where available, connect to a cold water main.

3.4 TESTING

A. Upon completion of installation of transformers, energize primary circuit at rated voltage and frequency from normal power source and test transformers, including, but not limited to, audible sound levels, to demonstrate capability and compliance with requirements. Where possible, correct malfunctioning units at the site, then retest to demonstrate compliance; otherwise, remove and replace

with new units and proceed with retesting. Test voltage and connect tap setting for an acceptable no load voltage level.

END OF SECTION

SECTION 26 24 16

PANELBOARDS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Extent of panelboard and enclosure work, including cabinets and cutout boxes, is indicated by drawings and schedules.

B. Types of panelboards and enclosures in this section include the following:

1. Power-distribution panelboards

C. Refer to other Electrical work sections for cable/wire, connectors, and electrical raceway work required in conjunction with panelboards and enclosures; not work of this section.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Manufacturers: subject to compliance with requirements, provide products of one of the following (for each type of panelboard and enclosure):

1. General Electric Company
2. Siemens
3. Square D Company
4. Cutler-Hammer

2.2 PANELBOARDS

A. Except as otherwise indicated, provide panelboards, enclosures and ancillary components, of types, sizes, and ratings indicated, which comply with manufacturer's standard materials, design and construction in accordance with published product information. Equip with number of unit panelboard devices as required for complete installation. Where more than one type of component meets indicated requirements, selection is Installer's option. Where types, sizes, or ratings are not indicated, comply with NEC, UL, and established industry standards for applications indicated.

B. Power Distribution Panelboards: Provide dead-front safety type power

distribution panelboards as indicated, with panelboard switching and protective devices in quantities, ratings, types and with arrangement shown. Provide anti-turn solderless pressure type main lug connectors approved for copper conductors. Construct unit for connecting feeder at top or bottom of panel to suit application. Equip with copper full length bus bars and full-sized neutral bus. Provide suitable lugs on neutral bus for outgoing feeders requiring neutral connections. Provide molded-case main and branch circuit breaker types for each circuit, with toggle handles that indicate when tripped. Where multiple-pole breakers are indicated, provide with common trip so overload on one pole will trip all poles simultaneously. Provide a bare uninsulated grounding bar suitable for bolting to enclosure. Provide panelboards fabricated by same manufacturer as enclosures and which mate properly with enclosures.

C. Panelboard enclosures: Provide galvanized sheet steel cabinet type enclosures, in sizes and NEMA types as indicated, code-gage minimum 16-gauge thickness. Construct with multiple knockouts and wiring gutters. Provide fronts with adjustable indicating trim clamps, and doors with flush lock and keys. All panelboard enclosures keyed alike with concealed door hinges and door swings as indicated. Provide door-in-door construction. Equip with interior circuit-directory frame and card with clear plastic covering. Provide baked grey enamel finish over a rust inhibitor. Design enclosure for recessed or surface mounting as indicated. Provide enclosures fabricated by same manufacturer as panelboards and which mate properly with panelboards to be enclosed. Provide panels for 208Y/120-Volt or 480Y/277-Volt service as determined for the use. Wet location panelboards shall be NEMA 4 enclosures.

D. Panelboard accessories: Provide panelboard accessories and devices including, but not necessarily limited to; cartridge and plug time-delay type fuses, circuit breakers, ground-fault protection units, etc., as recommended by panelboard manufacturer for ratings and applications indicated. Provide extra gutter space, split-bus, contactor space, and circuit breaker arrangement to accommodate the energy management system described in other specifications. Provide suitable enclosure space to accommodate time clock, relays, contactors, and control items as shown on the drawings. The separate space shall be under a separate door located at the top of the panel with locking provisions.

PART 3 - EXECUTION

3.1 INSTALLATION OF PANELBOARDS

A. Install panelboards and enclosures where indicated in accordance with manufacturer's written instructions, applicable requirements of NEC and NECA's "Standard of Installation", and in compliance with recognized industry practices to ensure that products fulfill requirements.

B. Coordinate installation of panelboards and enclosures with cable and raceway installation work.

C. Anchor enclosures firmly to walls and structural surfaces, ensuring that they are permanently and mechanically secure.

D. Provide electrical connections within enclosures.

E. Fill out panelboard’s circuit directory card upon completion of installation work. Directory shall be type-written.

F. Provide 6-each empty 3/4" conduits stubbed out above ceiling from all recessed panelboards.

END OF SECTION

SECTION 26 27 26

WIRING DEVICES

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. The extent of wiring device work is indicated by drawings and schedules. Wiring devices are defined as single discrete units of electrical distribution systems which are intended to carry but not utilize electric energy.

B. Types of electrical wiring devices in this section include the following:

1. Receptacles
2. Switches
3. Wall plates
4. Plugs
5. Plug connectors

1.2 COORDINATION

A. Receptacles shall match plug configurations for owner-furnished equipment.

B. Provide cord and plug sets to match equipment requirements.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

1. Bryant Electric Co.
2. Eagle Manufacturing
3. Harvey Hubbell Inc.
4. Pass and Seymour Inc.
5. Leviton Manufacturing
6. Wiremold Company

2.2 FABRICATED WIRING DEVICES

A. General: Provide factory-fabricated wiring devices, in types, colors, and electrical ratings for applications indicated and complying with NEMA Stds pub No. WD 1, NEMAWD6, UL498, and DSCC W-C5966. Where types and grades are not indicated, provide proper selection as determined by Installer to fulfill wiring requirements, and complying with NEC and NEMA standards for wiring devices. Wiring devices other than those listed shall be of the type and rating required for service.

B. Receptacles:

Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, and FS W-C-596.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Cooper; 5351 (single), CR5362 (duplex)
    b. Hubbell; HBL5351 (single), HBL5352 (duplex)
    c. Leviton: 5891 (single), 5352 (duplex)
    d. Pass & Seymour; 5361 (single), 5362 (duplex)

C. GFCI Receptacles

General Description:

1. Straight blade, feed-through type.
2. Comply with NEMA WD 1, NEMA WD 6, UL 498, UL 943 Class A, and FS W-C-596.
3. Include indicator light that shows when the GFCI has malfunctioned and no longer provides proper GFCI protection.

Weather-Resistant GFCI Convenience Receptacles, 125V, 20A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498 Supplement sd, and FS W-C-596.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Cooper; WRVGF20.
    b. Hubbell; GFTR20.
    c. Pass & Seymour; 2095TRWR.

D. Switches

1. Single Pole: General use snap switch rated 20 amp, 120/277 volt, (red face), side wired, screw terminals. Bryant Cat. No. 4901-I, or equal by Hubbell, P & S, Leviton, or Eagle.

2. Double Pole: General use snap switch rated 20 amp, 120/277 volt, (red face), side wired, screw terminals. Bryant Cat. No. 4902-1, or equal by Hubbell, P & S, Leviton or Eagle.

3. Three Way: General use snap switch rated 20 amp, 120/277 volt, (red face), side wired, screw terminals. Bryant Cat. No. 4903-I, or equal by Hubbell, P & S, Leviton or Eagle.

4. Four Way: General use snap switch rated 20 amp, 120/277 volt, (red face), side wired, screw terminals. Bryant Cat. No. 4904-I, or equal by Hubbell, P & S, Leviton, or Eagle.

5. Single Pole With 277 Volt Pilot Light: Special application snap switch rated 20 amp, 277 volt, (red face), clear handle with red pilot light, side wired, screw terminals. Bryant Cat. No. 4901 PLR277, or equal by Hubbell, Leviton, P & S., or Eagle.

6. Single Pole With 120 Volt Pilot Light: Special application snap switch rated 20 amp, 120 volt, (red face), clear handle with red pilot light, side wired, screw terminals. Bryant Cat. No. 4901PLR120, or equal by Hubbell, Leviton, P. & S., or Eagle.

E. Pendant cord/connector devices

1. Description: Matching, locking-type plug and receptacle body connector, NEMA WD6, Configurations L5-20P and L5-20R, Heavy-Duty grade.

   (a) Body: Nylon with screw-open cable-gripping jaws and provisions for attaching external cable grip.

   (b) External Cable Grip: Woven wire-mesh type made of high-strength galvanized-steel wire stand, matched to cable diameter, and with attachment provision designed for corresponding connector.

F. Cord and plug sets

1. Description: Match voltage and current ratings and number of conductors to requirements of equipment being connected.

2. Cord: Rubber-insulated, stranded-copper conductors, with Type SOW-A jacket; with green-insulated grounding conductor and equipment-rating

ampacity plus a minimum of 30 percent.

3. Plug: Nylon body and integral cable-clamping jaws. Match cord and receptacle type for connection.

2.3 WIRING DEVICE ACCESSORIES

A. Wall Plates: Provide single-switch and duplex outlet wall plates for wiring devices, of types, sizes, and with ganging and cutouts as indicated. Construct with metal screws for securing plates to devices; screw heads colored to match finish of plates; plate color shall match wiring devices. Provide wall plates possessing the following additional construction features:

1. Receptacle Wall Plates: Molded high impact nylon, smooth finish. Bryant Series 88000, or equal by Hubbell, Leviton, P & S, or Eagle.

2. Switch Wall Plates: Molded high impact nylon, smooth finish. Bryant Series 88000, or equal by Hubbell, Leviton, P & S, or Eagle.

PART 3 - EXECUTION

3.1 INSTALLATION OF WIRING DEVICES

A. Install wiring devices as indicated, in compliance with manufacturer's written instructions, applicable requirements of NEC and NECA's "Standard of Installation", and in accordance with recognized industry practices to fulfill project requirements.

B. Coordinate with other work, including painting, electrical box and wiring work, as necessary to interface installation of wiring devices with other work.

C. Install wiring devices only in electrical boxes which are clean; free from excess building materials, dirt, and debris.

D. Install galvanized steel wall plates in unfinished spaces.

E. Delay installation of wiring devices until wiring work is completed.

F. Delay installation of wall plates until after painting work is completed.

G. Adjust location of service poles to suit arrangement of partitions and furnishings.

3.2 PROTECTION OF WALL PLATES AND RECEPTACLES

A. Upon installation of wall plates and receptacles, advise Contractor regarding

proper and cautious use of convenience outlets. At time of Substantial completion, replace those items which have been damaged, including those burned and scored by faulty plugs.

3.3 GROUNDING

A. Provide electrically continuous, tight grounding connections for wiring devices, unless otherwise indicated.

3.4 TESTING

A. Prior to energizing circuitry, test wiring devices for electrical continuity and proper polarity connections. After energizing circuitry, test wiring of devices to demonstrated compliance with requirements.

END OF SECTION

SECTION 26 28 12

MOTOR AND CIRCUIT DISCONNECTS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Extent of motor and circuit disconnect switch work is indicated by drawings, schedules, and code requirements. Types of motor and circuit disconnect switches in this section including the following:

1. Equipment disconnects
2. Appliance disconnects
3. Motor-circuit disconnects

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

1. General Electric Co.
2. Siemens
3. Square D Company
4. Cutler-Hammer

2.2 FABRICATED SWITCHES

A. Heavy-Duty Safety Switches: Provide surface-mounted, heavy-duty type, sheet steel enclosed safety switches, of types, sizes and electrical characteristics indicated; fusible type, rated 240 volts or 600 volts, 400 amperes and below, 60 hertz, 3-blades, 4-poles, solid neutral; incorporating quick-make, quick-break type switches; so construct that switch blades are visible in OFF position with door open. Equip with operating handle which is integral part of enclosure base and whose position is easily recognizable, and is padlockable in OFF position; construct current carrying parts of high-conductivity copper, with silver-tungsten type switch contacts, and positive pressure type reinforced fuse clips. Provide NEMA type 3R enclosure for outdoor.

B. Fuses: Provide fuses for safety switches, as recommended by switch manufacturer, of classes, types, and ratings needed to fulfill electrical

requirements for service indicated. Provide fuses to match equipment label requirements when fuse information is furnished as part of the equipment label.

PART 3 - EXECUTION

3.1 INSTALLATION OF MOTOR AND CIRCUIT DISCONNECT SWITCHES

A. Install motor and circuit disconnect switches where required by code, complying with manufacturer's written instructions, applicable requirements of NEC, NEMA, and NECA's "Standard of Installation", and in accordance with recognized industry practices to ensure that products fulfill requirements.

B. Coordinate motor and circuit disconnect switch installation work with electrical raceway and cable work, as necessary for proper interface.

C. Install disconnect switches used with motor-driven appliances, and motors and controllers within sight of controller position unless otherwise indicated.

D. Mount disconnect switches securely. Use stainless steel or silicon bronze fasteners for mounting outdoor switches.

E. Where building walls or equipment frames do not provide suitable mounting surface, provide galvanized unistrut frames or racks which will securely support the disconnect switch. Indoor frames may be painted unistrut frames.

END OF SECTION

SECTION 26 28 16

OVERCURRENT PROTECTIVE DEVICES

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Extent of overcurrent protective device work is indicated by drawings, schedules, and code requirements.

B. Types of overcurrent protective devices in this section include the following:

1. Circuit breakers
2. Fuses

C. Provide overcurrent protection for all electrical work.

D. Maintenance Stock, Fuses: For types and ratings required, furnish additional fuses, amounting to one unit for every 5 installed units, but not less than one unit of each.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

1. Circuit breakers:

a. General Electric Co.
b. Siemens
c. Square D Company
d. Cutler-Hammer

2. Fuses:

a. Bussman Mfg. Co.
b. Littelfuse Co.

2.2 CIRCUIT BREAKERS

A. General: Except as otherwise indicated, provide circuit breakers and ancillary components, of types, sizes, ratings and electrical characteristics indicated or required, which comply with manufacturer's standard design, materials, components, and construction in accordance with published product information, and as required for a complete installation.

B. Molded-Case Circuit Breakers: Provide factory-assembled, molded-case circuit breakers amperes rated as indicated on the drawings, 600-Volts for 480-Volt system and 240-Volts for 208-Volt system, 60 HZ, 3-pole or single-pole as indicated with RMS symmetrical interrupting ratings as required by the application and location within the distribution system. Provide breakers with permanent thermal and instantaneous magnetic trips in each pole, ampere ratings as indicated. Construct with overcenter, trip-free, toggle type operating mechanisms with quick-make, quick-break action and positive handle indication. Provide push-to-trip button on cover for mechanically tripping circuit breakers. Construct breakers for mounting and operating in any physical position and in an ambient temperature of 40 C. Provide with mechanical screw type removable connector lugs, AL/CU rated.

2.3 FUSES

A. General: Except as otherwise indicated, provide fuses of types, sizes and ratings and electrical characteristics indicated or required, which comply with manufacturer's standard design, materials, and construction in accordance with published product information, and with industry standards and configurations.

B. Class L Fuses: Provide NEMA Class L fuses in current ratings indicated or required, for service entrances and main and feeder circuits.

C. Class J (K-5) Fuses: Provide NEMA Class J (K-5), dual-element types, with time delay of 10 seconds at 500% of rating, for use with switches.

D. Where equipment nameplate requires a specific fuse, the required fuse shall be furnished.

PART 3 - EXECUTION

3.1 INSTALLATION OF OVERCURRENT PROTECTIVE DEVICES

A. Install overcurrent protective devices as indicated or required, in accordance with the manufacturer's written instructions and with recognized industry practices to ensure that protective devices comply with requirements. Comply with NEC and NEMA standards for installation and application of overcurrent protective devices.

B. Coordinate with other work, including electrical wiring work, as necessary to interface installation of overcurrent protective devices with other work.

C. Fasten circuit breakers without mechanical stresses, twisting or misalignment being exerted by clamps, supports, or cables.

D. Set field-adjustable circuit breakers for trip settings as indicated, subsequent to installation of devices.

E. Install fuses, if any, in fused circuit breakers and fused disconnect switches.

3.2 ADJUST AND CLEAN

A. Inspect circuit-breaker operating mechanisms for malfunctioning and, where necessary, adjust units for free mechanical movement.

3.3 FIELD QUALITY CONTROL

A. Prior to energization of overcurrent protective devices, test devices for continuity of circuitry and for short-circuits. Correct malfunctioning units, and then demonstrate compliance with requirements.

END OF SECTION

SECTION 31 1100

SITE CLEARING

1. GENERAL

1.1. SUMMARY

A. This section includes the following:

1. Protection of existing trees.
2. Removal of trees and other vegetation.
3. Topsoil stripping.
4. Clearing and grubbing.
5. Removing above-grade improvements.
6. Removing below-grade improvements.

1.2. RELATED DOCUMENTS

A. Drawings and general provisions of Contract apply to this section.

1.3. PROJECT CONDITIONS

A. Traffic. Conduct site clearing operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks, or other occupied or used facilities without permission from authorities having jurisdiction.

B. Protection of Existing Improvements. Provide protections necessary to prevent damage to existing improvements indicated to remain in place.

1. Protect improvements on adjoining properties and on Owner's property.

2. Restore damaged improvements to their original condition, as acceptable to property owners.

C. Protection of Existing Trees and Vegetation. For existing trees and other vegetation indicated to remain in place, protect against unnecessary cutting, breaking, or skinning of roots; skinning or bruising of bark; smothering of trees by stockpiling construction materials or excavated materials within drip line; excess foot or vehicular traffic; or parking of vehicles within drip line. Provide temporary guards to protect trees and vegetation to be left standing.

2. PRODUCTS (Not Applicable)

3. EXECUTION

3.1. SITE CLEARING

A. General. Remove trees, shrubs, grass, and other vegetation, improvements, or obstructions as required to permit installation of new construction. Remove similar items elsewhere on-site or premises as specifically indicated. "Removal" includes digging out and disposing of stumps and roots. Stumps and roots may be buried on- site at spoil location noted on Drawings. Other areas may also be used upon approval of the Engineer.

1. Cut minor roots and branches of trees indicated to remain in a clean and careful manner, where such roots and branches obstruct installation of new construction.

B. Topsoil. Topsoil is defined as friable clay loam surface soil found in a depth of not less than 4 inches. Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones, and other objects over 2 inches in diameter, and without weeds, roots, and other objectionable material.

1. Strip topsoil to whatever depths encountered in a manner to prevent intermingling with underlying subsoil or other objectionable material.

   a. Remove heavy growths of grass from areas before stripping.
   b. Where existing trees are indicated to remain, leave existing topsoil in place
      within drip lines to prevent damage to root system.

2. Stockpile topsoil in storage piles in areas indicated or directed. Construct storage piles to provide free drainage of surface water. Cover storage piles, if required, to prevent wind erosion.

C. Clearing and Grubbing. Clear site of trees, shrubs, and other vegetation, except for those indicated to be left standing.

1. Completely remove stumps, roots, and other debris protruding through ground surface.

2. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.

   a. Place fill material in horizontal layers not exceeding 6 inches loose depth, and thoroughly compact to density equal to adjacent original ground.

D. Burning on Owner's Property. Burning will be permitted only at designated areas and times directed by Owner. Provide full-time monitoring of burning materials until fires are extinguished. Obtain all state and local permits required for burning and comply with all state and local codes.

END OF SECTION

SECTION 31 2000

EARTHWORK

1. GENERAL

1.1 SCOPE

A. This section includes earthwork and related operations, including but not limited to clearing and grubbing the construction site; dewatering; excavating all classes of material encountered; pumping, draining, and handling of water encountered in the excavations; handling, storage, transportation, and disposal of all excavated and unsuitable material; construction of fills and embankments; backfilling around structures and pipe; backfilling all trenches and pits; compacting; all sheeting, shoring, and bracing; preparation of subgrades; surfacing and grading; and any other similar, incidental, or appurtenant earthwork operation which may be necessary to properly complete the work.

B. Provide all services, labor, materials, and equipment required for all earthwork and related operations necessary or convenient to the Contractor for furnishing a complete work as shown on the Drawings or specified in these Contract Documents.

1.2 GENERAL

A. The elevations shown on the Drawings as existing are taken from the best available data and are intended to give reasonable, accurate information about the existing elevations. They are not precise, and the Contractor should satisfy himself as to the exact quantities of excavation and fill required.

B. Perform earthwork operations in a safe and proper manner taking appropriate precautions against all hazards.

C. Maintain in good condition at all times all excavated and fill areas for structures, trenches, fills, topsoil areas, embankments, and channels until final acceptance by the Owner. Repair all damage caused by erosion or other construction operations using material of the same type as the damaged materials.

D. If soil borings are available for the area of this work, they will be on file at the Owner's address where they will be made available for review or may be included as an appendix to these Specifications. This information is made available for such use as Contractor may choose to make of it in the preparation of his bid, but the Owner gives no guarantee, either expressed or implied, that it represents a true or complete cross section of all of the

material to be encountered in performing the excavation and earthwork on this project.

E. Earthwork operations within the rights-of-way of the State Department of Transportation, the County Road Department, and the respective cities shall be conducted in accordance with the requirements and provisions of the permits issued by those agencies for the construction within their respective rights-of-way. Such requirements and provisions, where applicable, shall take precedence over and supersede the provisions of these Specifications.

F. Control grading to prevent water running into excavations. Obstruction of surface drainage shall be avoided and a means shall be provided whereby storm water can be uninterrupted in existing gutters, other surface drains, or temporary drains. Material for backfill or for protection of excavation in public roads from surface drainage shall be neatly placed and kept shaped so as to cause the least possible interference with public travel. Free access must be provided to all fire hydrants, valves, meters, and private drives.

G. No classification of excavated materials will be made and no separate payment for rock removal shall be allowed. Excavation and trenching work shall include the removal and subsequent handling of all materials excavated or otherwise removed in performance of the contract work, regardless of the type, character, composition, or condition thereof, no separate payment shall be allowed.

H. Tests for compaction and density shall be conducted through the Contractor by an independent testing laboratory selected by him and acceptable to the Engineer. Costs of compaction tests performed by an independent testing laboratory shall be paid for directly by the Contractor. Make all necessary excavations and supply any samples of materials necessary for conducting compaction and density tests. Pay the cost of all retests made necessary by the failure of materials to conform to the requirements of these Contract Documents.

I. All earthwork operations shall comply with the requirements of OSHA Construction Standards, Part 1926, Subpart P, "Excavations, Trenching, and Shoring," and Subpart O, "Motor Vehicles, Mechanized Equipment, and Marine Operations," and shall be conducted in a manner acceptable to the Engineer.

J. It is understood and agreed that a thorough investigation by the Contractor has been made of the surface and subsurface conditions of the site and any special construction problems which might arise as a result of nearby watercourses and floodplains, particularly in areas where construction activities may encounter water-bearing sands and gravels or limestone solution channels. Provide all services, labor, equipment, and materials necessary or convenient for completing the work.

2. PRODUCTS (Not applicable)

3. EXECUTION

3.1 INITIAL SITE PREPARATION

A. Preparatory to beginning construction operations, remove from the site all vegetative growth, trees, brush, stumps, roots, debris, and any other objectionable matter, including fences, buildings, and other structures shown on the Drawings in the construction areas which are designated for removal or which, if left in place, would interfere with the proper performance or completion of the contemplated work, would impair its subsequent use, or would form obstructions therein.

B. Grub and remove stumps and roots to a depth not less than 5 feet below grade. Fill all holes or cavities which extend below the subgrade elevation of the proposed work with compacted layers of crushed rock or earth backfill conforming to the requirements specified here for backfill. Do not incorporate organic material from clearing operations in excavation backfill or embankment material.

C. Exercise special precautions for the protection and preservation of trees, cultivated shrubs, sod, fences, buildings, and other structures located in the construction area but not within designated clearing limits as shown on the Drawings or within the limits of embankments, excavations, or proposed structures. Repair or replace any of the aforementioned items damaged by Contractor's operation or construction activities.

D. Remove and dispose of any excess material resulting from clearing or site preparation operations. Dispose of such materials in a manner acceptable to the Engineer and at an approved location where such materials can be lawfully placed.

3.2 DEWATERING

A. Provide and maintain at all times during construction ample means and devices with which to promptly remove and properly dispose of all water from any source entering the excavations or other parts of the work. Dewatering shall be accomplished by methods which will ensure a dry excavation and preservation of the final lines and grades of the bottoms of excavations. Methods of dewatering may include sump pumps, well points, deep wells, or other suitable methods which do not damage or weaken structures, foundations, or subgrades. Shallow excavations may be dewatered using open ditches, provided such ditches are kept open and free-draining at all times. The actual dewatering methods used shall be acceptable to the Engineer.

B. Do not place concrete or mortar in water nor allow water to rise over newly placed concrete or mortar for at least 24 hours after placement, unless specifically authorized by the Engineer. No concrete structure shall be exposed to unequal hydrostatic forces until the concrete has reached its specified 28-day strength. Do not allow water to rise above bedding during pipe-laying operations. Exercise care to prevent damage to pipelines or structures resulting from flotation, undermining, or scour. Dewatering operations shall commence when ground or surface water is first encountered and shall be continuous until water can safely be allowed to rise in accordance with the provisions of this section. Protect excavations from the entrance of surface water to the extent possible by the use of dikes and/or covers.

C. Standby pumping equipment shall be on the jobsite. A minimum of 1 standby unit (a minimum of 1 for each 10 in the event well points are used) shall be available for immediate installation should any pumping unit fail. The design and installation of well points or deep wells shall be suitable for the accomplishment of the work. Submit drawings or diagrams on proposed well point or deep well dewatering systems to the Engineer for review.

D. If foundation soils are disturbed or loosened by the upward seepage of water or an uncontrolled flow of water, excavate and replace the affected areas with crushed rock at no cost to the Owner.

E. Dispose of the water from the work in a suitable manner without damage to adjacent property. Conveyance of the water shall not interfere with traffic flow or treatment facilities operation. Do not drain water into work built or under construction without prior consent of the Engineer. The Contractor will be held responsible for the condition of any pipe or conduit which he may use for drainage purposes, and all such pipes or conduits shall be left clean and free of sediment.

F. Provide sedimentation and desilting basins as necessary or when directed by the Engineer to prevent the entrance of excessive or injurious amounts of sand and silt from surface runoff or dewatering operations into storm drains or receiving waters. The system used for desanding or desilting the water shall be a baffled structure and shall provide not less than 5 minutes detention time and shall be designed to have a "flow-through" velocity not exceeding 0.2 foot per second at the anticipated peak flow. The method of desanding or desilting and the point of disposal shall be subject to the approval of the Engineer.

G. Dispose of water safely and in accordance with applicable Environmental Protection Agency, U.S. Army Corps of Engineers, and State Water Quality Control Division standards and permits.

3.3 SHEETING, SHORING, AND BRACING

A. The sides of all excavations shall be sufficiently sheeted, shored, and braced as necessary to prevent slides, cave-ins, settlement, or movement of the banks; to maintain the excavation clear of all obstructions; and to provide safe working conditions. Wood or steel sheeting shall be used in wet, saturated, or flowing ground. All sheeting, shoring, and bracing shall have sufficient strength and rigidity to withstand the pressure exerted and to maintain shape and position under all circumstances.

B. Correctly assessing the need for sheeting, analyzing the stresses induced, and maintaining regulatory compliances shall be totally the responsibility of the Contractor. Since the Engineer does not dictate or determine the Contractor's sequence or limits of excavation, the Engineer assumes no responsibility for sheeting and shoring. The Contractor must employ or otherwise provide for adequate professional structural and geotechnical engineering supervision to assess the need for sheeting and shoring and design same. Results of sheeting and shoring analysis and design shall be submitted to the Engineer on request.

C. Excavations adjacent to existing or proposed buildings and structures, or in paved streets or alleys, shall be sheeted, shored, and braced adequately to prevent undermining beneath or subsequent settlement of such structures or pavements. Underpinning of adjacent structures shall be done when necessary to maintain structures in safe condition. Any damage to structures or pavements occurring through settlements, water or earth pressures, slides, caves, or other causes due to failure or lack of sheeting or bracing, or improper bracing or occurring through negligence or fault of the Contractor in any other manner shall be repaired by the Contractor at his own expense.

D. Sheeting, shoring, or bracing materials shall not be left in place unless otherwise specified or shown on the Drawings or ordered by the Engineer in writing. Such materials shall be removed in such manner that no danger or damage will occur to new or existing structures or property, public or private, and so that cave-ins or slides will not take place. Trench sheeting shall be left in place until backfill has been brought to a level 12 inches above the top of the pipe. It shall then be cut off and the upper portion removed. Sheeting for structures shall be left in place until backfill has been brought to a level 12 inches above the top of the bottom footing. It shall then be cut off and the upper portion removed.

E. All holes and voids left in the work by the removal of sheeting, shoring, or bracing shall be filled and thoroughly compacted.

3.4 EXCAVATION

A. General

1. Excavation shall include the removal of all material from an area necessary for the construction of a pipeline or structure. Excavations shall provide adequate working space and clearances for the work to be performed therein.

2. All material excavated below the bottom of concrete walls, footings, and foundations shall be replaced, by and at the expense of the Contractor, with Class B concrete to the lines and grades shown on the Drawings, except where otherwise shown on the Drawings, specified herein, or authorized by the Engineer.

3. Where quicksand, soft clay, spongy or swampy earth, or other materials unsuitable for subgrade or foundation purposes are encountered below the excavation limits, they shall be removed and disposed of to the level of suitable material. Areas so excavated shall be backfilled with Class B concrete or with compacted layers of crushed rock, sand, or other approved material conforming to the requirements specified herein for backfill to the lines and grades shown on the Drawings.

4. Place barriers at each end of all excavation and at such places as may be necessary along excavations to warn all pedestrian and vehicular traffic of such excavations. Place lights along excavations from sunset each day to sunrise of the next day until the excavations are backfilled. Barricade all excavations in such a manner as to prevent persons from falling or walking into any excavation.

B. Rock Excavation

1. Rock encountered in the process of excavation for structures shall be uncovered and stripped of all loose materials over the entire limits of excavation.

2. Rock encountered for removal in a trench section shall be uncovered for a distance of not less than 50 feet.

3. Excavate rock and large boulders in trenches over the horizontal limits of excavation and to depths as shown on the Drawings.

4. Backfill the space below grade for pipelines to the proper grade with compacted layers of crushed rock or sand conforming to the requirements specified herein for backfill. Where pipe sewers are constructed on concrete cradles, excavate rock to the bottom of the cradle as shown on the Drawings.

5. Excavate rock under structures to lines and grades shown on the Drawings. Unless specified otherwise, where rock excavation has been carried below grade, the Contractor shall backfill to grade with Class B concrete at his own expense.

6. Where rock foundation is obtained at grade for over 50 percent of the area of any one structure, the portion of the foundation that is not rock shall be excavated below grade to reach a satisfactory foundation of rock. The portion below grade shall be backfilled with Class B concrete.

7. Where rock foundation is obtained at grade for less than 50 percent of any one structure and satisfactory rock cannot be found over the remaining area by reasonable additional excavation, the rock shall be removed for a depth of 12 inches below grade and the space below grade shall be backfilled to the proper grade with compacted layers of crushed rock conforming to the requirements specified herein for backfill.

8. Drilling and blasting operations, if allowed, shall be conducted with due regard for the safety of persons and property in the vicinity and in strict conformity with requirements of all ordinances, laws, and regulations governing blasting and the use of explosives. Conduct rock excavation near existing pipelines or other structures with the utmost care to avoid damage. Promptly repair injury or damage to other structures and properties to the satisfaction of the Owner by the Contractor at his own expense. The Contractor is advised to hire qualified consultants to perform a "pre-blast survey" in area where damage could occur due to blasting; all expenses for such survey must be borne by the Contractor, and no separate payment for same will be made.

9. Complete rock excavation for all structures and adjacent trenches under this Contract and any other rock excavation directed by the Engineer before construction of any structure is started in the vicinity.

C. Borrow Excavation

1. Wherever the backfill of excavated areas or the placement of embankments or other fills requires specified material not available at the site or material in excess of suitable material available from the authorized excavations, such materials shall be obtained from other sources. This may require the opening of borrow pits at points not immediately accessible from the work. In such cases make suitable arrangements with the property owner and pay all costs incident to the borrowed material including royalties, if any, for the use of the material. Before a borrow pit is opened, the quality and suitability of the material to be obtained therefrom shall be approved by the Engineer.

2. Borrow pits shall be cleared, grubbed, and finish-graded in accordance with the requirements specified herein.

D. Roadway Excavation. Roadway excavation shall consist of excavation for roadways and parking areas in conformity with lines, grades, cross sections, and dimensions shown on the Drawings. After shaping to line, grade, and cross section, the subgrade shall be rolled until compacted to a

depth of at least 6 inches to 100 percent of the maximum density at optimum water content as determined by AASHTO T99, Method A. This operation shall include any reshaping and wetting required to obtain proper compaction. All soft or otherwise unsuitable material shall be removed and replaced with suitable material.

E. Trench Excavation

1. Trench excavation shall consist of the removal of materials necessary for the construction of water, sewer, and other pipelines and all appurtenant facilities including manholes, inlets, outlets, headwalls, collars, concrete saddles, piers, and pipe protection called for on the Drawings.

2. Excavation for pipelines shall be made in open cut unless shown otherwise on the Drawings. Trenches shall be cut true to the lines and grades shown on the Drawings or established by the Engineer on the ground. The banks of trenches shall be cut in vertical, parallel planes equidistant from the pipe centerline. From an elevation 12 inches above the top of the pipe to the bottom of the trench, the horizontal distances between vertical planes for different sizes of pipe shall not exceed those shown on the Drawings. When sheeting is used, the width of the trench shall be considered as the distance between the inside faces of the sheeting. The bottom of the trench shall be cut carefully to the required grade of the pipe except where bedding materials or cradles are shown, in which case the excavation shall extend to the bottom of the bedding or cradles as shown on the Drawings. Minimum pipe cover shall be as shown on the Drawings or specified in these Contract Documents.

3. Unless specified elsewhere herein or shown on the Drawings, the minimum trench width shall be the diameter of the pipe plus 12-inches clear space on each side. Unless specified elsewhere herein or shown on the drawings, the minimum cover over the top of the pipe shall be 30-inches.

4. The use of a motor-powered trenching or sawing machine will be permitted, but full responsibility for the preservation, replacement, and/or repair of damage to any existing utility services and private property shall rest solely with the Contractor. Tailings from rock trenching shall not be used as pipe embedment or backfill and shall be disposed of by the Contractor.

5. Bell holes for bell and spigot pipe and/or mechanical joint pipe shall be excavated at proper intervals so the barrel of the pipe will rest for its entire length upon the bottom of the trench. Bell holes shall be large enough to permit proper installation of all joints in the pipe. Bell holes shall not be excavated more than 10 joints ahead of pipe laying. No part of any bell or coupling shall be in contact with the trench bottom, trench walls, or granular embedment when the pipe is jointed.

6. Excavation for manholes, outlets, collars, saddles, piers, and other pipeline structures shall conform to the additional requirements specified herein for structural excavation.

7. Pipe trenches shall not be excavated more than 400 feet in advance of pipe laying and all work shall be performed to cause the least possible inconvenience to the public. Adequate temporary bridges or crossings shall be constructed and maintained where required to permit uninterrupted vehicular and pedestrian traffic.

8. Wherever pipe trenches are excavated below the elevation shown on the Drawings, the Contractor, at his own expense, shall fill the void thus made at the proper grade with Class B concrete or with compacted layers of crushed rock or sand conforming to the requirements specified herein for backfill, unless otherwise specified herein or shown on the Drawings.

9. In all cases where materials are deposited along open trenches, they shall be placed so that no damage will result to the work and/or adjacent property in case of rain or other surface wash.

F. Structural Excavation

1. Structural excavation shall consist of the removal of all materials necessary for the construction of structures, including tanks, foundations, footings, wet wells, dry wells, box culverts, flumes, channels, buildings, and other miscellaneous structures.

2. The bottoms of structural excavations shall be true to the lines and grades shown on the Drawings. Faces of excavations shall not be undercut for extended footings. Except as provided herein for excavation of unsuitable material or rock, where the excavation is carried below the subgrade elevation shown on the Drawings, the Contractor shall backfill the void thus made to the proper grade with Class B concrete at his own expense.

3.5 BACKFILLING

A. Materials for backfilling shall conform to the following requirements or as specifically noted on the drawing:

1. Select Earth Backfill: Fine, sound, loose earth containing optimum moisture content for compaction to 90 percent of maximum density, free from all wood, vegetable matter, debris, and other objectionable material, and having scattered clods, stones, or broken concrete less than 1 1/2-inches in maximum dimension except that the maximum particle size shall be 3/4-inch when used with PVC or other flexible thermoplastic pipe.

2. Common Earth Backfill: Sound, loose earth containing optimum moisture content for compaction to 90 percent of maximum density, free from all wood, vegetable matter, debris, and other objectionable material, and having scattered clods, stones, or broken concrete and pavement less than 6 inches in maximum dimension.

3. Sand: Natural or imported sand conforming to ASTM D 1073.

4. Crushed Stone: Washed size 67 stone as noted or specified herein.

5. Class B Concrete: Class B concrete as specified elsewhere in these Specifications or on the Drawings.

B. General

1. Earth backfill shall be compacted to not less than 90 percent of the maximum density as determined by ASTM D 698 at a moisture content within 3 percentage points, unless otherwise specified herein. Crushed stone and sand shall be compacted to not less than 83 percent of the solid volume density as determined from the bulk specific gravity by AASHTO T-84 and T-85 and the dry weight of the aggregate.

2. Material that is too dry for adequate compaction shall receive a prior admix of sufficient water to secure optimum moisture content. Material having excessive water content shall not be placed at any time.

3. Backfill material required to be compacted shall be placed in horizontal layers not to exceed 6 inches in thickness (before compaction) and compacted in place by ramming, tamping, or rolling, unless otherwise specified herein. Compaction shall be accomplished by power-driven tools and machinery wherever possible. Compaction and consolidation of sand and crushed stone backfill shall be accomplished using vibrating equipment in a manner acceptable to the Engineer.

C. Backfilling Trenches

1. The backfilling of sewers, water, and other pipeline trenches shall be started immediately after the construction of same has been inspected, tested, and approved by the Engineer. Select backfill or crushed stone as shown on the Drawings or specified herein shall be placed in the trench under and on each side of the pipe in 6-inch layers for the full width of the trench and thoroughly and uniformly compacted by ramming and/or tamping to a minimum of 90 percent of the maximum density determined as specified herein. Select earth backfilling or crushed stone as shown on the Drawings or specified herein shall start above the pipe bedding. Sufficient select backfill or crushed stone as shown on the Drawings shall be placed around the pipe and compacted to provide a cover of not less than 12 inches over the top of the pipe. Mechanical compactors or tampers shall not be used within 12 inches of pipe. Compaction in this area shall be accomplished by

hand methods. Backfilling shall proceed simultaneously on both sides of the pipe to prevent lateral displacement. Final backfill shall be as specified herein or shown on the Drawings.

2. Caution shall be used during backfill operations for PVC or other flexible thermoplastic pipe to prevent pipe deformation. PVC or other flexible thermoplastic pipe shall not be subjected to roller or wheel loads until a minimum of 30 inches of backfill has been placed over the top of the pipe. A hydrohammer shall NOT be used until a minimum depth of 48 inches of backfill has been placed over the top of the pipe.

3. In streets and alleys, across sidewalks and driveways, and at any other improved areas subject to vehicular traffic or other superimposed loads, crushed rock backfill shall be placed and compacted in 12-inch layers from the bottom of the trench upward for the full depth of the trench. Crushed rock backfill shall be compacted by use of a hydrohammer or approved vibratory compactor. The top 6 inches of the finished subgrade shall be equal to not less than 100 percent of the maximum density as determined by ASTM D 698 at a moisture content of within 3 percentage points of optimum. When field tests show failure to meet the density requirement, the subgrade shall be loosened by disking, harrowing, or other approved methods to a depth of not less than 6 inches, then reshaped and re-compacted as indicated in this paragraph.

4. Trenches under concrete slabs and footings of structures shall be completely backfilled with compacted sand or crushed rock or filled with Class B concrete as shown on the Drawings.

5. All backfilling shall be done in such a manner that the pipe or structure over or against which it is being placed will not be disturbed or injured. Any pipe or structure injured, damaged, or moved from its proper line or grade during backfilling operations shall be removed and repaired to the satisfaction of the Engineer and then re-backfilled.

D. Backfilling Around Structures

1. Unless otherwise noted, backfilling around structures shall consist of common earth backfill placed in 6-inch layers and compacted by tamping to a minimum of 90 percent of the maximum density determined as specified herein for the full depth of the excavation from the bottom to the finished grade. No backfill shall be placed against concrete structures until the concrete has reached its specified 28-day compressive strength. Where practical, compaction of structural backfill shall be accomplished by power-driven tamping equipment.

2. Where crushed rock mats under slabs and foundations are called for on the Drawings, excavate below grade to the depth of the crushed rock mat as shown on the Drawings and install a compacted crushed rock bed. This shall be finished to a true line or plane and even with the subgrade of the concrete foundations, piers, footings, or slabs.

Before placing any crushed stone, remove all loose earth or debris. This crushed rock mat shall extend 12 inches beyond all slabs and foundations or to edges of sheet piling.

3. Crushed rock mats 12 inches or less in thickness shall be constructed of compacted layers of crushed rock conforming to Section 903.23, Size 7 (½-inch to No. 4), of the SSRBC.

4. Crushed rock mats of thickness greater than 12 inches shall have the top 12 inches constructed of compacted layers of crushed rock as specified above. That portion below the top 12 inches shall be constructed of compacted layers of crushed rock conforming to Section 903.05, Class A, with a modified gradation of 6 inches to dust as received from the crusher.

5. The use of earth backfill to support footings, foundations, and structures shall not be permitted, unless otherwise shown on the Drawings.

3.6 FILLS AND EMBANKMENTS

A. Fills and embankments shall consist of all earth fills except backfills in trenches or around structures. Unless special material is specified or shown on the Drawings, material for fills and embankments shall consist of excavated material from structures or of a mixture of such excavated materials and materials borrowed from other sources by the Contractor. All material used for fills and embankments shall be free from wood, vegetable matter, debris, soft or spongy earth or clay, large rock, or other objectionable material and shall be acceptable to the Engineer.

B. Materials shall be placed in the fill or embankment in successive layers 8 inches or less in thickness before compaction, each layer being approximately horizontal and extending to the full limit of the required cross section, and shall be compacted over the entire surface to not less than 95 percent of the maximum density as determined by ASTM D 698 at a moisture content of within 3 percentage points of optimum. The process shall be repeated for each layer of material until the fill or embankment conforms to the plan lines, grades, and cross sections. The degree of compaction and moisture content required, the method of tamping, and the equipment used shall be approved by the Engineer.

C. The area over which the fill or embankment is to be constructed shall first be cleared of all vegetation, debris, and other objectionable material and, if the ground is in a loose, uncompacted condition, it shall be compacted to a minimum 95 percent of maximum density determined as specified herein.

D. No material shall be placed beyond the sloping lines of embankment unless so ordered by the Engineer. Material allowed to be placed beyond the lines of embankment shown on the Drawings will be compacted as required above unless otherwise authorized by the Engineer.

E. Material for embankments or roadway fills shall be placed in 6-inch maximum lifts and shall be compacted by rolling with power rollers weighing not less than 10 tons, with sheepsfoot rollers, with vibrating rollers, or with pneumatic tire rollers, as required to accomplish the work. While and as each layer is deposited, water shall be applied in sufficient amount to ensure optimum moisture to secure the compaction specified.

F. The use of trucks, carryalls, scrapers, tractors, or other heavy hauling equipment shall not be considered as rolling in lieu of rollers, but the traffic of such hauling equipment shall be distributed over the fill in such a manner as to make the use of the compaction afforded thereby as an addition to compaction by the use of rollers.

G. Wherever a trench passes through a fill or embankment, the fill or embankment material shall be placed as compacted to an elevation 12 inches above the top of the pipe before the trench is excavated.

H. Subgrades for all roadbeds shall meet the requirements of Subsection 2.5 C.4.

3.7 DISPOSAL OF WASTE AND UNSUITABLE MATERIALS

A. All materials removed by excavation which are suitable for the purpose shall be used to the extent possible for backfilling pipe trenches, foundations, and footings and for making embankment fills or for such other purposes as may be shown on the Drawings. All materials not used for such purposes shall be considered as waste materials and the disposal, thereof shall be made at the Contractors expense in a manner and at locations approved by the Engineer.

B. Waste materials shall be spread in uniform layers and neatly leveled and shaped. Spoil banks shall be provided with sufficient and adequate openings to permit surface drainage of adjacent lands.

C. Unsuitable materials, consisting of wood, vegetable matter, debris, soft or spongy clay, peat, and other objectionable material so designated by the Engineer, shall be removed from the work site and disposed of at the Contractors expense, in a manner and at a location approved by the Engineer.

D. No unsuitable or waste material shall be dumped on private property unless written permission is furnished by the owner of the property and unless a dumping permit is issued from the local jurisdiction.

E. The Contractor is responsible for any and all permits and other requirements, such as sediment runoff control necessitated by the disposal of waste material.

3.8 FINAL GRADING

A. After other earthwork operations have been completed, the sites of all structures, roads, and embankments shall be graded within the limits and to the elevations shown on the Drawings. Grading operations shall be so conducted that materials shall not be removed or loosened beyond the required limits. The finished surfaces shall be left in smooth and uniform planes such as are normally obtainable from the use of hand tools. If Contractor is able to obtain the required degree of evenness by means of mechanical equipment, the use of hand labor methods will not be required. Neatly trim and finish slopes and ditches to slopes shown on the Drawings unless otherwise approved by the Engineer.

B. Grade and dress all finished ground surfaces to present a surface varying not more than plus or minus 0.10 foot as regards local humps or depressions, unless otherwise specified or shown on the Drawings, and shall be acceptable to the Engineer.

C. When specific grading requirements are not shown on the drawings, the contractor shall grade all areas within the limits of construction, or otherwise disturbed by construction, to drain and to match the existing, adjacent ground.

3.9 TOPSOIL

A. All areas to be planted with trees or shrubs, or with sprigged grass as shown on the plans, shall be prepared by grading to a smooth, even surface to a level 4 inches below the elevation of the finished grade shown on the Drawings. It shall then be brought to a neat and finished grade by the addition of 4 inches of approved topsoil.

B. Topsoil removed from the construction area may be stockpiled and reused or topsoil may be obtained from approved borrow areas. If obtained from borrow areas, make suitable arrangements with the property owner and pay all costs incident to the borrowed material including royalties.

3.10 SETTLEMENT

A. The Contractor shall be responsible for all settlement of backfill, fills, and embankments which may occur within 1 year after final acceptance of the work by the Owner.

B. Make, or cause to be made, all repairs or replacements made necessary by settlement within 30 days after receipt of written notice from the Engineer or Owner.

3.11 DUST CONTROL

A. The Contractor shall use all means necessary to control dust on and near the work and all off-site borrow areas.

B. The Contractor shall thoroughly moisten all surfaces as required to prevent dust being a nuisance to the public, neighbors and concurrent performance of work on the site.

END OF SECTION

SECTION 31 2500

SLOPE PROTECTION AND EROSION CONTROL

1. GENERAL

1.1. SCOPE

A. This section shall consist of temporary control measures that may be required during the life of the Contract to control erosion and water pollution through the use of berms, dikes, dams, sediment basins, fiber mats, netting, mulches, grasses, slope drains, temporary silt fences, and other control devices.

B. The erosion control measures discussed in this Section shall be installed per the approved Stormwater Pollution Prevention Plan (SWPPP) for the project and as shown on the design drawings. The Contractor is responsible for implementing the sediment and erosion control aspects of the Work in compliance with requirements of the Tennessee Erosion and Sediment Control Handbook.

2. PRODUCTS

2.1. TEMPORARY BERMS

A. A temporary berm is constructed of compacted soil, with or without a shallow ditch, at the top of fill slopes or transverse to centerline on fills.

B. These berms are used temporarily at the top of newly constructed slopes to prevent excessive erosion until permanent controls are installed or slopes stabilized.

2.2. TEMPORARY SLOPE DRAINS

A. A temporary slope drain is a facility consisting of stone gutters, fiber mats, plastic sheets, concrete or asphalt gutters, half-round pipe, metal pipe, plastic pipe, sod, or other material acceptable to the Engineer that may be used to carry water down slopes to reduce erosion.

2.3. SEDIMENT STRUCTURES

A. Sediment basins, ponds, and traps are prepared storage areas constructed to trap and store sediment from erodible areas in order to protect properties and stream channels below the construction areas from excessive siltation.

2.4. CHECK DAMS

A. Check dams are barriers composed of logs and poles, large stones, sand bags, or other materials placed across a natural or constructed drainway.

B. Stone check dams shall not be utilized where the drainage area exceeds 50 acres. Log and pole structures shall not be used where the drainage area exceeds 5 acres.

2.5. TEMPORARY SEEDING AND MULCHING

A. Temporary seeding and mulching are measures consisting of seeding, mulching, fertilizing, and matting utilized to reduce erosion. All cut and fill slopes, including waste sites and borrow pits, shall be seeded when and where necessary to eliminate erosion.

2.6. BRUSH BARRIERS

A. Brush barriers shall consist of brush, tree trimmings, shrubs, plants, and other approved refuse from the clearing and grubbing operation.

B. Brush barriers are placed on natural ground at the bottom of fill slopes, where the most likely erodible areas are located, to restrain sedimentation particles.

2.7. BALED HAY OR STRAW CHECKS

A. Baled hay or straw erosion checks are temporary measures to control erosion and prevent siltation. Bales shall be either hay or straw containing 5 cubic feet or more of material.

B. Baled hay or straw checks shall be used where the existing ground slopes toward or away from the embankment along the toe of slopes, in ditches, or other areas where siltation, erosion, or water run-off is a problem.

2.8. TEMPORARY SILT FENCES

A. Silt fences are temporary measures utilizing woven wire or other approved material attached to posts with filter cloth composed of burlap, plastic filter fabric, etc., attached to the upstream side of the fence to retain the suspended silt particles in the run-off water.

9. EROSION CONTROL BLANKET

A. Erosion control blanket are utilized on cut and fill slopes to protect the slopes from erosion until a permanent vegetative cover can be established. The material shall consist of Curlex blankets by American Excelsior Company or approved equal. The type will be dependent upon the slopes to be protected.

3. QUALIFICATIONS

3.1. PRECONSTRUCTION CONFERENCE

A. Schedules and Methods of Operation. No work shall be started until the following erosion control schedules and methods of operation have been accepted by the Engineer.

1. Submit for acceptance the schedule for accomplishment of temporary and permanent erosion control work as applicable for clearing and grubbing, slope protection, grading, bridges and other structures at watercourses, construction, and paving.

2. Submit for acceptance the proposed method of erosion control on haul roads and borrow pits and the plan for disposal of waste materials.

3.2. CONSTRUCTION REQUIREMENTS

A. The Contractor shall limit the surface area of erodible earth material exposed by clearing and grubbing, excavation, borrow, and fill operations. The Contractor shall provide immediate, permanent, or temporary pollution control measures to prevent contamination of adjacent streams or other watercourses, lakes, ponds, or other water impoundment. Such work may involve the construction of temporary berms, dikes, dams, sediment basins, or slope drains, and the use of temporary mulches, mats, seeding, or other control devices or methods as necessary to control erosion. Cut and fill slopes shall be permanently stabilized, seeded and mulched as the excavation proceeds.

B. The Contractor shall incorporate all erosion control features into the project at the earliest practicable time as outlined in the accepted schedule. Temporary pollution control measures shall be used to correct conditions that develop during construction that were not foreseen during the design stage; that are needed prior to installation of permanent pollution control features; or that are needed temporarily to control erosion that develops during normal construction practices, but are not associated with permanent control features on the project.

C. Where erosion is likely to be a problem, clearing and grubbing operations should be so scheduled and performed that grading operations and permanent erosion control features can follow immediately thereafter if the project conditions permit; otherwise, erosion control measures may be required between successive construction stages. Preconstruction vegetation ground cover shall not be destroyed, removed, or disturbed more than 20 calendar days prior to grading or earth moving unless approval is granted otherwise.

D. Contractor shall limit the area of excavation, borrow, and embankment operations in progress commensurate with the Contractor's capability and progress to keep the finish grading, mulching, seeding, and other such permanent pollution control measures current in accordance with the accepted schedule. Should seasonal limitations make such coordination unrealistic, temporary erosion control measures shall be taken immediately to the extent feasible and justified.

E. Under no conditions shall the amount of surface area or erodible earth material exposed at one time by excavation or fill within the project area exceed 750,000 square feet without prior approval by the Engineer.

F. The Engineer may increase or decrease the amount of surface area of erodible earth material to be exposed at one time by clearing and grubbing, excavation, and borrow and fill operations as determined by his analysis of project conditions.

G. The Contractor shall control surface water run-on/runoff by intercepting and diverting stormwater down or cross gradient away from Work areas through the use of dikes, ditches, curb walls, pipes, sumps, slope drains, or other approved means.

H. Where construction vehicles access routes intersect public roads, make provisions to mitigate the transport of mud, soil, or dust onto the public roads.

I. In the event of conflict between these requirements and pollution control laws, rules, or regulations of other federal, state, or local agencies, the more restrictive laws, rules, or regulations shall apply

3.3. CONSTRUCTION MANAGEMENT TECHNIQUES

A. Clearing and grubbing must be held to the minimum necessary for grading and equipment operation.

B. Construction must be sequenced to minimize the exposure time of cleared surface area.

C. Construction must be staged or phased for large projects. Areas of one phase must be stabilized before another phase can be initiated. Stabilization shall be accomplished by temporarily or permanently protecting the disturbed soil surface from rainfall impacts and runoff.

D. Erosion and sediment control measures must be in place and functional before earth moving operations begin, and must be constructed and maintained throughout the construction period. Temporary measures may be removed at the beginning of the work day, but must be replaced at the end of the work day.

E. All control measures shall be checked, and repaired as necessary, weekly in dry periods and within 24 hours after any rainfall of 0.5 inch within a 24-hour period. During prolonged rainfall, daily checking and repairing is necessary. The Contractor shall maintain records of checks and repairs.

F. A specific individual shall be designated to be responsible for erosion and sediment controls on each project site.

3.4. CONSTRUCTION OF EROSION CONTROL FEATURES

A. Temporary Berms. A temporary berm shall be constructed of compacted soil, with a minimum width of 24 inches at the top and a minimum height of 12 inches with or without a shallow ditch, constructed at the top of fill slopes or transverse to centerline on fills. Temporary berms shall be graded so as to drain to a compacted outlet at a slope drain. The area adjacent to the temporary berm in the vicinity of the slope drain must be properly graded to enable this inlet to function efficiently and with minimum ponding in this area. All transverse berms required on the downstream side of a slope drain shall extend across the grade to the highest point at approximately a 10 degree angle with a perpendicular to centerline. The top width of these berms may be wider and the side slope flatter on transverse berms to allow equipment to pass over these berms with minimum disruptions. When practical and until final roadway elevations are approached, embankments should be constructed with a gradual slope to one side of the embankment to permit the placement of temporary berms and slope drains on only one side of the embankment.

B. Temporary Slope Drains

1. Temporary slope drains shall consist of stone gutters, fiber mats, plastic sheets, concrete or asphalt gutters, half-round pipe, metal pipe, plastic pipe, flexible rubber, or other materials which can be used as temporary measures to carry water accumulating in the cuts and on the fills down the slopes prior to installation of permanent facilities or growth of adequate ground cover on the slopes.

2. Fiber matting and plastic sheeting shall not be used on slopes steeper than 4:1 except for short distances of 20 feet or less.

3. All temporary slope drains shall be adequately anchored to the slope to prevent disruption by the force of the water flowing in the drains. The base for temporary slope drains shall be compacted and concavely formed to channel the water or hold the slope drain in place. The inlet end shall be properly constructed to channel water into the temporary slope drain. Energy dissipaters, sediment basins, or other approved devices shall be constructed at the outlet end of the slope drains to reduce erosion downstream. An ideal dissipater would be dumped rock or a small sediment basin which would slow the water as well as pick up some sediment. All temporary slope drains shall be removed when no longer necessary and the site restored to match the surroundings.

C. Sediment Structures

1. Sediment structures shall be utilized to control sediment at the foot of embankments where slope drains outlet, at the bottom as well as in the ditch lines atop waste sites, and in the ditch lines or borrow pits. Sediment structures may be used in most drainage situations to prevent excessive siltation of pipe structures. All sediment structures shall be at least twice as long as they are wide.

2. When use of temporary sediment structures is to be discontinued, all sediment accumulation shall be removed, and all excavation backfilled and properly compacted. The existing ground shall be restored to its natural or intended condition.

D. Check Dam

1. Utilize check dams to retard stream flow and catch small sediment loads. Materials utilized to construct check dams are varied and should be clearly illustrated or explained in the Contractor's erosion control plan.

2. Key all check dams into the sides and bottom of the channel a minimum depth of 2 feet. A design is not needed for check dams but some typical designs are shown in the standard plans.

3. Do not use stone check dams where the drainage area exceeds 50 acres. Log and pole structures should generally not be used where the drainage area exceeds five acres.

E. Temporary Seeding and Mulching. Perform seeding and mulching in accordance with Section 32 9219, Seeding.

F. Brush Barriers. Brush barriers shall consist of brush, tree trimmings, shrubs, plants, and other approved refuse from the clearing and grubbing operation. The brush barriers shall be constructed approximately parallel to original ground contour. Each brush barrier shall be compressed to an approximate height of 3 to 5 feet and approximate width of 5 to 10 feet. The embankment shall not be supported by the construction of brush barriers.

G. Baled Hay or Straw Erosion Checks. Hay or straw shall be embedded in the ground 4 to 6 inches to prevent water flowing underneath. The bales shall also be anchored securely to the ground by wooden stakes driven through the bales into the ground. Bales can remain in place until they rot, or be removed after they have served their purpose, as determined by the Engineer. Keep the checks in good condition by replacing broken or damaged bales immediately after damage occurs.

H. Temporary Silt Fences

1. Temporary silt fences shall be placed on the natural ground, at the bottom of fill slopes, in ditches, or other areas where siltation is a problem. Silt fences are constructed of wire mesh fence with a covering of burlap or some other suitable material on the upper grade side of the fence and anchored into the soil.

2. Maintain the silt fence in a satisfactory condition for the duration of the project or until its removal. The silt accumulation at the fence may be left in place and seeded or removed. The silt fence becomes the property of the Contractor whenever the fence is removed.

I. Erosion Contol Blanket

1. Erosion control blankets shall be installed in accordance with manufacturers recommendations to include anchor trenches, bedding, overlapping, and blanket anchoring.

3.5. MAINTENANCE

A. The erosion control features installed by the Contractor shall be acceptably maintained by the Contractor until no longer needed or permanent erosion control methods are installed. Any materials removed shall become the property of the Contractor.

B. In the event that temporary erosion and pollution control measures are required due to the Contractor's negligence, carelessness, or failure to maintain properly, the contractor shall immediately correct the damages that have occurred and install needed measures as required by the Engineer.

3.6. REMOVAL

A. At the conclusion of the Work, remove all erosion and sediment control materials.

B. Remove erosion and sediment control materials in such a way as to minimize ground disturbance and the potential for future erosion and/or sediment transport. Fill, compact, and stabilize all disturbed ground, including trenches associated with the removal of erosion and sediment controls, as directed by Engineer.

3.7. EROSION CONTROL OUTSIDE PROJECT AREA

A. Temporary erosion control shall include construction work outside the project area where such work is necessary as a result of construction such as borrow pit operations, haul roads, and equipment storage sites. Bid price in such cases shall include all necessary clearing and grubbing, construction incidentals, maintenance, and site restoration when no longer needed. All erosion and sediment control shall be performed by the Contractor at his own expense.

END OF SECTION

SECTION 32 1000

NEW AND REPLACEMENT PAVING

1. GENERAL

1.1. SUMMARY

A. This section includes provisions for hot-mixed asphalt paving and mineral aggregate subbase over prepared subgrade for trench width, full pavement width paving, and other areas as shown on the Drawings.

B. Prepared subgrade is specified in Section 31 2000, Earthwork.

C. Proof rolling of prepared subgrade is included in this section.

D. Saw-cutting of edges of existing pavement is required to minimize subsidence of the pavement into the trench and to minimize the width of pavement replacement.

1.2. RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplemental Conditions and Division 1 Specification sections, apply to this section.

1.3. SUBMITTALS

A. Submit the following in accordance with Conditions of Contract and Division 1 Specification sections.

1. Material certificates signed by material producer and Contractor, certifying that each material item complies with or exceeds specified requirements.

2. Pavement marking plan indicating lane separations and defined parking spaces. Note dedicated handicapped spaces with international graphics symbol.

1.4. SITE CONDITIONS

A. Weather Limitations. Apply prime and tack coats when ambient temperature is above 50°F (10°C) and when temperature has not been below 35°F (1°C) for 12 hours immediately prior to application. Do not apply when base is wet or contains an excess of moisture.

B. Construct hot-mixed asphalt surface course when atmospheric temperature is above 40°F (4°C) and when base is dry. Base course may be placed when air temperature is above 30°F (-1°C) and rising.

C. Grade Control. Establish and maintain required lines and elevations.

2. PRODUCTS

2.1. MATERIALS

A. General. Use locally available materials and gradations that exhibit a satisfactory record of previous installations.

B. Coarse Aggregate. Sound, angular crushed stone, crushed gravel, or properly cured crushed blast furnace slag, complying with ASTM D 692-00.

C. Fine Aggregate. Sharp-edged natural sand or sand prepared from stone, properly cured blast furnace slag, gravel, or combinations thereof, complying with ASTM D 1073-99.

D. Mineral Filler. Rock or slag dust, hydraulic cement, or other inert material complying with ASTM D 242.

E. Asphalt Cement. ASTM D 3381 for viscosity-graded material; ASTM D 946 for penetration-graded material.

F. Prime Coat. Cut-back asphalt type, ASTM D 2027; MC-30, MC-70, or MC-250.

G. Tack Coat. Emulsified asphalt; ASTM D 977.

H. Mineral Aggregate Subbase. SSRBC, Section 303, Type A (Class A aggregate, Grading D).

I. Geotextile Fabric. 6 oz/sy, woven, polypropylene fabric; Mirafi, Inc., Type 600x, or equal.

J. Lane Marking Paint. Alkyd-resin type, ready-mixed complying with AASHTO M 248, Type I.

1. Color: White.
2. Color: Yellow.

2.2. TYPES OF PAVEMENT

A. Replace all existing pavement in streets, driveways, or parking areas which is removed, destroyed, or damaged by construction of improvements as specified herein, as shown on the Drawings, or as called for in the Bid Schedule. Unless otherwise shown or specified, all paved surfaces shall be replaced in kind or as required by permit. Unless shown or specified otherwise, a minimum of 2” of asphaltic concrete or 4” portland cement shall be utilized over a minimum compacted mineral aggregate base course. Restoration shall extend a minimum of 12” outside the extents of trench width. Materials, equipment, and construction methods used for paving work shall conform to the Specifications applicable to the particular type required for replacement, repair, or new pavements.

B. Where sewerage or water lines and appurtenances are constructed in or across unpaved, chert, or crushed stone surfaced streets, roadways, driveways, or parking areas, repair or replace the surface removed or damaged with a minimum of 6 inches of crushed stone in accordance with Section 401, "Mineral Aggregate Surface," SSRBC.

C. In no case shall paving repair be commenced without prior approval of the Engineer of the type of pavement, the equipment to be used, and the method or procedure to be used.

D. The pavement mixture shall not be spread until the designated surface has been previously cleaned and prepared, is intact, firm, properly cured, dry, and the tack coat has been applied.

3. EXECUTION

3.1. SURFACE PREPARATION

A. Remove loose material from compacted subgrade surface immediately before applying subbase.

B. Roll prepared subgrade surface to check for unstable areas and areas requiring additional compaction.

C. Do not begin paving work until deficient subgrade areas have been corrected and are ready to receive subbase.

D. Place mineral aggregate subbase and compact in accordance with the applicable SSRBC specifications to provide a minimum of 6 inches or as shown on Drawings. Subbase thickness greater than 8 inches shall be placed in two or more layers.

E. Roll prepared subbase surface to check for unstable areas and areas requiring additional compaction.

F. Do not begin paving work until deficient subbase areas have been corrected and are ready to receive paving.

G. Prime Coat. Apply at rate of 0.20 to 0.50 gallon per square yard over compacted subbase. Apply material to penetrate and seal, but not flood, surface. Cure and dry as long as necessary to attain penetration and evaporation of volatile components.

H. Tack Coat. Apply to contact surfaces of previously constructed asphalt or portland cement concrete and surfaces abutting or projecting into hot-mixed asphalt pavement. Distribute at rate of 0.05 to 0.15 gallon per square yard of surface.

I. Allow to dry until at proper condition to receive paving.

J. Exercise care in applying bituminous materials to avoid smearing of adjoining concrete surfaces. Remove and clean damaged surfaces.

3.2. PLACING MIX

A. General. Place hot-mixed asphalt mixture on prepared surface, spread, and strike off. Spread mixture at minimum temperature of 225°F (107°C). Place areas inaccessible to equipment by hand. Place each course to required grade, cross-section, and compacted thickness.

B. Paver Placing. Place in strips not less than 10 feet wide, unless otherwise acceptable to Engineer. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete base course for a section before placing surface course.

C. Immediately correct surface irregularities in finish course behind paver. Remove excess material forming high spots with shovel or lute.

D. Joints. Make joints between old and new pavements, or between successive days' work, to ensure continuous bond between adjoining work. Construct joints to have same texture, density, and smoothness as other sections of hot-mixed asphalt course. Clean contact surfaces and apply tack coat.

E. Curbs. Construct curbs over compacted pavement surfaces. Apply a light tack coat unless pavement surface is still tacky and free from dust.

F. Place curb materials to cross-section indicated or, if not indicated, to local standard shapes, by machine or by hand in wood or metal forms. Tamp hand-placed materials and screed to smooth finish. Remove forms as soon as material has cooled.

3.3. ROLLING

A. General. Begin rolling when mixture will bear roller weight without excessive displacement.

B. Compact mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.

C. Breakdown Rolling. Accomplish breakdown or initial rolling immediately following rolling of joints and outside edge. Check surface after breakdown rolling and repair displaced areas by loosening and filling, if required, with hot material.

D. Second Rolling. Follow breakdown rolling as soon as possible, while mixture is hot. Continue second rolling until mixture has been evenly compacted.

E. Finish Rolling. Perform finish rolling while mixture is still warm enough for removal of roller marks. Continue rolling until roller marks are eliminated and course has attained 95 percent laboratory density.

F. Patching. Remove and replace paving areas mixed with foreign materials and defective areas. Cut out such areas and fill with fresh, hot-mixed asphalt. Compact by rolling to specified surface density and smoothness.

G. Protection. After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.4. TRAFFIC AND LANE MARKINGS

A. General. Provide traffic and lane markings in all areas where markings have been damaged due to trench width pavement. On full width pavement, provide markings in all areas were markings were present at beginning of project or where markings are designated to be provided on the Drawings.

B. Cleaning. Sweep and clean surface to eliminate loose material and dust.

C. Striping. Use chlorinated-rubber base traffic lane-marking paint, factory-mixed, quick-drying, and non-bleeding.

D. Do not apply traffic and lane marking paint until layout and placement have been verified with Engineer.

E. Apply paint with mechanical equipment to produce uniform straight edges. Apply at manufacturer's recommended rates to provide minimum 12 to 15 mils dry thickness.

3.5. WHEEL STOPS

A. General. Secure wheel stops to hot-mixed asphalt surface with not less than two ¾-inch-diameter galvanized steel dowels embedded in precast concrete at ⅓ points. Size length of dowel to penetrate at least ½ hot-mixed asphalt depth.

3.6. FIELD QUALITY CONTROL

A. General. Testing in-place hot-mixed asphalt courses for compliance with requirements for thickness and surface smoothness will be done by Owner's testing laboratory. Repair or remove and replace unacceptable paving as directed by Engineer.

B. Thickness. In-place compacted thickness tested in accordance with ASTM D 3549 will not be acceptable if exceeding following allowable variations:

1. Base Course: plus or minus 1/2 inch.
2. Surface Course: plus or minus 1/4 inch.

C. Surface Smoothness: Test finished surface of each hot-mixed asphalt course for smoothness, using 10-foot straightedge applied parallel with and at right angles

to centerline of paved area. Surfaces will not be acceptable if exceeding the following tolerances for smoothness:

1. Base Course Surface: 1/4 inch.

2. Wearing Course Surface: 3/16 inch.

3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is ¼ inch.

D. Check surface areas at intervals as directed by Engineer.

END OF SECTION

SECTION 32 9219

SEEDING

1. GENERAL

1.1. SCOPE

A. The work covered by this section consists of furnishing all labor, equipment, and material required to place topsoil, seed, commercial fertilizer, agricultural limestone, and mulch material, including seedbed preparation, harrowing, compacting, and other placement operations on graded earthen areas as described herein and/or shown on the Drawings. In general, seeding operations shall be conducted on all newly graded earthen areas not covered by structures, pavement, or sidewalks; all cleared or grubbed areas which are to remain as finish grade surfaces; and on all existing turf areas which are disturbed by construction operations and which are to remain as finish grade surfaces. Areas disturbed by borrow activities shall also be seeded according to these Specifications.

B. Temporary Seeding and Erosion Control

1. This practice is applicable on areas subject to erosion for up to 12 months or until establishment of finished grade or permanent vegetative cover. Temporary vegetative measures shall be coordinated with permanent measures to assure economical and effective stabilization.

2. Temporary seeding shall be applied to exposed soil surfaces which are not to be fine-graded for periods from 15 days to one year. Such areas include denuded areas, soil stockpiles, dikes, dams, sides of sediment basins, temporary roadbanks, backfilled and rough graded utility line trenches, and disturbed areas along utility lines, etc.

3. Temporary seeding shall be in accordance with the temporary seeding schedule and shall meet the same requirements for seed bed preparation and mulching with the exception that lime and fertilizer need not be applied unless the soil is very low fertility and low pH.

1.2. QUALITY ASSURANCE

A. Prior to seeding operations, furnish to the Engineer labels or certified laboratory reports from an accredited commercial seed laboratory or a state seed laboratory showing the analysis and germination of the seed to be furnished. Acceptance of the seed test reports shall not relieve the Contractor of any responsibility or liability for furnishing seed meeting the requirements of this section.

B. Prior to topsoil operations, obtain representative samples and furnish soil test certificates including textural, pH, and organic ignition analysis from the State University Agricultural Extension Services or other certified testing laboratory.

2. PRODUCTS

2.1. TOPSOIL

A. Place a minimum of 4 inches of topsoil over all graded earthen areas and over any other areas to be seeded. Sources of topsoil shall be approved by the Engineer prior to disturbance.

B. Topsoil shall be a friable loam containing a large amount of humus and shall be original surface soil of good, rich, uniform quality, free from any material such as hard clods, stiff clay, hardpan, partially disintegrated stone, pebbles larger than 1/2 inch in diameter, lime, cement, bricks, ashes, cinders, slag, concrete, bitumen or its residue, boards, sticks, chips, or other undesirable material harmful or unnecessary to plant growth. Topsoil shall be reasonably free from perennial weeds and perennial weed seeds, and shall not contain objectionable plant material, toxic amounts of either acid or alkaline elements, or vegetable debris undesirable or harmful to plant life.

C. Topsoil shall be natural topsoil without admixture of subsoil material, and shall be classifiable as loam, silt loam, clay loam, sandy loam, or a combination thereof. The pH shall range from 5.5 to 7.0. Topsoil shall contain not less than 5 percent nor more than 20 percent, by weight, of organic matter as determined by loss on ignition of samples oven-dried to 65°C.

2.2. SEED

A. Deliver seed in new bag or bags that are sound and labeled in accordance with the U.S. Department of Agriculture Federal Seed Act.

B. All seed shall be from the last crop available at time of purchase and shall not be moldy, wet, or otherwise damaged in transit or storage.

C. Seed shall bear the grower's analysis testing to 98 percent for purity and minimum 85 percent for germination. At the discretion of the Engineer, samples of seed may be taken for check against the grower's analysis.

D. Species, rate of seeding, fertilization, and other requirements are shown in the Seeding Requirements Table.

2.3. FERTILIZER AND LIMING MATERIALS

A. Fertilizer and liming materials shall comply with applicable state, local, and federal laws concerned with their production and use.

TEMPORARY SEEDING REQUIREMENTS TABLE					
			Rates per 1,000 Square Feet		
Area	Sowing Season	Species	Seed	Fertilizer*	Limestone**
All Areas	4/15 to 8/15	Sudangrass (Sorghum Sudanese)	1.5 lbs.	10 lbs. 10-20-20	100 lbs.
	8/16 to 4/14	Annual Ryegrass (Lolium Temulentum)	1 lb.	10 lbs. 10-20-20	100 lbs.
*Fertilizer is not required on fertile soils. Apply on very low fertility soil. **Apply limestone on highly acidic soils (pH 5.5 and lower).					

B. Commercial fertilizer shall be a ready-mixed material and shall be equivalent to the grade or grades specified in the Seeding Requirements Table. Container bags shall be labeled with the name and address of the manufacturer, brand name, net weight, and chemical composition.

C. Agricultural limestone shall be a pulverized limestone with a calcium carbonate content not less than 85 percent by weight. Agricultural limestone shall be crushed so that at least 85 percent of the material will pass a No. 10 mesh screen and 50 percent will pass a No. 40 mesh screen.

2.4. MULCH MATERIAL

A. All mulch materials shall be air-dried and reasonably free of noxious weeds and weed seeds or other materials detrimental to plant growth.

B. Mulch shall be composed of wood fiber, straw, or stalks, as specified herein. Mulch shall be suitable for spreading with standard mulch-blowing equipment.

PERMANENT SEEDING REQUIREMENTS TABLE

			Rates per 1,000 Square Feet		
Area	Sowing Season	Species	Seed	Fertilizer	Limestone
Flat to rolling terrain with slopes less than 3:1	3/1 to 6/1	Kentucky 31 Fescue Ladino White Clover*	4 lbs. 1/4 lb.	30 lbs. 6-12-12	100 lbs.
	8/1 to 11/1	Kentucky 31 Fescue Ladino White Clover* Annual Ryegrass	4 lbs. 1/4 lb. 2 lbs.	30 lbs. 6-12-12	100 lbs.
Embankments with slopes greater than 3:1	3/1 to 6/1	Hulled Sericea Lespedeza* Kentucky 31 Fescue Weeping Lovegrass	1 lb. 3 lbs. 1/4 lb.	30 lbs. 6-12-12	100 lbs.
	8/1 to 11/1	Unhulled Sericea Lespedeza* Kentucky 31 Fescue Annual Ryegrass	1 lb. 3 lbs. 2 lbs.	30 lbs. 6-12-12	100 lbs.
*Requires inoculation.					

C. Straw mulch shall be partially decomposed stalks of wheat, rye, oats, or other approved grain crops.

D. Stalks shall be the partially decomposed, shredded residue of corn, cane, sorghum, or other approved standing field crops. and liming materials shall comply with applicable state, local, and federal laws

2.5. MULCH BINDER

A. Mulch on slopes exceeding a 3 to 1 ratio shall be held in place by the use of an approved erosion control fabric, such as Curlex I as manufactured by American Excelsior Company, or approved equal. Fabric shall consist of strips of biodegradable paper interwoven with yarn that is subject to degradation by ultraviolet light.

2.6. INOCULANTS FOR LEGUMES

A. All leguminous seed shall be inoculated prior to seeding with a standard culture of nitrogen-fixing bacteria that is adapted to the particular seed involved.

2.7. WATER

A. Water shall be clean, clear, and free from any objectionable or harmful chemical qualities or organisms and shall be furnished by the Contractor.

3. EXECUTION

3.1. SECURING AND PLACING TOPSOIL

A. Topsoil shall be secured from areas where topsoil has not been previously removed, either by erosion or mechanical methods. Topsoil shall not be removed to a depth in excess of the depth approved by the Engineer.

B. The area or areas from which topsoil is secured shall possess such uniformity of soil depth, color, texture, drainage, and other characteristics as to offer assurance that when removed the product will be homogeneous in nature and will conform to the requirements of these Specifications.

C. All areas from which topsoil is to be secured shall be cleaned of all sticks, boards, stones, lime, cement, ashes, cinders, slag, concrete, bitumen or its residue, and any other refuse which will hinder or prevent growth.

D. When securing topsoil from a designated pit or elsewhere, should strata or seams of material occur which do not come under the requirements for topsoil, such material shall be removed from the topsoil or if required by the Engineer, the pit shall be abandoned.

E. Before placing or depositing topsoil upon any area, all improvements within the area shall be completed, unless otherwise approved by the Engineer.

F. The areas in which topsoil is to be placed or incorporated shall be prepared before securing topsoil for use.

3.2. SEEDBED PREPARATION

A. Before fertilizing and seeding, the topsoil surfaces shall be trimmed and worked to true line free from unsightly variations, bumps, ridges, and depressions, and all

detrimental material, roots, and stones larger than 3 inches in any dimension shall be removed from the soil.

B. Not earlier than 24 hours before the seed is to be sown, the soil surface to be seeded shall be thoroughly cultivated to a depth of not less than 2 inches with a weighted disc, tiller, pulvimixer, or other equipment, until the surface is smooth and in a condition acceptable to the Engineer.

C. If the prepared surface becomes eroded as a result of rain or for any other reason, or becomes crusted before the seed is sown, the surface shall again be placed in a condition suitable for seeding.

D. Ground preparation operations shall be performed only when the ground is in a tillable and workable condition, as determined by the Engineer.

3.3. FERTILIZATION AND LIMING

A. Following seedbed preparation, fertilizer shall be applied to all areas to be seeded so as to achieve the application rates shown in the Seeding Requirements Table.

B. Fertilizer shall be spread evenly over the seedbed and shall be lightly harrowed, raked, or otherwise incorporated into the soil for a depth of 1/2 inch.

C. Fertilizer need not be incorporated in the soil as specified above when mixed with seed in water and applied with power sprayer equipment. The seed shall not remain in water containing fertilizer for more than 30 minutes when a hydraulic seeder is used.

D. Agricultural limestone shall be thoroughly mixed into the soil according to the rates in the Seeding Requirements Table. The specified rate of application of limestone may be reduced by the Engineer if pH tests indicate this to be desirable. It is the responsibility of the Contractor to obtain such tests and submit the results to the Engineer for adjustment in rates.

3.4. SEEDING

A. Seed of the specified group shall be sown as soon as preparation of the seedbed has been completed. No seed shall be sown during high winds, nor until the surface is suitable for working and is in a proper condition. Seeding shall be performed during the dates shown in the Seeding Requirements Table unless otherwise approved by the Engineer. Seed mixtures may be sown together, provided they are kept in a thoroughly mixed condition during the seeding operation.

B. Seeds shall be uniformly sown by any approved mechanical method to suit the slope and size of the areas to be seeded, preferably with a broadcast type seeder, windmill hand seeder, or approved mechanical power-drawn seed drills. Hydroseeding and hydromulching may be used on steep embankments, provided full coverage is obtained. Care shall be taken to adjust the seeder to the proper rate before seeding operations are started and to maintain the

adjustment during seeding. Seed in hoppers shall be agitated to prevent segregation of the various seeds in a seeding mixture.

C. Immediately after sowing, the seeds shall be covered and compacted to a depth of 1/8 to 3/8 inch by a cultipacker or suitable roller.

D. Leguminous seeds shall be inoculated prior to seeding with an approved and compatible nitrogen-fixing inoculant in accordance with the manufacturer's mixing instructions.

3.5. MULCHING

A. All seeded areas shall be uniformly mulched in a continuous blanket immediately after seeding. The mulch shall be applied so as to permit some sunlight to penetrate and air to circulate, and at the same time shade the ground, reduce erosion, and conserve soil moisture. Approximately 25 percent of the ground shall be visible through the mulch blanket.

B. One of the following mulches shall be spread evenly over the seeded areas at the following application rates:

1. Wood Fiber 1,400 lbs/acre
2. Straw 4,000 lbs/acre
3. Stalks 4,000 lbs/acre

These rates may be adjusted at the discretion of the Engineer at no additional cost to the Owner, depending on the texture and condition of the mulch material and the characteristics of the seeded area.

C. Mulch on slopes greater than a 3 to 1 ratio shall be held in place by the use of an approved erosion control fabric. Fabric shall be installed immediately after seeding and fertilizing area (mulch shall not be used under fabric).

D. Erosion control fabric shall be installed and applied in accordance with the manufacturer's recommendations. Any fabric which becomes torn, broken loose from securing staples, or undermined shall be immediately and satisfactorily repaired. Areas where seed is washed out before germination shall be fertilized, reseeded, and restored. Any required restoration work shall be performed without additional compensation.

3.6. WATERING

A. Maintain the proper moisture content of the soil to ensure adequate plant growth until a satisfactory stand is obtained. If necessary, watering shall be performed to maintain an adequate water content in the soil.

B. Watering shall be accomplished by hoses, tank truck, or sprinklers in such a way to prevent erosion, excessive runoff, and overwatered spots.

3.7. MAINTENANCE

A. Upon completion of seeding operations, the Contractor shall clear the area of all equipment, debris, and excess material, and the premises shall be left in a neat and orderly condition.

B. Maintain all seeded areas without additional payment until final acceptance of the work by the Owner. Re-grading, re-fertilizing, re-liming, reseeding, or re-mulching shall be done at Contractor's expense. Seeding work shall be repeated on defective areas until a satisfactory uniform stand is achieved. Damage resulting from erosion, gullies, washouts, or other causes shall be repaired by filling with topsoil, compacting, and repeating the seeding work.

END OF SECTION

SECTION 33 0513.16

PRECAST CONCRETE STRUCTURES

1. GENERAL

1.1 SCOPE

A. Furnish all labor, materials, equipment, and incidentals required to install rectangular, monolithic, or sectional precast water and wastewater structures, pipe connectors, and accessories as specified herein.

1.2 RELATED SECTIONS

A. Section 31 2000 - Earthwork

1.3 REFERENCES

A. Prestressed Concrete Institute. Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products.

B. National Precast Concrete Association. Quality Control Manual for Precast Concrete Plants.

C. American Society for Testing and Materials (ASTM)

1. ASTM C 478 - Standard Specification for Precast Reinforced Concrete Manhole Sections.

2. ASTM C 890 - Standard Practice for Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures.

3. ASTM C 891 - Standard Practice for Installation of Underground Precast Concrete Utility Structures.

4. ASTM C 923 - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipe and Laterals.

5. ASTM C 913 - Standard Specifications for Precast Concrete Water and Wastewater Structures.

6. ASTM C1226 – Standard Specifications for Precast Concrete Septic Tanks.

D. American Association of State Highway and Transportation Officials Standard Specification for Joints for Circular Concrete Sewer and Culvert Pipe Using Flexible Watertight Gaskets (AASHTO M198).

E. American Concrete Institute Building Code Requirements for Reinforced Concrete (ACI 318).

F. Occupational Safety and Health Administration Standard 1926.704 - Requirements for Precast Concrete.

1.4 SUBMITTALS

A. Copy of certificate or report showing that the precast concrete manufacturer conforms to Article 1.5 - Qualifications.

B. Schedule of precast concrete structure sections to be provided on the project, charting the following items, when applicable:

1. Sheet number where the precast structure plan and profile is shown on the plans.

2. Line number (when there is more than one line on the project).

3. Precast structure station number.

4. Invert elevation of the influent and effluent line as indicated on the plans.

5. Top elevation of the precast structure frame as indicated on the plans.

6. Top elevation of precast structure base slab as calculated.

7. Total height of precast structure required from top of base slab to top of frame.

8. Total height of assembled base, risers, and cone or top provided from top of base to top of top.

9. Manufacturer's part number or catalog number and number required of each base, riser, and top provided for the precast structure.

10. Each pipe size and type and its connector's part number, distance from top of base slab, and horizontal distances from inner wall corners of precast structure.

C. Detail of each precast concrete structure section to be provided showing or charting the following:

1. Manufacturer's part number or catalog number.
2. Inside dimensions.
3. Lay length excluding base slab.
4. Wall thickness and base or top thickness where applicable.
5. Handling weight.

6. Wire size, spacing, and area provided per vertical foot.
7. Reinforcing bar size and spacing.
8. Design loads.
9. Concrete mix number and design strength.
10. Height, width, slope, and annular space of the tongue and groove.

D. Pipe connector details and material specifications.

E. Joint material detail, material specifications and calculations showing that the joint material cross section is greater than the joint's annular space times its height.

F. Lifting device and hole detail.

G. Submit the following at the request of the Engineer or Owner:

1. Structural analysis and design calculations for precast components, performed in accordance with applicable codes and standards, showing that allowable stresses will not be exceeded. A registered professional engineer must seal all calculations.

2. Calculations or test results verifying that the lifting device components and holes are designed in accordance with OSHA Standard 1926.704.

3. Concrete 28-day compression strength results for every day production of precast components for the project was performed showing the required strength according to the guidelines established in ACI 318.

4. Reinforcing and cement mill reports for materials used in the manufacture of precast components for this project.

5. The above test reports for similar precast components recently produced, submitted prior to production of precast components for this project.

1.5 QUALIFICATIONS

A. The precast manufacturer shall comply with one of the following requirements:

1. Manufacture precast components for the project in a plant certified in the Prestressed Concrete Institute's (PCI) Plant Certification Program.

2. Manufacture precast components for the project in a plant certified in the National Precast Concrete Association's (NPCA) Plant Certification Program.

3. Retain an independent testing or consulting engineering firm approved by the Engineer for precast plant inspection. The basis for plant

inspection shall be the National Precast Concrete Association Quality Control Manual or the Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products. The above firm shall inspect the precast plant 2 weeks prior to and at 1-week intervals during production of materials for this project and issue a report, certified by a registered engineer that materials, methods, products, and quality control meet the requirements of the above quality control manuals.

B. The precast manufacturer shall have a recognized quality improvement process installed at the manufacturing facility.

C. The precast manufacturer shall provide engineering certification as to the structural adequacy of any precast component, if requested.

D. All concrete compressive strength testing shall be performed in a laboratory inspected by the CCRL of the National Bureau of Standards.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Maintain materials and surrounding air temperature to minimum 50°F prior to, during, and 48 hours after completion of masonry, grouting or concreting work.

2. PRODUCTS

2.1 MATERIALS

A. Concrete shall conform to ASTM C 478 and as follows:

1. Compressive Strength: 5,000 psi minimum at 28 days.

2. Air Content: 4 percent minimum.

3. Alkalinity: Adequate to provide a life factor, Az = Calcium carbonate equivalent times cover over reinforcement, no less than 0.35 for bases, risers and tops.

4. Cementitious Materials: Minimum of 564 pounds per cubic yard.

5. Coarse Aggregates: ASTM C 33. Sound, crushed, angular stone only. Smooth or rounded stone shall not be used.

6. Fine Aggregates: ASTM C 33. Free from organic impurities.

7. Chemical Admixtures: ASTM C 494. Calcium chloride or admixtures containing calcium chloride shall not be used.

8. Air Entraining Admixtures: ASTM C 260.

B. Reinforcing steel shall be ASTM A 615 Grade 60 deformed bar, ASTM A82 wire or ASTM A 185 welded wire fabric.

C. Lifting loops shall be ASTM A 416 steel strand. Lifting loops made from deformed bars shall not be allowed.

D. Butyl rubber sealant shall conform to Federal Specification SS-S-210A, AASHTO M-198, Type B - Butyl Rubber and as follows: maximum of 1% volatile matter and suitable for application temperatures between 10 and 100°F.

E. Butyl rubber with bentonite sealant shall conform to Federal Specification SS-S-210A, ASTM D 297, and containing no asphaltics as follows: maintaining 99% solids with a maximum of 1% volatile matter and suitable for application temperatures between 5 and 125°F.

F. Epoxy gels used for interior patching of wall penetrations shall be a 2-component, solvent-free, moisture-insensitive, high modulus, high-strength, structural epoxy paste adhesive meeting ASTM C 881, Type I and II, Grade 3, Class B and C, Epoxy Resin Adhesive.

2.2 COMPONENTS

A. Precast component fabrication and manufacture shall be as described in this paragraph and as described in the paragraphs for the specific components.

1. Precast structures shall be manufactured in conformance with ASTM C 913. Wall and inside slab finishes resulting from casting against forms standard for the industry shall be acceptable, except form ties through the wall of the product are not allowed. Exterior slab surfaces shall have a float finish. Small surface holes, normal color variations, normal form joint marks, minor depressions, chips and spalls will be tolerated. Dimensional tolerances shall be those set forth in the appropriate references and specified below.

2. Joint surfaces for joints between precast structure components shall be keyways or tongue and grooves manufactured to the joint surface design and tolerance requirements of ASTM C 913.

3. Lift holes and inserts used for handling precast structures shall be sized for a precision fit with the lift devices, shall not penetrate through the precast structure wall, and shall comply with OSHA Standard 1926.704.

B. Precast base sections shall have the base slab cast monolithically with the walls.

C. Precast riser sections. The minimum lay length of precast riser sections shall be 36 inches.

D. Precast cone sections shall have an inside diameter at the top of 24 inches. The width of the top ledge shall be no less than the wall thickness required for the cone section. Concentric cones shall be used only for shallow manholes.

E. Precast top sections. Flat slab top sections shall be designed for HS-20 traffic loadings as defined in ASTM C 890. Transition top sections shall provide for transition to other diameter risers, cones, and flat slab top sections with a joint equal to that of a riser section. Venting of top sections shall be as shown on the details.

F. Pipe to manhole connectors shall conform to ASTM C 923. On large diameter flexible pipes, provisions for control of the pipe outside diameter to within the tolerances of the connector shall be made.

G. Joints shall be sealed internally between the tongue and the groove and additionally around the external perimeter of the joint as follows:

1. External seals shall consist of a polyethylene backed flat butyl rubber sheet no less than 1/16-inch thick and 6 inches wide applied to the outside perimeter of the joint.

2. Joints with a perimeter greater than or equal to 18 feet shall be internally sealed with butyl rubber/bentonite sealant.

3. Joints with a perimeter less than 18 feet shall be internally sealed with butyl rubber sealant.

H. Manhole rings, covers, hatches and doors, frames and grate to be provided as equal to those shown on the precast structure details. Materials shall be cast iron, steel, or aluminum as conforming to details per application. For dimensions of castings see precast top details.

I. The precast manufacturer shall provide lifting devices complying with OSHA Standard 1926.704 for handling the precast components. The design of lifting devices shall comply with ASTM C 913, Paragraph 5.8 standards.

2.3 CONFIGURATION

A. Precast concrete structures are to be constructed as specified and as shown on the detail drawings.

B. The number of joints shall be minimized. Use no more than two sections up to 8 feet of depth and no more than one additional section for each 4 feet of depth.

C. Provide inverts conforming to the details shown on the Drawings when rectangular sewer manholes are required.

D. Round transition assemblies shall conform to ASTM C 478.

3. EXECUTION

3.1 EXAMINATION

A. Inspect precast components prior to unloading from the delivery truck.

3.2 DELIVERY, STORAGE, AND HANDLING

A. Coordinate delivery with the manufacturer. Handle and store the precast components in accordance with ASTM C 891 and the manufacturer's recommendations using methods that will prevent damage to the components and their joint surfaces.

3.3 PLACING PRECAST CONCRETE SECTIONS

A. Excavate the required depth and remove materials that are unstable or unsuitable for a good foundation. Prepare a level, compacted foundation extending 6 inches beyond the precast base and follow ASTM C 891 excavation standards.

B. Set base plumb and level, aligning pipe opening with pipe invert.

C. Thoroughly clean bells and spigots to remove dirt and other foreign materials that may prevent sealing. Unroll the butyl sealant rope directly against base of spigot. Leave protective wrapper attached until sealant is entirely unrolled against spigot. Do not stretch. Overlap from side to side, not top to bottom.

D. Set risers and tops, aligning internal wall surfaces, so that proper alignment is achieved taking particular care to clean, prepare, and seal joints.

E. Fill the void between horizontal joint surfaces with a sand cement grout around the outside perimeter, when recommended by the manufacturer.

F. After joining manhole sections, apply the butyl sealant sheet around the outside perimeter of the joint.

G. Lift holes leaving less than 2 inches of wall thickness shall be plugged from the outside using a sand cement mortar. Lift holes penetrating the wall shall be additionally sealed with an interior application of an epoxy gel 1-inch thick extending 2 inches beyond the penetration.

H. Vacuum test the assembled precast structure after completing pipe connections and sealing but before backfilling or placing frame and cover as follows:

1. Plug pipes with suitably sized and rated pneumatic or mechanical pipeline plugs. Place plugs a minimum of 6 inches beyond the precast wall and brace to prevent displacement of the plugs or pipes during testing.

2. Position the vacuum tester head assembly to seal against the interior surface of the top of the top section and inflate according to the manufacturer's recommendations.

3. Draw a vacuum of 10 inches of mercury, close the valve on the vacuum line, and shut off the vacuum pump.

4. Measure the time for the vacuum to drop to 9 inches of mercury. The precast structure shall pass when the time to drop to 9 inches of mercury meets or exceeds the following:

Structure Area in Plain View (square feet)	10	20	30	40	50	80
Seconds	60	75	90	105	120	150

5. If the precast structure fails the test, remove the head assembly and coat the interior with a soap and water solution and repeat the vacuum test for approximately 30 seconds. Leaking areas will have soapy bubbles. After the necessary repairs are made, repeat the test until the precast structure passes.

I. Perform the final finishing to the manhole interior by filling all chips or fractures greater than ½ inch in length, width or depth and depressions more than ½ inch deep in inverts with a sand cement mortar. Grout joints according to manufacturer's specifications. Clean the interior of the precast structure, removing all dirt, spills, or other foreign matter.

END OF SECTION

SECTION 33 1113.23

POLYVINYL CHLORIDE PIPE FOR PRESSURE APPLICATIONS

1. GENERAL

1.1. SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and install PVC piping in the locations shown on the Drawings and as specified herein.

1.2. RELATED WORK

A. The following sections contain requirements that relate to this section:

1. Section 33 1216: Valves.
2. Section 33 1113.13: Ductile Iron Pipes and Fittings.

1.3. DESCRIPTION OF SYSTEM

A. Plastic pipe shall be used for pressure piping in water mains, sewage force mains, and process piping.

B. Install piping in the locations shown on the Drawings.

C. PVC valves and fittings shall be used in pressure sewers 1-inches in diameter through 3-inches in diameter.

D. Use ductile iron mechanical joint valves and fittings in all water and sewage force mains 4-inches in diameter and larger.

1.4. QUALIFICATIONS

A. All plastic pipe shall be furnished by a single manufacturer who is fully experienced, reputable, and qualified in the manufacture of the items to be furnished. The equipment shall be designed, constructed, and installed in accordance with ASTM and AWWA methods and shall comply with these Specifications.

1.5. SUBMITTAL

A. Submit shop drawings to the Engineer for approval in accordance with these Specifications and include dimensioning and technical specification for all piping to be furnished.

B. Submit samples of all materials specified herein to the Engineer for approval when requested.

1.6. PIPE MARKING

A. All PVC pipe shall be marked with the following information:

1. Manufacturer's name or trademark.
2. Nominal pipe size and OD base.
3. AWWA or ASTM material code designation.
4. Dimension ratio.
5. AWWA pressure class.
6. AWWA or ASTM specification designation (AWWA C900, ASTM D 2241, ASTM D 1785, Schedule 40 or 80).
7. Product record code.
8. Certification seal(s), if required.

1.7. RECEIVING, HANDLING, AND STORAGE

A. Receive, handle, and store PVC pipe in accordance with AWWA Manual No. M23, "PVC Pipe Design and Installation," except that all PVC pipe stored longer than one week shall be covered with an opaque material.

2. PRODUCTS

2.1. MATERIALS

A. Pipe shall meet ASTM D 2241, "Standard Specification for Polyvinyl Chloride (PVC) Plastic Pipe (SDR-PR)"; AWWA C900, Class 100; or ASTM D 1785, Schedule 40 or 80. Length shall be 20 feet. Pipe shall be green for sewage and blue for water. Pipe shall be provided as shown on the Drawings and specified herein, otherwise shall be C900 DR18 or ASTM D 2241 DR21. Pipe specifications as provided in 00 4143 Bid Schedule shall take precedence over this paragraph.

B. Potable water service certification shall be NSF No. 14, "National Sanitation Foundation Standard No.14 for Thermoplastic Materials, Pipe, Fittings, Valves, Traps and Joining Materials."

C. Gasket shall be ASTM F 477, "Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe." Gaskets for pipe 6-inch and larger shall be supplied with retainer rings.

D. Push-on joint shall be ASTM D 3139, "Standard Specification for Joints for Plastic Pressure Pipe Using Flexible Elastomeric Seals."

E. PVC material 12454-B (PVC 1120) shall be ASTM D 1784, "Standard Specification for Rigid Polyvinyl Chloride (PVC) Compounds and Chlorinated Polyvinyl Chloride (CPC) Compounds."

F. Fittings for water mains and sewage force mains 4-inches in diameter and larger shall be short or long body ductile iron and be equipped with mechanical thrust restraint per Section 33 1113.33, Ductile Iron Pipe and Fittings.

G. Valves and fittings for buried pressure sewers 1-inches through 3-inches in diameter shall be Schedule 40 PVC (pressure rated) with glued joints. All valves shall be of the true union type, Spears Industrial, Hayward TBH Series, or Engineer approved equal. Restrain by means of concrete thrust blocks or as shown on the drawings. Solvent cement joints shall be made in a two-step process with primer conforming to ASTM F 656 and solvent cement conforming to ASTM D 2564.

H. Pipe in sizes 1 inch through 3-inches shall be Schedule 40 in accordance with ASTM D 1785 unless otherwise shown on the Drawings or specified herein. Solvent cement joints shall be made in a two-step process with primer conforming to ASTM F 656 and solvent cement conforming to ASTM D 2564.

I. Pipe in sizes 4-inches through 12-inches shall be SDR 21 with 200 psi pressure rating in accordance with ASTM D 2241 unless otherwise shown on the Drawings or specified herein for sewage service. Pipe in sizes 4-inches through 12-inches shall be SDR 18 with 235 psi pressure rating in accordance with AWWA C900 unless otherwise shown on the Drawings or specified herein for water service.

J. PVC pipe installed inside of structures or used to transport liquid or gaseous chlorine shall have threaded joints. Solvent welding of field joints will not be permitted. PVC for threaded joints shall be Schedule 80, NSF approved and shall conform to the latest requirements of Commercial Standard CS 207 and ASTM D 1785 for Schedule 80 water pressure ratings. Fittings shall comply with the requirements of ASTM D 2464 for molded, Schedule 80, screwed fittings.

K. PVC pipe conveying material with operating temperatures that exceed 140°F, shall be chlorinated polyvinyl chloride (CPVC) in accordance with ASTM D 1784, Type 4, Grade1, Class 23477-B.

L. Threaded joints shall be made with IPS threads. All joints shall be made up with PTFE thread tape or thread dope or with pipe manufacturer's recommended joint compound for use with chlorine solutions.

3. EXECUTION

3.1. INSTALLATION

A. Alignment and Grade. Lay and maintain all pipe at the established lines and grades. Install fittings, valves, air vents, and hydrants at the required locations with valve and hydrant stems level or as shown on the Drawings.

B. Trench Construction

1. Stockpiling Excavated Material. Stockpile all excavated material in a manner that will not endanger the work or obstruct sidewalks and driveways. Hydrants under pressure, valve-pit covers, valve boxes, curb-stop boxes, fire and police call boxes, and other utility controls shall be kept accessible.

2. Trench Depth. Provide minimum of 48-inches of cover in traffic areas and 30-inches of cover in non-traffic areas, unless noted otherwise.

3. Trench Width. Trench width at the ground surface may vary depending on depth, type of soil, and position of surface structures.

a. For construction with a backhoe or trencher the minimum clear width of the trench, sheeted or unsheeted, measured at the springline of the pipe shall be 12-inches of clear space on each side of the pipe or as shown on the Drawings. If the maximum recommended trench width must be exceeded or if the pipe is installed in a compacted embankment, then pipe embedment shall be compacted to a point of at least 2 1/2 pipe diameters from the pipe on both sides of the pipe or to the trench walls, whichever is less.

b. Quantities of crushed stone embedment in rock trenches shall be based upon the actual width of trench, not to exceed 2 feet plus the pipe outside diameter, unless authorized by the Engineer.

C. Dewatering. Where conditions are such that running or standing water occurs in the trench bottom or the soil in the trench bottom displays a "quick" tendency, remove the water by pumps and other suitable means (such as well points or pervious underdrain bedding) until the pipe has been installed and the backfill has been placed to a sufficient height to prevent flotation of pipe.

D. Preparation of Trench Bottom. Construct the trench bottom to provide a firm, stable, and uniform support for the full length of the pipe. Provide bell holes at each joint to permit proper assembly and pipe support. Backfill to grade any part of the trench bottom excavated below grade and compact as required to provide firm pipe support. When an unstable subgrade condition is encountered that could provide inadequate pipe support, additional trench depth shall be excavated and refilled with suitable foundation material. Remove ledge rock, boulders, and large stones to provide 6-inches of cushion on all sides of the pipe and accessories.

E. Laying of Pipe. To prevent damage, use proper implements, tools, and equipment for placement of the pipe in the trench. Under no circumstances shall pipe or accessories be dropped into the trench. Remove all foreign matter or dirt from the pipe interior. Assemble pipe joints with care. When pipe laying is not in progress, open ends of installed pipe shall be closed to prevent entrance of trench water, dirt, foreign matter, or small animals into the pipeline.

F. Pipe Embedment and Backfill

a. Install PVC pipe with embedment and backfill in accordance with details and descriptions as shown in the Drawings. If the Drawings do not describe embedment and backfill requirements, comply with the following:

1. Native Earth Embedment: PVC pipe shall be installed with select earth providing uniform longitudinal support under the pipe, except as noted on the Drawings. Embedment shall be crushed stone under improved surfaces. Work backfill material under the sides of the pipe to provide satisfactory haunching. Initial backfill material shall be crushed stone and placed to a minimum depth of 12 inches over the top of the pipe as shown on the Drawings. Carefully select and place all pipe embedment material. Exclude from the embedment material sharp stones and crushed rock (larger than 3/4 inch) which could cause significant scratching or abrasion of the pipe. Compact bedding and initial backfill to a minimum of 90 percent standard proctor.

2. Rock Trench Embedment: In areas having rock trenches, PVC pipe shall be installed with # 67 crushed stone providing uniform longitudinal support

under the pipe. Work backfill material under the sides of the pipe to provide satisfactory haunching. Initial backfill material shall be crushed stone and placed to a minimum depth of 12 inches over the top of the pipe as shown on the Drawings. Carefully select and place all pipe embedment material. Exclude from the embedment material sharp stones and crushed rock (larger than 3/4 inch) which could cause significant scratching or abrasion of the pipe. Compact bedding and initial backfill to a minimum of 90 percent standard proctor.

3. Final Backfill: After placement and compaction of pipe embedment materials and initial backfill, the balance of backfill materials may be machined placed. The material shall contain no large stones or rocks, frozen material or debris. Exercise proper compaction procedures to provide required 90 percent density, standard proctor. Final backfill shall be crushed stone in improved areas and common earth in unimproved areas.

4. Select tailings form a rock trencher shall only be used as approved by the Engineer.

C. Furnish a full-face resilient gasket when a joint consists of a PVC flange and a flat-faced metal flange.

D. Install PVC valves with the flow arrow in the proper direction. Union nuts on PVC valves shall be tightened only hand tight in accordance with manufacturer's instructions. Furnish spare o-ring seals and seats with each PVC valve.

E. Service line taps into PVC pipe shall be made using tapping saddle constructed for use on PVC pipe. Saddles shall be constructed of epoxy coated ductile iron, Ford FC202 or equal and have all stainless-steel bolts or screws and a resilient rubber gasket to provide a positive, watertight seal, unless otherwise noted on the Drawings.

3.2. TESTING

A. All piping shall be hydrostatic tested to the rated pressure class of the pipe being tested, or 150 psi, whichever is less.

Procedure	Pressure	Test Duration (hours)
Simultaneous Pressure and Leaking Tests	150% of working pressure at point of test, but not less than 125% of normal working pressure at highest elevation	2
Separate Pressure Test	150% of working pressure at point of test, but not less than 125% of normal working pressure at highest elevation	1
Separate Leakage Test	150% of normal average working pressure of segmented test	2

Source: Recommended Standard for the Installation of Polyvinyl Chloride (PVC) Pressure Pipe, UNI-B-3, Uni-Bell Plastic Pipe Association.

B. Buried Pipe

2. To prevent floating of the pipe, place sufficient backfill prior to filling pipe with water and subsequent field testing. Where local conditions require that the trenches be backfilled immediately after the pipe has been laid, the testing may be performed after backfilling has been completed, but before placement of permanent surface.
3. At least seven days shall elapse after the last concrete thrust or reaction blocking, if used, has been cast with normal (Type I) portland cement. The elapsed time may be reduced to three days with the use of a high-early-strength (Type III) portland cement. It is suggested that testing be conducted first on short lengths of installed pipeline, thereby permitting the installer to verify that proper installation and joint assembly techniques have been employed.

C. Procedure. The following procedure is based on the assumption that the pressure and leakage tests will be performed at the same time. Separate tests may be made if desired, in which case the pressure test shall be performed first. Apply the specified test pressure by means of a pump connected to the pipe. Maintain the test pressure for the specified time (by additional pumping if necessary). While the line is under pressure, carefully examine the system and all exposed pipe, fittings, valves, and hydrants for leakage. Repair or replace all defective elements and repeat the test until all visible leakage has been stopped and the allowable leakage requirements have been met.

1. Test Method. The installer may perform simultaneous pressure and leakage tests, or he may perform separate pressure and leakage tests on the installed system at test durations and pressures specified below.
4. Allowable Leakage

a. The duration of each leakage test shall be 2 hours, unless otherwise specified, and during the test the main shall be subjected to the pressure required in the following table.

ALLOWABLE LEAKAGE FOR AWWA PVC PIPE
Average Test Pressure in Line (psi)
(Allowable Leakage per 1,000 Feet or 50 Joints [gal/hr])

Nominal Pipe Size (in)	50	100	150	200	250
4	0.19	0.27	0.33	0.38	0.43
6	0.29	0.41	0.50	0.57	0.64
8	0.38	0.54	0.66	0.76	0.85
10	0.48	0.68	0.83	0.96	1.07
12	0.57	0.81	0.99	1.15	1.28

b. Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe, or any valved section thereof, to maintain pressure within 5 psi of the specified leakage test pressure after the pipe has been filled with water and the air in the pipeline has been expelled. No installation shall be

accepted if the leakage is greater than that determined by the following formula:

$$L = \frac{ND\sqrt{P}}{7400}$$

Where:

L = allowable leakage, gph
N = number of joints in the length of pipeline tested
D = nominal diameter of the pipe, inch
P = average test pressure during the leakage test, psig

c. Leakage values determined by the above formula are to be found in the preceding table.

D. Take all precautions necessary to protect any equipment that might be damaged by the pressures used in the tests. Delicate equipment shall be valved off, removed, or otherwise protected.

E. Securely anchor and restrain all piping against movement prior to application of test pressures. All joints, fittings, and valves will be left open where possible. Carefully examine all exposed pipe, fittings, valves, and joints during the pressure test.

F. Expel all air from piping before applying the specified test pressure. If hydrants, blowoffs, or air release valves are not available at the high places, make the necessary taps at points of highest elevation before the test is made and insert plugs after the test has been completed

G. Excessive leakage developing during the test shall be corrected at the Contractor's expense. If the defective portion cannot be located, the Contractor, at his expense, shall remove and reconstruct as much of the original work as necessary to obtain a facility meeting the specified leakage limits.

H. Contractor shall bear the complete cost of the tests, including set-up, labor, temporary piping, blocking, gauges, bulkheads, water, air, soap solutions, and any other materials required to conduct the tests.

I. All pipe used for gaseous chlorine shall be tested with ammonia solution as recommended by the manufacturer of the chlorination equipment.

3.3. CLEANUP

A. After completing each section of the sewer line, remove all debris and construction materials and equipment from the site of the work, grade and smooth over the surface of both sides of the line, and leave the entire right-of-way in a clean and neat condition. Unless otherwise called for on the Drawings, restore all disturbed areas to as close to its original condition as possible. Restoration shall include, but not be limited to, grassing and replacing of shrubbery, trees, fences, and other improvements which have been disturbed.

B. Complete cleanup and restoration as soon as practical but in no case later than 30 calendar days after each section of line is installed.

END OF SECTION

SECTION 33 1113.24

HIGH DENSITY POLYETHYLENE PIPE FOR PRESSURE APPLICATIONS

1. GENERAL

1.1 SUMMARY

A. This section includes furnishing all labor, materials, equipment to install high density polyethylene (HDPE) pipe and fittings as shown on the Drawings and/or as specified herein.

1.2 QUALIFICATIONS

A. All HDPE pipe and fittings shall be furnished by a single manufacturer who is fully experienced, reputable, and qualified in the manufacture of the items to be furnished. The equipment shall be designed, constructed, and installed in accordance with ASTM methods and shall comply with these Specifications.

1.3 SUBMITTAL

A. Shop drawings shall be submitted to the Engineer for approval in accordance with Section 01 3323: Shop Drawings, Product Data, and Samples, and shall include dimensioning and technical specification for all piping to be furnished.

B. Submit samples of all materials specified herein to the Engineer for approval when requested.

1.4 PIPE MARKING

A. All HDPE pipe shall be marked with the following information:

1. Manufacturer's name or trademark.
2. Nominal pipe size and OD base.
3. ASTM material code designation.
4. Dimension ratio (DR).
5. Type, Class, and Grade.

1.5 RECEIVING, HANDLING, AND STORAGE

A. Care shall be taken during transportation of the pipe that it is not cut, kinked or otherwise damaged.

B. Ropes, fabric, or rubber protected slings and straps shall be used when handling pipes.

C. Chains, cables, or hooks inserted into the pipe ends shall not be used.

D. Two slings spread apart shall be used for lifting each length of pipe. Pipe or fittings shall not be dropped onto rocky or unprepared ground.

E. The handling of the joined pipeline shall be in such a manner that the pipe is not damaged by dragging it over sharp and cutting objects.

F. Slings for handling the pipeline shall not be positioned at butt fused joints.

G. Sections of the pipes with cuts and gouges shall be removed and the ends of the pipeline rejoined.

H. Pipes shall be stored on wooden sleepers, spaced suitably and of such width as not to allow deformation of the pipe at the point of contact with the sleeper or between the supports.

I. Stacking of the polyethylene pipes shall be limited to a height that will not cause excessive deformation of the bottom layers of pipes under anticipated temperatures conditions.

2. PRODUCTS

2.1 MATERIALS

A. The pipe and fittings supplied under this Specification shall be high performance, high molecular weight, high density polyethylene pipe as manufactured in accordance with AWWA C906 for sizes 4-inch through 24-inch and in conformance with ASTM D 3350-06.

B. The pipe material designation shall be PE4710. Minimum cell classification value of the pipe material shall be 445474C in conformance with ASTM D 3350.

C. The pipe shall contain no recycled compounds except that generated in the manufacturer's own plant from resin of the same specification from the same raw material.

D. The fittings and adapter supplied under this Specification shall be molded from a polyethylene compound having a cell classification equal to or exceeding the compound used in the pipe or shall be manufactured using a polyethylene compound having a cell classification equal to or exceeding the cell classification of the pipe supplied under this Specification. To ensure compatibility of polyethylene materials, all fittings supplied under this Specification shall be of the same manufacturer as the pipe being supplied.

2.2 PHYSICAL PROPERTIES OF PIPE COMPOUND

A. Density. The density shall be 0.947 - 0.955 gms/cm^3 when tested in accordance with ASTM D 1505.

B. Melt Flow. Melt flow shall be not greater than 0.15 gms/10 min. when tested in accordance with ASTM D 1238 - Condition E.

C. Flex Modulus. Flexural Modulus shall be 110,000 psi to less than 160,000 psi when tested in accordance with ASTM D 790.

D. Tensile Strength at Yield. Tensile strength at yield shall be 3,000 psi to less than 3,500 psi when tested in accordance with ASTM D 638.

E. ESCR. Environmental stress crack resistance shall be in excess of 5,000 hours with zero failures when tested in accordance with ASTM D 1693 - Condition C.

F. Hydrostatic Design Basis shall be 1,600 psi at 23°C when tested in accordance with ASTM D 2837.

2.3 PIPE SIZE

A. Pipe supplied under this specification shall have ductile iron pipe size (DIPS) outside diameter unless otherwise specified.

B. The dimension ratio (DR) of the pipe supplied shall be DR 13.5 or DR 17 as shown on the Drawings. Pipe specifications as provided in 00 4143 Bid Schedule shall take precedence over this paragraph.

2.4 CERTIFICATION

A. The Owner or the Engineer may request certified lab data to verify the physical properties of the materials supplied under this Specification or may take random samples and have them tested by an independent laboratory.

3. EXECUTION

3.1 INSTALLATION

A. Thermal Butt-Fusion Joints. Pipes shall be joined to one another, to polyethylene fittings, and to the flanged, mechanical, and plain end adapters by means of thermal butt-fusion. The butt fusion equipment used in the joining procedures shall be capable of meeting all conditions recommended by the pipe manufacturer and required by PPI including requirements relating temperature, alignment, and interfacial fusion pressure. Butt fusion joining shall produce a joint weld strength equal to or greater than the tensile strength of the pipe itself. Polyethylene pipe lengths, fittings, adapters, and flanged or mechanical connections to be joined by thermal-butt fusion shall be of the same type, grade, and class of polyethylene compound and supplied from the same raw material supplier. All butt-fusion joints shall be de-beaded inside and out.

B. Mechanical Joints (MJ). Connections to ductile iron fittings and valves shall be by a polyethylene MJ adapter, with stainless steel stiffeners, retaining

glands, gaskets, and joint restraint for a complete installation. MJ hardware shall be EBBA Iron, or Engineer approved equal. Glands, material assembly and bolting shall be in accordance with ANSI A21.11 (AWWA C111); full face rubber gasket shall be included in the kit.

C. Plain End (PE). Plain end connections of the polyethylene pipe to ductile iron or PVC pipe shall be restrained by adapters, including HDPE bell fittings as required. Adapters shall include a stainless steel stiffeners (in both HDPE and PVC pipes), extended T-bolts, retaining glands, and gaskets for a complete installation. Hardware shall be EBBA Iron, or Engineer approved equal. Glands, material assembly and bolting shall be in accordance with ANSI A21.11 (AWWA C111); full-face rubber gasket shall be included in the kit.

D. Polyethylene wall anchor fittings and concrete anchors shall be utilized as shown on the Drawings and at all pipe material transitions, fittings, and valves.

E. Flanged Joints. Connections of the polyethylene pipe to flanged accessories, other flanged piping systems, or flanged equipment shall be through flanged connections consisting of the following:

1. A polyethylene flanged connection thermally butt-fused to the end(s) of the pipe.

2. A stainless steel back-up flange shall be sized to ANSI B16.1 outside diameter and drilling pattern.

3. Bolts and nuts shall be high strength, low –alloy steel having a minimum yield point strength of 40,000 psi and an ultimate tensile strength of 70,000 psi.

4. Full face rubber gaskets shall conform to AWWA C111.

5. Flange adapters utilized for ductile iron and PVC piping shall not be utilized.

F. All HDPE piping shall be adequately supported, anchored, and restrained.

3.2 TRENCHING AND BACKFILL

A. Locate pipe as per the line and grade shown on the Drawings.

B. Grade trench bottom to provide smooth, firm, stable, and rock-free foundation throughout the length of the pipe.

C. Provide bedding and backfill as shown on Drawings or as Specified herein.

D. Install tracer wire in the bottom of ditch, while locating tape will be a maximum of 12 inches from top of finished grade. Sections of tracer wire shall be joined using splice kits and all joints shall be wrapped to prevent corrosion. Tracer

wire shall be brought, with ample slack, into valve boxes, clean out boxes, and vacuum/air relief boxes.

E. Install pipe according to manufacturer's instructions.

F. Lift and roll pipe into position. Do not drag or drop pipe over prepared bedding.

G. Install backfill at sides and over top of pipe as shown on Drawings.

3.3 INSPECTION

A. Inspect the pipe for defects before installation and fusion. Defective, damaged or unsound pipe shall be rejected.

B. Inspect each joint after fusion.

3.4 TESTING

A. Leak Testing. Hydrostatic leak testing shall be conducted in accordance with ASTM F 2164, "Field Leak Testing of PE Pressure Piping Systems Using Hydrostatic Pressure." Test pressure shall be as indicated on the Drawings or shall be 150 psi if not noted.

B. Expel all air from piping before applying the specified test pressure. If hydrants, blow-offs, or air release valves are not available at the high places, make the necessary taps at points of highest elevation before the test is made and insert plugs after the test has been completed.

C. Excessive leakage developing during the test shall be corrected at the Contractor's expense. If the defective portion cannot be located, the Contractor, at his expense, shall remove and reconstruct as much of the original work as necessary to obtain a facility meeting the specified leakage limits.

D. Contractor shall bear the complete cost of the tests, including set-up, labor, temporary piping, blocking, gauges, bulkheads, water, air, soap solutions, and any other materials required to conduct the tests.

END OF SECTION

SECTION 33 1216

VALVES

1 GENERAL

1.1 SCOPE

A. The work covered by this section includes furnishing all labor, equipment, and materials required to furnish and install all metal valves, including operators, boxes, and accessories, as specified herein, shown on the Drawings, or required for proper completion of the work under these Contract Documents.

B. The Contractor's attention is called to the fact that all valves, especially in the smaller sizes, are not necessarily shown completely on the Drawings, which are more or less schematic. Furnish and install all valves indicated or required for proper operation of the equipment or services requiring such valves.

1.2 SHOP DRAWINGS AND ENGINEERING DATA

A. Submit complete shop drawings and engineering data to the Engineer in accordance with the requirements of Section 01 3323 - Shop Drawings, Product Data and Samples.

1.3 STORAGE AND PROTECTION

A. Store and protect valves and accessories in accordance with the requirements of the valve manufacturer or as directed by the Engineer.

B. Completely drain valves prior to shipment. Protect ends of flanged and mechanical joint valves with full size wooden baffles securely bolted to the valve ends. Size of baffles shall be at least equal to outside diameter of flange. Secure valves 24 inches in size and larger to a wooden skid to facilitate handling and storage.

1.4 SHOP PAINTING

A. Clean, shop prime, and shop paint valves and accessories in accordance with the requirements of these Specifications.

B. All interior and exterior nonmachined, nonbearing ferrous surfaces on iron body valves, gates, and accessories shall be blast cleaned and painted at the factory with two coats of asphaltic varnish conforming to Federal Specification TT-V-51c, unless otherwise specified. Exterior nonmachined, nonbearing ferrous surfaces on valve operators and on nonsubmerged or nonburied butterfly and eccentric plug valves shall be blast cleaned and painted at the factory with one coat of zinc chromate primer conforming to Federal Specification TT-P-645 and one coat of compatible alkyd enamel. Other paint systems may be proposed by the valve supplier, subject to the Engineer's approval.

1.5 OPERATION AND MAINTENANCE DATA

A. Submit complete operation and maintenance data on the valves in accordance with the requirements of Section 01 7823, Operating and Maintenance Data.

1.6 QUALITY ASSURANCE

A. The valve manufacturers shall furnish a written certification to the Engineer that all valves and operators furnished comply with all applicable requirements of the governing AWWA standards specified herein.

1.7 GUARANTEE

A. Provide a guarantee against defective equipment and workmanship in accordance with the requirements of Section 01 7836, Warranties and Bonds.

2 PRODUCTS

2.1 GENERAL

A. All castings, regardless of material, shall be free from surface defects, swells, lumps, blisters, sandholes, or other imperfections.

B. All valves shall have the name of the manufacturer, rated working pressure, and size of the valve cast upon the body or bonnet in raised letters. Alternately, the name of the valve manufacturer, rated working pressure, and size may be stamped on a stainless steel identification plate permanently attached to the valve body or bonnet. Valves specified to conform with AWWA requirements shall have the letters "AWWA" cast upon the valve body or bonnet in raised letters.

C. Valves and operating mechanisms shall be of the proper size and dimensions to fit the pipe connections thereto and shall be installed in the position and within the space shown on the Drawings.

D. The direction of rotation of the operator to open the valve shall be to the left (counterclockwise), unless otherwise specified. Each valve body or operator shall have cast thereon the word OPEN and an arrow indicating the direction to open.

E. A union or coupling shall be provided within 2 feet on each side of a threaded end valve unless the valve can be otherwise easily removed from the piping. This shall not apply to soldered end valves in copper plumbing.

F. All exposed bolts and nuts on buried or submerged valves and operators shall be brass or stainless steel for corrosion resistance. Exposed bolts and nuts on exposed valves and operators shall be of corrosion-resistant materials or shall be zinc or cadmium plated.

G. Valves and operators shall be of the proper size to fit the pipe connections and shall fit in the position and space as shown on the Drawings.

H. Valve operators shall be of sufficient size and capacity to seat, unseat, and operate the valve under the maximum specified differential pressure. Where no maximum differential pressure is specified, the operator shall be designed for a differential pressure equal to the maximum working pressure of the valve. Additional allowances shall be made for the lubricating and/or scale-forming tendencies of the fluid.

2.2 GATE VALVES

A. All gate valves smaller than 2-inches and those larger than 24-inches shall be of the single disc, double sealed, solid tapered wedge type, unless otherwise specified. Gate valves in sizes 2 through 24-inches shall be of the single disc, resilient seated type, unless otherwise specified. Valves shall have non-rising stems and be capable of being repacked under pressure when valve is fully open. Minimum working pressures shall be 200 psi for valves through 14-inches in size and 150 psi for valves 16-inches and larger.

B. Gate valves smaller than 2-inches shall be bronze body, bronze fitted valves, and have 150-pound, cast bronze body, union bonnet, PTFE-impregnated asbestos packing, and threaded ends per ANSI B2.1. Bronze shall conform to ASTM B62. Brass for nuts and gland shall conform to ASTM V16. Valve discs shall be reversible. For use in copper plumbing, furnish gate valves with solder ends per ANSI B16.18.

C. Gate valves larger than 24-inches in water and wastewater shall be iron body, bronze mounted valves conforming in all respects to the applicable material and dimensional requirements of AWWA C500. Gate valves shall have an 0-ring or self-adjusting chevron packing stem seal, and 125-pound flanged ends per ANSI B16.1, except for valves to be buried underground, which shall have mechanical joint ends per ANSI A21.11 (AWWA C111). Body seat rings shall be ASTM B62 bronze and be screwed into the body so as to be field replaceable. Disc faces and all moving parts shall be bronze or bronze mounted. Cast iron for body and bonnet shall conform to ASTM A126, Grade B.

D. Gate valves in sizes 2 through 24-inches for use in water and wastewater shall be of the ductile iron body, resilient seated type, manufactured in conformance with AWWA C509. Gate shall be of ductile iron with bonded resilient seat and integral flush drain. Minimum working pressure shall be 200 psi when unbalanced pressure is applied to either side of the gate. Gate valves shall have a minimum of two 0-ring stem seals; one above and one below the integral stem collar. The area between the 0-rings shall be filled with permanent lubricant. Valve shall have no metal fasteners or screws exposed in the wetted portion of the valve. All ferrous surfaces shall be shot-blasted to a white metal finish. All interior and exterior valve surfaces, including the interior of the gate and all bolt holes shall be coated with an epoxy coating in accordance with AWWA C550. The minimum thickness of the coating shall be 8 mils. Valve ends shall be of the type required for the installation as specified herein or shown on the Drawings and meet the requirements as specified in Paragraph C of this section.

E. Gate valves 3-inches in size and larger in steam service shall have 125-pound cast iron body, bronze trim, and outside stem and yoke.

F. Furnish gate valves with nut, wrench, chain, or handwheel operators as shown on the Drawings. Unless otherwise shown or specified, valves shall have operators as specified in this section. Extension stems, floor stands, and valve boxes and covers shall be furnished where shown or required.

G. Resilient wedge valves for buried service 16-inch diameter and larger shall have bevel gear operators, unless otherwise noted.

2.3 BUTTERFLY VALVES

A. Unless otherwise shown or specified, butterfly valves shall be of the resilient seated, tight-closing type and conform in all respects to the applicable material and dimensional requirements of AWWA C504. Wafer-type butterfly valves in sizes 24-inches and larger shall conform to all general requirements of AWWA C504 except laying length. Butterfly valves shall operate from fully open to fully closed with a 90-degree rotation of the valve stem.

B. Valves shall be designed for the working pressures and/or pressure class designations shown on the Drawings or specified in these Specifications. If a working pressure or pressure rating is not given, the following requirements shall apply:

Service	AWWA Pressure Rating
Low Pressure Air	25B
Wastewater or Sludge	150B
Potable or Plant Water	150B

C. Wafer type valves shall have a pressure rating of not less than 150 psi. Valves shall be drip-tight and bubble-tight at rated pressure differential across the valve in both directions.

D. Valve body shall be one-piece, constructed of cast iron conforming to ASTM A126, Class B. The diameter of the opening shall be not less than the diameter of the corresponding pipe size. Unless otherwise specified, valve body shall be of the short- body style in accordance with Table 2 of AWWA C504. This requirement shall not apply to wafer type valves. No part of the valve internals shall extend beyond the valve ends when the valve is in the closed position. Short-body valves shall have 125-pound flanged ends per ANSI B16.1. Wafer type valves shall be designed to fit between 125- pound flanges per ANSI B16.1.

E. Disc shall be cast bronze conforming to ASTM B143, Alloy 1A, cast iron conforming to ASTM A126, Class B, Ni-Resist cast iron conforming to ASTM A436, Type 1 or 2, or Ni-resist ductile iron conforming to ASTM A439, Type D2. When used in wastewater or raw water, disc shall be streamlined with no exterior ribbing or openings.

F. Shafts shall be polished stainless steel conforming to ASTM A276, Type 304 or Type 316. All keys and pins used in securing valve disc to shafts shall be stainless steel or monel.

G. Valve seat shall be one-piece, molded synthetic rubber, Buna-N (Hycar) for wastewater and Buna-N or neoprene for air. Where temperatures exceed 180°F, EPT or Viton seats shall be used. Retaining rings, if used, shall be stainless steel. The method of mounting valve seat shall conform to the applicable requirements of AWWA C504, Section 3.5. Valve seats in sizes 24-inches and larger shall be field replaceable without necessity of chipping, burning, or cutting. Seats secured with retaining rings shall be fully adjustable. Metal seat mating surfaces shall be smoothly contoured and polished 18-8 stainless steel or monel. Alloy cast iron will not be acceptable as a seat mating surface. Sprayed or plated seat mating surfaces will not be acceptable.

H. Shaft seals shall be 0-ring or self-adjusting chevron packing of Buna-N or neoprene. Shaft seals shall conform to the requirements of AWWA C504, Section 3.7, and shall be of a design that allows replacement of the seal without removing the valve shaft. Alternately, pull-down packing is acceptable if the packing is adjustable and replaceable without removing valve operator.

I. Valve bearings shall be self-lubricating, sleeve-type bearings of corrosion resistant materials. Bearing load shall not exceed 2,500 psi. Provide valves 24-inches in size and larger with an adjustable, two-way thrust bearing to center the disc in the valve and allow the valve to be installed with the valve stem vertical. Bearing shall be easily accessible for adjustment.

J. Where the valve is installed adjacent to a fitting, flow meter, another valve, or similar items, furnish a spool piece or adaptor coupling as a spacer so that valve disc does not interfere with the operation of the adjacent meter or valve or contact cement linings on pipe or fittings.

K. Furnish valve with a lever operator, rotary manual operator, electric motor operator, or pneumatic cylinder operator as shown on the Drawings. Unless otherwise shown or specified, furnish a lever operator on valves 6-inches and smaller and a rotary manual operator on valves 8-inches and larger. Furnish extension stem and floorstand where shown or required.

L. Butterfly valves for drinking water service shall be coated interior and exterior with 10 mils, minimum, of TNEMEC Potapox 20, fully compliant with AWWA C550.

M. Butterfly valves shall be as manufactured by Dezurik, Pratt, Golden Anderson, or Engineer approved equal.

2.4 TWO-WAY PLUG VALVES

A. Two-way plug valves, unless otherwise shown or specified, shall be of the eccentric, non-lubricated type with resilient, neoprene-faced or epoxy-coated plugs providing drip-tight shut-off at rated pressure. Port area shall not be less than 100 percent of the corresponding full pipe area in sizes 16-inches and smaller and 100 percent of the corresponding full pipe area in valves 18-inches and larger. Two-way valves shall operate from fully open to fully closed with a 90-degree rotation of the valve stem.

B. Valves shall be designed for a working pressure of not less than 175 psi in sizes through 16-inches and 150 psi in sizes 18-inches and larger. Valves shall be drip-tight at rated pressure differential in both directions.

C. Valves shall have bodies of ASTM A126, Grade B or ASTM A48, Grade 40 cast iron. Valves 4-inches and larger in size shall have bolted bonnet.

D. Body seats for resilient-faced plugs shall be welded in and contain a minimum of 90 percent nickel. Welded-in seats shall conform to the applicable requirements of AWWA C507, Section 3.2 and AWWA C504, Section 3.5.

E. Plugs without a resilient coating or facing shall be epoxy coated and shall have a field replaceable, full-circle rubber seat securely attached to the plug. Body seats shall be nylon coated.

F. Shaft seal shall be of the self-adjusting or split-V type of Buna-N and shall comply with the applicable requirements of AWWA C504, Section 3.7 and AWWA C507, Section 3.2. Seals requiring adjustment shall be adjustable and replaceable without bonnet or shaft removal.

G. Supply bearings in both the upper and lower journals. Bearings shall be permanently lubricated and replaceable with stainless steel, bronze, or specially coated corrosion resistant sleeves and bushings. Bearings shall conform to the applicable requirements of AWWA C504, Section 9 and AWWA C507, Section 8.

H. Valves sized 2 1/2-inches and smaller shall have threaded ends per ANSI B2.1. End connections for valves sized 3-inches and larger shall be 125-pound flanged per ANSI B16.1, except for valves to be buried underground, which shall have mechanical joint ends per ANSI A21.11 (AWWA C111). Flanged end valves in sizes 12-inches and smaller shall have a laying length equal to that of an AWWA gate valve of the same size.

I. Valves intended for buried or submerged service shall be sealed against the entrance of water and dirt.

J. Furnish valves with a lever operator, rotary manual operator, or electric motor operator as shown on the Drawings. Unless otherwise shown or specified, a lever operator shall be furnished on valves 6-inches and smaller, and a rotary manual operator with handwheel shall be furnished on valves 8-inches and larger. Extension stem, floorstand, and valve box shall be furnished where shown or required.

K. Two-way plug valves shall be DeZurik, Golden Anderson, or Engineer approved equal.

2.5 CURB STOPS AND CORPORATION STOPS

A. Curb stops shall be of all-bronze construction with straight-through unobstructed pattern flow, PTFE-coated plug, top and bottom 0-ring plug seals, 0-ring port seals, and solid tee handle. Valves shall be suitable for 175 psi minimum working pressure. A quarter turn shall operate the valve from fully open to fully

closed position. Valves shall comply with the applicable requirements of AWWA C800.

B. Furnish curb stops with cast iron foot pieces to permit the curb box to rest on a solid surface without bearing on the curb stop or piping.

C. Curb boxes shall be of cast iron, have a 2-inch inside diameter, and be of the extension type with lid and plug. One compatible steel shut-off rod of suitable length shall be furnished. Coat curb boxes and bases with a suitable bituminous coating.

D. Corporation stops for service line connections shall be precision fitted, individually lapped, ground joint key stops of all bronze construction. For tapped connections to water mains, inlet threads shall be of the steep taper, corporation stop type. Corporation stops shall conform to the applicable requirements of AWWA C800.

2.6 AIR RELEASE VALVES

A. Air release valves shall have nylon or stainless steel body and cover, stainless steel float, stainless steel or bronze trim, and Buna-N seat. All other attaching parts or internal parts shall be stainless steel.

B. Valve shall be designed for a working pressure of 0 to 150 psi unless otherwise shown or specified and shall be equipped with an orifice appropriate to the venting needs of the pipeline.

C. Sewage valves shall be equipped with an elongated body, a 2-inch NPT inlet connection, and a 1/2-inch NPT outlet connection and shall be provided with 2-inch inlet shut-off valve, 1-inch blow-off valve, and 1/2-inch back-flush valve with quick-disconnect coupling and flushing hose with quick-disconnect connections.

D. Air release valves shall be installed in valve pit, complete with tapping saddle and connecting line to main, gate valve, etc., and at the location(s) shown on the Drawings. Valves 2- inches and smaller shall have NPT screwed inlet. Combination air vacuum/air release valves shall be ARI, or Engineer approved equal.

2.7 PRESSURE REDUCING VALVES FOR WATER

A. Pressure reducing valves shall automatically reduce a higher inlet pressure to a preset, steady outlet pressure. The reducing valve shall be very sensitive to slight pressure changes and immediately control the main valve to maintain the desired pressure. Valve outlet pressure shall be adjustable between 3 and 30 psi.

B. The main valve shall be direct acting, single seated, spring-loaded, diaphragm-actuated, globe type valve. When the downstream pressure exceeds the pressure setting, the main valve shall close drip-tight. Piston actuators will not be acceptable. Main valve shall be guided at two locations. No external packing glands shall be used and the diaphragm shall not be used as a seating surface.

C. Pressure reducing valves sized 2-inches and smaller shall have cast bronze body; stainless steel seat ring; PTFE, Buna-N, or composition disc and diaphragm; and outside screw adjustment. Valves shall be suitable for 230-psi inlet pressure. Valves shall be furnished with threaded ends per ANSI B2.1.

D. Pressure reducing valves 3-inches and larger shall have cast iron body, bronze trim, bolted cover, and pilot-controlled main valve. The pilot control system shall be external, connected to the valve with union fittings. Pressure setting shall be adjustable by a single screw adjustment enclosed in a tamperproof housing. Valve shall be suitable for an inlet pressure of not less than 175 psi. Valves sized 2 1/2-inches shall have threaded ends per ANSI B2.1. Valves 3-inches and larger shall have 125-pound, flanged ends per ANSI B16.1. Valve body and cover shall be of cast iron conforming to ASTM A48. Valve trim and pilot control shall be of ASTM B61 or B62 bronze. Pilot control trim shall be stainless steel. Pilot valve shall be supplied with an integral strainer constructed of heavy and fine mesh monel screens to protect the pilot control system from foreign particles. Pilot-controlled valves shall be GA Industries Fig. 45-D, or Engineer approved equal.

E. A separate Y-pattern strainer with threaded or bolted cleanout shall be furnished and installed immediately upstream of each pressure reducing valve. Area through the screen shall be not less than 4 times the full pipe area. Strainers shall have a pressure rating not less than that of the protected pressure regulating valve.

F. A 2-inch pressure gauge with tee-head, bronze gauge cock shall be installed on the upstream and downstream side of each pressure regulating valve unit. Pressure gauges on the upstream side shall have a range of approximately 0 to 160 psi. Pressure gauges on the downstream side shall have a range of approximately 0 to 80 psi.

2.8 BALL VALVES

A. Ball valves shall be of the quarter turn type with full pipe size opening through the valve. Ball valves shall be suitable for a differential working pressure in either direction of not less than 400 psi.

B. Ball valves shall have a three-piece, bolted body designed to allow the interior portion of the valve to be removed without disturbing adjacent piping.

C. Unless otherwise specified or required, ball valves shall have brass body, self-aligning brass ball, blowout-proof brass stem, reinforced PTFE seats and seals, plastic-coated plated steel handle, and threaded ends per ANSI B2.1.

D. In stainless steel piping, or where specified, valve shall have a forged Type 316 stainless steel body, ball, and trim.

2.9 CHECK VALVES

A. Check valves shall be of the swing type suitable for use in either horizontal or vertical piping, unless otherwise shown or specified. Disc shall swing entirely clear of the path of flow when in the open position. All internal parts shall be readily accessible and easily replaced in the field.

B. Check valves in sizes 2 1/2-inches and smaller shall be Y-pattern, regrinding, bronze body, and bronze mounted valves. Valves shall have 200-pound cast bronze body, renewable bronze disc, screwed cap, and threaded ends per ANSI B2.1. Bronze for body and cap shall conform to ASTM B61. Brass nuts and pin shall conform to ASTM B16. Valves shall have a hinge bumper capable of preventing the valve from sticking in the open position and an arrow cast on the valve body to indicate direction of flow.

C. Check valves in sizes 3-inches and larger shall be iron body, bronze mounted valves conforming to AWWA C508, epoxy-coated inside and outside. Valves shall have 125-pound cast iron body, bolted and gasketed cover, stainless steel or bronze hinge pin, rubber faced, renewable, bronze or cast iron resilient disc, renewable bronze seat ring, outside lever and adjustable weight, and 125-pound flanged ends per ANSI B16.1. Cast iron for body and cap shall conform to ASTM A126, Grade B. Bronze for disc and seats shall conform to ASTM B584. Iron body check valves shall be Golden Anderson, or Engineer approved equal.

D. Valves shall be installed with pressure under the disc.

E. Check valves in air or gas piping sized 2 1/2-inches or smaller shall be bronze, swing type check valves conforming to the requirements of Item B above, except that the disc shall have a replaceable, resilient seat of Buna-N or PTFE. Bronze check valves for air or gas service shall be Nibco Fig. T-453-W, Kennedy Fig. 442, or equal.

F. Check valves in air or gas piping sized 3-inches and larger shall be of the double plate, spring-loaded, clapper type with cast iron body, aluminum, bronze or bronze plates, stainless steel hinge pin and springs, and Buna-N seats. When operating temperatures exceed 180°F, Viton seats shall be used. Check valves shall be wafer style bodies suitable for mounting between two 125-pound ANSI B16.1 flanges. Check valves shall be rated for a working pressure of not less than 150 psi. Install clapper style check valves in horizontal piping with the pin in a vertical position.

2.10 HOSE BIBBS

A. Hose bibbs shall be angle hose valves of bronze construction suitable for 125 psi minimum working pressure. Valves shall have a renewable PTFE or resilient disc and shall be furnished with a 3/4-inch male hose outlet connection. Body and bonnet shall be ASTM B62 bronze. Valves shall be furnished with a suitable cap and chain. Inlet connection shall be threaded per ANSI B2.1.

2.11 ALTITUDE VALVES

A. Altitude valves shall be single-acting, hydraulically operated, pilot actuated, diaphragm or piston type globe valves designed for ground level control of water level in storage tanks. Valve shall be of the non-throttling differential type and shall be air and water cushioned on closing to prevent surges on shutoff. Valve shall be suitable for 175 psi working pressure. Operating point and closing speed shall be adjustable.

B. Valve shall have a cast iron body and bolted bonnet conforming to ASTM A126, Class B, bronze pilot control valve and main valve trim, resilient seat disc, stainless steel pilot trim, and reinforced synthetic rubber diaphragm. Seat ring, disc, and diaphragm shall be removable without removing the valve from the line. Piston type valves shall be constructed with removable resilient seals and guides to prevent metal-to-metal contact. No external packing glands shall be used and the diaphragm shall not be used as a seating surface. Main valve stem shall be guided at both ends. Pilot control shall be three-way, hydraulically balanced, diaphragm type.

C. An indicator rod shall be provided to show valve position. A fine mesh stainless steel or Monel strainer shall be provided in the control piping. A 4 1/2-inch pressure gauge calibrated in both psi and feet of water shall be provided on both sides of the altitude valve.

D. Valve shall be furnished with 125-pound flanged ends per ANSI B16.1.

E. A standard repair kit shall be supplied for the altitude valve. Kit shall include liner cap, seat ring, cover gasket, indicator packing, vent packing, and piston cup for main valve, seat ring, lower packing, upper packing, stem gasket, and diaphragm for pilot.

F. Altitude valves shall be GA Industries Figure 3200-D; or approved equal.

2.12 FLAP VALVES

A. Flap valves shall be designed to withstand the stresses resulting from high-head seating applications and to maintain sensitivity to unseating heads.

B. Flap valves shall have iron bodies and shall be bronze mounted. Valves shall be furnished with bronze hinge pins, flap rings, and seat rings.

C. Valves shall be furnished with 125-pound flanged ends per ANSI B 16.1.

2.13 KNIFE GATE VALVES

A. Knife gate valves shall be of the flanged wafer type with outside stem and yoke and a metal-seated, knife-blade gate with a beveled edge designed to push aside or cut through solids in its path. Knife gate valve shall have full round port opening and shall have a working pressure of at least 125 psi in sizes 10-inches and smaller and 50 psi in sizes 12-inches and larger. Valves shall be capable of providing bi-directional, drip tight shutoff.

B. Knife gate valves shall have a heavy, one-piece body and end flanges of steel or cast iron. Valves shall be lined throughout with stainless steel, including the chest and packing areas. Liner shall extend beyond flange to form raised face mating surface. Knife gate shall be of ground and polished stainless steel of sufficient thickness to resist deformation of rated pressure across the gate. A full circle, raised-face seat with machined gate jambs at the sides and bottom shall be provided to hold the gate and assure positive seating. Seat shall have a neoprene or Buna-N elastomer D shaped ring recessed into the face of the valve

seat for a driptight shutoff. All wetted parts of the valve shall be of Type 304 stainless steel.

C. Knife gate shall be sealed with a minimum of four rings of PTFE or neoprene-impregnated asbestos packing. Gland shall be of corrosion-resistant material or shall be specially coated for corrosion resistance. Gland bolts and nuts shall be stainless steel.

D. A heavy, fabricated, angular steel yoke assembly with stainless steel rising stem and bronze yoke sleeve shall be provided on the valve. Valve shall be provided with handwheel operator or extension stem and floorstand as shown on the Drawings. Valves 24-inches and larger shall have a geared operator.

E. Ends of the valve shall be flanged and shall be drilled to mate with 125-pound cast iron flanges per ANSI B16.1.

F. Knife gate valves shall be Orbinox, Dezurik, Fabri-Valve, or Engineer approved equal.

2.14 MANUAL VALVE OPERATORS

A. All gate valves shall be furnished with manual operators as follows, unless otherwise shown or specified:

B. Operating nuts for buried or submerged valves shall be standard 2-inch square nuts and shall conform to AWWA C500, Section 19. Extension stems, valve boxes, and stem guides shall be furnished where shown, specified, or required for proper operation.

C. Manual rotary operators for buried or submerged service shall be totally enclosed and completely sealed to prevent the entrance of water and dirt. Buried or submerged operators shall be finished on the outside with a bituminous or other approved coating. Rotary operators for buried or submerged service shall be capable of withstanding 300 foot-pounds of torque on the operating nut or handwheel. A corrosion-resistant, dial type valve position indicator shall be provided at the operating nut on the extension stem of buried operators to provide a remote indication of valve position.

D. All manual rotary and lever operators shall be capable of seating or unseating the valve disc under the most adverse conditions in the particular application with not more than an 80-pound pull on the handwheel or lever. Valve operators shall be capable of holding the valve in any position between fully open and fully closed without creeping or fluttering. Operators shall be provided with adjustable, mechanical, stop-limiting devices to prevent over-travel of the valve disc in the open and closed positions. Manual rotary and lever operators shall comply with all applicable requirements of AWWA C540, Sections 11.1, 11.2, and 11.3.

2.15 VALVE BOXES

A. All buried valves shall be provided with three-piece, cast iron, extension sleeve type valve boxes suitable for the depth of cover shown on the Drawings.

B. Valve boxes shall not be less than 5- inches in diameter, shall have a minimum thickness of 3/16-inch at any point, and shall be provided with suitable cast iron bases and covers. Covers shall have cast thereon an appropriate name designating the service for which the valve is intended ("W" for water, "S" for drain or waste lines). Covers in roadways shall be of the deep locking type.

C. All parts of valve boxes, bases, and covers shall be heavily coated with a suitable bituminous finish.

D. Valves and boxes shall be set plumb. Each valve box shall be placed directly over the valve it serves with the top of the box flush with the finished grade.

2.16 T-HANDLE OPERATING WRENCH

A. Furnish two T-handle, steel valve operating wrenches with sockets compatible with standard 2-inch square valve operating nuts.

B. The operating wrenches shall be at least 36-inches in length.

2.17 SPARE PARTS

A. Furnish the following spare parts where applicable for the valves specified herein:

1. Stem packing	One set each type and size of valve
2. Renewable stainless steel or bronze seat ring	One each type and size of valve
3. 0-ring stem or shaft seals	One set each type and size of valve
4. Resilient seat or disc	One each type and size of valve
5. Shaft bearings or bushings	One set each type and size of valve
6. Hinge pin, disc, spring, and disc bolts	One set each type and size of check valve
7. Gaskets	One set each type and size of valve
8. Special tool or seat wrench required for valve servicing and maintenance	One each

B. Suitably protect spare parts against corrosion and impact to withstand long-term storage. All parts shall be clearly labeled and identified by manufacturer's name and number and the valve to which they belong.

3 EXECUTION

3.1 FACTORY TESTS

A. Test all valves at the point of manufacture for proper and unobstructed operation and for leakage and adequacy of design.

B. Test iron body gate valves in accordance with AWWA C500, Section 5.

C. Test butterfly and plug valves in accordance with AWWA C504, Section 5.

D. Test iron body check valves in accordance with AWWA C508, Section 5.

E. All other valves shall be given an operation test, a leakage test at rated pressure differential, and a hydrostatic test at two times rated pressure. During the hydrostatic test, there shall be no leakage through the metal, the end joints, or the shaft or stem seal, nor shall any part be permanently deformed. During the leakage test, leakage shall not exceed that permitted by ANSI 816.104, Class IV for metal seated valves and Class VI for resiliently seated valves.

3.2 INSTALLATION

A. Install all valves in strict conformance with the Drawings and approved Shop Drawings and manufacturer's instructions.

B. Install all underground valves using a concrete valve box with cast iron frame and cover or in a cast iron valve box as specified herein.

C. Install valves in such a way that operators and packing are easily accessible. Valves with field replaceable seats shall be installed with sufficient clearance to permit removal of valve bonnet and stem without removing valve from the line.

D. Field measure and carefully coordinate stem size and threading where new operators are to be installed on existing valves.

3.3 FIELD TESTING

A. Following installation, test all valves under the anticipated operating conditions. The ability of the valves to operate properly without leakage, binding, sticking, fluttering, or excessive operating torque shall be demonstrated to the satisfaction of the Engineer. At Contractor's expense, adjust and/or replace any valve as necessary to ensure satisfactory operation.

END OF SECTION

SECTION 33 1616

FRP WASTEWATER TANK

PART - 1 GENERAL

1.1 SCOPE

a. Under this Section furnish and deliver FRP wastewater tanks capable of performing as specified herein. Equipment components shall conform to the specific requirements of this section.

b. The following items or services will be provided by others or the Contractor:

1) Unloading
2) Installation

1.2 RELATED SECTIONS

a. The following Sections are referenced, inclusive of the Contract Documents and Specifications:

1) 01 3323 Shop Drawings, Product Data, Samples
2) 01 4219 Applicable Codes and Standards
3) 01 6500 Transportation and Handling
4) 01 7823 Warranties and Bonds
5) 01 7843 Spare Parts

1.3 REFERENCE STANDARDS

b. The following Reference Standards are referenced and incorporated herein

2) American Concrete Institute (ACI) standard ACI 318, Building Code Requirements for Structural Concrete.
3) ANSI/AWWA D120 - Thermosetting Fiberglass-Reinforced Plastic Tanks.
4) IAPMO/ANSI Z1000 - Prefabricated Septic Tanks.
5) Tank manufacturer shall be recognized by Underwriters Laboratories as a manufacturer of tanks listed to the UL-1316 standard.

1.4 SUPPLIER

a. Qualifications

1) The FRP wastewater tank and all of its components shall be furnished by a single Supplier regularly engaged in the design and manufacture of FRP tanks.
2) The Supplier shall have at least 20 years of experience in the application, design, and furnishing of FRP wastewater tanks of the size and type specified herein.
3) The Supplier shall have at least 50 installations of similar or larger size and of similar type.

4) The Supplier shall have an established ISO 9001 certified quality management system or a written quality assurance program.

b. Relationship with Installing Contractor. The FRP wastewater tanks furnished under this Section will be purchased, unloaded, and installed by a Contractor selected by the Owner in accordance with detailed drawings and installation instructions furnished by the Supplier.

1.4 SHOP DRAWINGS AND ENGINEERING DATA

a. Submit complete shop drawings and engineering data to the Engineer prior to fabricating equipment in PDF format. Shop drawings shall include the following information:

1) Manufacturer's product data sheets giving detailed functional description.
2) Construction and material specifications.
3) Performance specifications.
4) Electrical requirements and wiring diagrams.
5) Exploded assembly diagrams and component lists.
6) Plan and elevation drawings with dimensions in English units.
7) Process and instrumentation diagrams.
8) List of spare parts to be furnished.

b. Submit complete installation, assembly, and erection drawings and detailed installation and adjustment instructions to the Contractor. Information shall include weights of equipment and anchor bolt location and arrangement. Equipment lifting points shall be provided, along with recommendations for short-term and long-term storage.

1.5 TRANSPORTATION

a. Provide transportation of all equipment, materials, and products furnished under this section to the job site. Coordinate transportation with Contractor's installation schedule.
b. Suitably box, crate, or otherwise protect all equipment during transportation.
c. Ship and deliver all equipment in the largest assembled sections practical or permitted by carrier regulations to minimize the number of field connections.
d. Ensure that the equipment is assembled and transported in such a manner so as to clear buildings, power lines, bridges, and similar structures encountered during shipment or delivery to the site of the work.
e. Small items and appurtenances such as gauges, valves, switches, instruments, and probes which could be damaged during shipment shall be removed from the equipment prior to shipment and packaged and shipped separately. All openings shall be plugged or sealed to prevent the entrance of water or dirt.

1.6 OPERATION AND MAINTENANCE DATA

a. Submit one preliminary copy (PDF format) and four final printed copies of a complete operation and maintenance manual covering all equipment and products furnished under this section. Manuals shall be assembled in tabbed and indexed 3-ring binders with typed table of contents. Organize manuals into separate sections for each piece of related equipment. Final operation and maintenance manuals shall be furnished in electronic (PDF) format as well as hard copy.

1.7 WARRANTY

a. Provide a written warranty against defective workmanship and materials on the FRP wastewater tanks for a period of 12 months following substantial completion of the construction contract. This warranty shall be in addition to any implied warranties and shall cover both parts and labor.

b. When work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the original warranty on the failed item of equipment by written endorsement.

c. Complete warranty work as soon as possible following receipt of notice from the Owner for a warranty claim.

d. In the event of multiple equipment failures of major consequence during the warranty period, disassemble, inspect, and modify or replace the affected equipment as necessary to prevent further occurrences and reinstate the original warranty.

1.8 PATENTS

a. Pay all patent fees and royalties and bear all costs incident to the use of any design, process, or product, which is the subject of patent or copyright by others.

b. Indemnify, defend, and hold harmless the Owner and Engineer and their employees and agents from and against all claims, damages, losses, and expenses (including attorney's fees and court costs) arising out of the infringement of any patent rights or copyrights incident to the performance of the work.

PART - 2 PRODUCTS

2.1 MANUFACTURERS:

A. Fiberglass Tanks:

1. Acceptable Manufacturer: Xerxes Corporation, or Engineer approved equal.

2.2 UNDERGROUND FRP WATER & WASTEWATER TANKS

A. Tank Design - Fiberglass reinforced plastic (FRP) tanks:

1. The tank size, fittings and accessories shall be as shown on the drawings.
2. Tank shall be manufactured with structural ribs which are fabricated as in integral part of the tank wall.
3. Tank shall be manufactured with a laminate consisting of resin and glass fiber reinforcement only. No sand/silica fillers or resin extenders shall be used.
4. Tank shall be vented to atmospheric pressure.
5. Tank shall be capable of handling liquids with specific gravity up to 1.1
6. Tank shall be compatible with liquids identified in the manufacturer's standard limited warranty.

B. Loading Conditions - Tank shall meet the following design criteria:

1. Internal Load - Tank shall be designed to withstand a 5-psig (35 kPa) air-pressure test with a 5:1 safety factor.
2. Surface Loads - Tank shall be designed to withstand surface H-20 and HS-20 axle loads when properly installed according to manufacturer's current Installation Manual and Operating Guidelines.
3. External Hydrostatic Pressure - Tank shall be designed for 7 feet (2.1 m) of overburden over the top of the tank, the hole fully flooded, and a safety factor of 5:1 against general buckling.

C. Onsite Wastewater Storage Applications:

1. Governing Standards, as applicable:
   a. ANSI/AWWA D120 - Thermosetting Fiberglass-Reinforced Plastic Tanks.
   b. American Concrete Institute (ACI) standard ACI 318, Building Code Requirements for Structural Concrete.
   c. IAPMO/ANSI Z1000 - Prefabricated Septic Tanks. Tank shall be IAPMO/ANSI Z1000 listed and labeled.
   d. Tank manufacturer shall be recognized by Underwriters Laboratories (UL) as a manufacturer of tanks listed to the UL-1316 standard.

2. Tank Design: Single-Wall vessel as specified and shown on the Drawings.

3. Tank Accessories – Water & Wastewater Storage Applications:
   a. Tank Anchoring:
      1) Anchor straps shall be as supplied by tank manufacturer and designed for a maximum load of 25,000 lbs (11340 kg).
      2) Galvanized turnbuckles shall be supplied by the tank manufacturer.
      3) Prefabricated concrete anchors shall be supplied by the tank manufacturer, designed to the ACI 318 standard, manufactured with 4,000 psi concrete and shall have adjustable anchor points.
   b. Access Openings:
      1) Access openings shall have a diameter of 24 inches, 30 inches, 36 inches, 42 inches or 48 inches (610 mm, 762 mm, 914 mm, 1067 mm and 1219 mm respectively), complete with riser, lid and necessary hardware.
   c. Attached Access Risers:
      1) Attached access risers shall be PVC or FRP as supplied by tank manufacturer.
      2) Attached 24 inch and 30-inch diameter access risers shall be PVC.
      3) Attached 36-inch, 42-inch and 48-inch diameter access risers shall be FRP.
      4) PVC and FRP access risers shall be available in 2-foot, 3-foot, 4-foot, 5-foot and 6-foot lengths. Appropriate lengths shall be specified on the site plans.
      5) Access risers ship loose and shall be attached to access openings during installation utilizing adhesive or FRP bonding kits as supplied by the tank manufacturer.
   d. Piping and Fittings:

1) Tank shall be equipped with factory-installed threaded fittings, or pipe stubs.
2) PVC piping shall at a minimum meet the requirements of ANSI Schedule 40.
3) All flanged nozzles shall be flanged and flat-faced and conform to Class 150 bolting patterns as specified in ANSI/ASME/ B16.5.
4) Carbon steel and stainless-steel NPT fittings shall withstand a minimum of 150 foot-pounds (203 NM) of torque and 1,000 foot-pounds (1356 NM) of bending, both with a 2:1 safety factor.

e. Manway Openings:
1) The standard manway shall be flanged, 22 inches (559 mm) I.D. and complete with gaskets, bolts and cover.
2) Manway openings shall be designed to withstand 5-psig (35 kPa) test pressure with a 5:1 safety factor.
3) Manway openings shall be used to support top mount agitator assemblies as required for process mixing.

f. Baffles and Partitions:
1) Baffles and Partitions shall be capable of withstanding hydrostatic loads occurring when one compartment is empty, and the remaining compartment(s) is full.

g. Pump/Mixer Platforms & Aeration Grid Supports:
1) 12-inch-long x 36-inch wide flat FRP platforms shall be affixed to the bottom of aeration tank chambers for the purpose of supporting aeration grid assemblies
2) 24-inch, 30-inch or 36-inch square flat FRP platforms shall be affixed to the bottom of pump/mixer chambers for the purpose of supporting pump and mixer slide rail assemblies.
3) All platforms shall be designed to support up to 300 lbs each.

PART - 3 EXECUTION

3.1 SERVICES TO BE PROVIDED

An approved manufacturer's representative shall provide the following services for each project. The general contractor shall install the fiberglass tanks and all related components that are not able to be factory installed.

A. Provide onsite technical assistance for the handling and positioning of the fiberglass tank(s) the day of installation.

B. Return to the site for testing and/or commissioning of the fiberglass tank(s) upon substantial completion of site work by the general contractor (backfill, piping, electrical, grading, etc.). Supplier shall be available to train the operator(s) and instruct the owner on treatment process operation the day of testing/commissioning.

C. Remain accessible to the owner and/or operator for phone consultation.

D. Be available on a contract basis for additional site visits or consultation.

3.2 INSTALLATION

A. Tank(s) shall be installed according to the tank manufacturer's Installation Manual and Operating Guidelines in effect at time of installation.

B. All materials and equipment shall be installed in a neat, workmanlike manner by the general contractor.

C. The FRP tanks and all applicable treatment units supplied shall be installed with sufficient ballast to offset buoyant forces due to induced or high groundwater conditions.

3.3 TESTING

A. Tank(s) shall be tested according to the tank manufacturer's Installation Manual and Operating Guidelines in effect at time of installation.

B. Underground water and wastewater tanks outfitted with access openings and field attached PVC or FRP access risers may not be pressure tested.

C. After installation, water and wastewater tanks shall undergo a 1-day hydrostatic test with sealed access risers and covers installed to confirm they are watertight.

END OF SECTION

40 9513.23

DOSING SYSTEM CONTROL PANEL

PART 1 - GENERAL

1.1 SCOPE

A. Under this Section furnish and deliver a complete wastewater effluent drip dispersal dosing system control panel capable of performing as specified herein and as shown on the drawings. Equipment components shall conform to the specific requirements of this section.

1.2 RELATED SECTIONS

A. The following Sections are referenced, inclusive of the Contract Documents and Specifications:

1. 01 3323 Shop Drawings, Product Data, Samples
2. 01 4219 Applicable Codes and Standards
3. 01 6500 Transportation and Handling
4. 01 7823 Warranties and Bonds
5. 01 7843 Spare Parts

1.3 REFERENCE STANDARDS

A. The following Reference Standards are referenced and incorporated herein

1. UL-508

1.4 SUPPLIER

A. Qualifications

1. The dosing system control panel and all of its components shall be furnished by a single Supplier regularly engaged in the design and manufacture of electrical and control equipment and systems.
2. The Supplier shall have at least 10 years of experience in the application, design, and furnishing of dosing system control panel equipment of the size and type specified herein.
3. The Supplier shall have at least 50 installations of similar or larger size and of similar type.
4. The Supplier shall have an established ISO 9001 certified quality management system or a written quality assurance program.

B. Relationship with Installing Contractor. The dosing system control panel furnished under this Section will be purchased, unloaded, and installed by a Contractor selected by the Owner in accordance with detailed drawings and installation instructions furnished by the Supplier.

1.5 SHOP DRAWINGS AND ENGINEERING DATA

A. Submit complete shop drawings and engineering data to the Engineer prior to fabricating equipment in PDF format. Shop drawings shall include the following information:

1. Manufacturer's product data sheets giving detailed functional description.
2. Construction and material specifications.
3. Performance specifications.
4. Electrical requirements and wiring diagrams.
5. Exploded assembly diagrams and component lists.
6. Plan and elevation drawings with dimensions in English units.
7. Process and instrumentation diagrams.
8. List of spare parts to be furnished.

B. Submit complete installation, assembly, and erection drawings and detailed installation and adjustment instructions to the Contractor. Information shall include weights of equipment and anchor bolt location and arrangement. Equipment lifting points shall be provided, along with recommendations for short-term and long-term storage.

1.6 TRANSPORTATION

A. Provide transportation of all equipment, materials, and products furnished under this section to the job site. Coordinate transportation with Contractor's installation schedule.
B. Suitably box, crate, or otherwise protect all equipment during transportation.
C. Ship and deliver all equipment in the largest assembled sections practical or permitted by carrier regulations to minimize the number of field connections.
D. Ensure that the equipment is assembled and transported in such a manner so as to clear buildings, power lines, bridges, and similar structures encountered during shipment or delivery to the site of the work.
E. Small items and appurtenances such as gauges, valves, switches, instruments, and probes which could be damaged during shipment shall be removed from the equipment prior to shipment and packaged and shipped separately. All openings shall be plugged or sealed to prevent the entrance of water or dirt.

1.7 OPERATION AND MAINTENANCE DATA

A. Submit one preliminary copy (PDF format) and four final printed copies of a complete operation and maintenance manual covering all equipment and products furnished under this section. Manuals shall be assembled in tabbed and indexed 3-ring binders with typed table of contents. Organize manuals into separate sections for each piece of related equipment. Final operation and maintenance manuals shall be furnished in electronic (PDF) format as well as hard copy.

1.8 WARRANTY

A. Provide a written warranty against defective workmanship and materials on the dosing system control panel system and components for a period of 12 months following substantial completion of the construction contract. This warranty shall be in addition to any implied warranties and shall cover both parts and labor.

B. When work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the original warranty on the failed item of equipment by written endorsement.

C. Complete warranty work as soon as possible following receipt of notice from the Owner for a warranty claim.

D. In the event of multiple equipment failures of major consequence during the warranty period, disassemble, inspect, and modify or replace the affected equipment as necessary to prevent further occurrences and reinstate the original warranty.

1.9 PATENTS

A. Pay all patent fees and royalties and bear all costs incident to the use of any design, process, or product, which is the subject of patent or copyright by others.

B. Indemnify, defend, and hold harmless the Owner and Engineer and their employees and agents from and against all claims, damages, losses, and expenses (including attorney's fees and court costs) arising out of the infringement of any patent rights or copyrights incident to the performance of the work.

PART 2 – PRODUCTS, MATERIALS, AND EQUIPMENT

2.1 CONTROL PANEL COMPONENTS

A. Controls and alarms shall be listed per UL 508. Panels shall be repairable in the field without the use of soldering irons or substantial disassembly.

B. Panel shall be Orenco Systems, Inc. TCOM™ control panel or Engineer approved equal.

C. Panel shall meet the following:

1. Data Collection and Utilization: Logs data for system conditions and events such as daily flows, pump run time, pump cycles, and alarm conditions. Logs shall store data for at least a year.
2. Downloadable Logs: Download logs into a *.dif or ASCII format for simple conversion to common spreadsheet or word processor programs.
3. Multi-Level Password Security: Only qualified personnel can remotely access site.
4. Program Logic Rules: Simple "If … then" declarations.
5. Rules can be written based on several operands, including the following:
6. Input/output status

7. Point status
8. Date: mm/dd/yy format
9. Time of day: 24-hour clock
10. Timers
11. Historical data (allows for control optimization or detection of trends)
12. Schedule functions to control digital “Points” based on date or day of week/time.
13. Automatic daylight savings time adjustment.
14. Automatic call-out to pagers during alarm conditions when panel detects trends that could lead to system failure.

D. In addition, the unit shall have the capability of real-time direct connection to the panel via laptop serial port, to allow the operator real-time access to detailed logged data and the ability to change point values.

1. Standard Components
   a. Motor-Start Contactor: 17 FLA, 1-2 hp, 60 Hz; 2.5 million cycles at FLA (10 million at 50% of FLA for 230VAC).
   b. HOA 3- Way Toggle Switch: Single-pole switch, Hands (manual) Off, Auto ON. 20 amps, 1 hp.
   c. Controls Circuit Breaker: 10 amps, OFF/ON switch. Single-pole 120 VAC. DIN rail mounting with thermal magnetic tripping characteristics.
   d. Pump Circuit Breaker: 20 amps, OFF/ON switch. Single-pole for 120 VAC or double-pole for 230 VAC. DIN rail mounting with thermal magnetic tripping characteristics.
   e. Audio Alarm: 80 dB at 24", warble-tone sound.
   f. 120VAC Ground Fault Interrupter (GFI)
   g. Current Sensor: 120 VAC with adjustable high & low alarm set points.
   h. Visual Alarm: 7/8" diameter red lens, “push-to-silence.” NEMA 4, 1-watt bulb, 115 VAC.
   i. Panel Enclosure: NEMA 4X rated, constructed of UV-resistant fiberglass or stainless steel; hinges and latch are stainless steel. Conduit couplings provided.
   j. Touch Screen Display: interface module with 5.7 color touch screen.
   k. Heater: Anti-condensation heater. Self-adjusting, radiates additional wattage as temperature drops.
   l. Surge Arrestor: AG2401 120/230V, three 18” leads, rated for a maximum of 32,000amps, UL/CSA listed.
   m. Start Capacitors: Start capacitors and start relays for the Orenco PF5030 pumps.

2. Inputs
   a. 4 - 20 ma Liquid Level Sensor with surge protection
   b. 2 floats (redundant off, high level)
   c. Analog current sensor for each pump
   d. Flow meter (pulse)

3. Alarms
   a. High Water Alarm
   b. Low Water Alarm
   c. Pump fail (low and high current)
   d. 24 VAC power faults

e. All inputs and outputs to be isolated using field replaceable relays, IDEC or Engineer approved equal

2.2 FUNCTIONALITY

A. Order of Operation

1. Detect 24vac status using a relay. If 24VAC power fails, turn off the discharge pumps and set an alarm.
   1. Drip field zone valves 24VAC solenoid, per drawings. 1 drip field flush valve - 24VAC solenoid
2. Timer settings:
   a. Normal: On: 15 min Off: 5 min
   b. High level: On: 15 min Off: 2 min
   c. Zone Flush: 4 min
3. Mode 1: two zones at one time 1. Turn on 2 dose pumps
   a. Pumps to alternate
   b. Open 2 zone valves
4. At end of a dose cycle, flush the zones
   a. Open the flush valve
   b. Close the second zone valve
   c. Typical flush time: 4 min
   d. Open second zone valve
   e. Close first zone valve
   f. Keep flush valve open
   g. Typical flush time: 4 min
5. Allow
   a. If water level drops to stop level during a cycle, resume operation with the next set of for zones to be disabled, and automatically skipped. zones when the water level rises.
   b. High level operation only requires 2 pumps.
   c. Off cycle
   d. Select the next 2 zones to dose.

PART 3 - EXECUTION

3.1 SELLER REQUIREMENTS DURING CONSTRUCTION

A. Assistance

1. Supplier shall provide assistance to the Engineer during the construction of the project. Construction assistance shall include, but not be limited to the following:
   a. Attending one (1) coordination meeting at the Engineer's office, including all associated costs for travel, lodging, meals, etc.
   b. Providing reviews for the final construction drawings and specifications related to the equipment specified herein.
   c. Providing written comments to the Engineer.
   d. Providing telephone and e-mail support during the construction process.

e. Providing detailed installation and wiring drawings for the Supplier provided equipment.

3.2 INSTALLATION

A. Comply with all handling and installation procedures recommended by the Supplier. Mount the electrical controls and perform necessary wiring to connect the equipment to the electrical service. Install controls and enclosures as indicated on the Drawings.

3.3 INSTALLATION CHECK-OUT AND START-UP SERVICES

A. Installation and Check-Out

1. Provide the services of a factory-trained engineer who has at least three (3) years' experience in systems described above to supervise and check out the installation by the Contractor. Provide a minimum of 2 trips and four (4) 8-hour days at the job site.

B. Start-Up and Training

1. Provide the services of a factory-trained engineer who has at least three (3) years' experience in systems described above to start up the system and provide training to the Owner's operators. Provide a minimum of 2 trips and four (4) 8-hour days at the job site for startup and 2 trips and two (2) 8-hour days for training.
2. These visits are separate and in addition to any follow-up visits for warranty work.

3.4 TESTING

A. Following installation

3.5 REPORTS

A. Following installation, the equipment shall be thoroughly checked out and tested by a qualified field representative of the pump manufacturer. The Supplier or his authorized representative shall submit a report certifying that the equipment has been installed properly, checked out, and is ready for safe operation in the manner intended.

3.6 SPARE PARTS

A. The following spare parts and safety equipment will be supplied

1. 10% spare relays

END OF SECTION

SECTION 46 0753.10

PACKAGE TEXTILE BASED FIXED GROWTH TREATMENT SYSTEM

PART 1 - GENERAL

1.1 SCOPE

A. Under this Section furnish and deliver a complete package textile based fixed growth treatment system capable of performing as specified herein. Equipment components shall conform to the specific requirements of this section. The source of influent to the treatment system is from a STEP collection system serving domestic wastewater sources.

B. It is the intent that the Supplier furnish and deliver to the job site all equipment and accessories and all necessary services for a complete system as specified herein. The scope of supply shall include, but is not limited to, the following major items:

1. FRP treatment tanks with textile media
2. Pumps and valves
3. Piping
4. Chemical storage and feed system
5. Controls
6. Electrical connection boxes
7. Field services

C. The package textile based fixed growth treatment system components shall be completely serviceable, with easy access to the pump(s), effluent screen, treatment system, and floats. The pump shall be designed for removal without removing the effluent screen and floats.

D. The following items or services will be provided by others or the Contractor:

1. Offloading of the equipment
2. Storage and protection
3. Installation

1.2 RELATED SECTIONS

A. The following Sections are referenced, inclusive of the Contract Documents and Specifications:

1. 01 3323 Shop Drawings, Product Data, Samples
2. 01 4219 Applicable Codes and Standards
3. 01 6500 Transportation and Handling
4. 01 7823 Warranties and Bonds
5. 01 7843 Spare Parts

1.3 SUPPLIER

A. Qualifications

1. The package textile based fixed growth treatment system and all of its components shall be furnished by a single Supplier regularly engaged in the design and manufacture of wastewater equipment and systems.
2. The Supplier shall have at least 10 years of experience in the application, design, and furnishing of wastewater equipment of the size and type specified herein.
3. The Supplier shall have at least 25 installations of similar or larger size and of similar type.
4. The Supplier shall have an established ISO 9001 certified quality management system or a written quality assurance program.

B. Relationship with Installing Contractor. The package textile based fixed growth treatment system furnished under this Section will be purchased, unloaded, and installed by a Contractor selected by the Owner in accordance with detailed drawings and installation instructions furnished by the Supplier.

1.3 PERFORMANCE AND DESIGN REQUIREMENTS

A. The package textile based fixed growth treatment system shall be designed to and treat filtered septic tank effluent. The treated effluent will be disinfected via ultraviolet disinfection and disposed of via subsurface drip irrigation (by others).

B. Characteristics – Influent and Site

1.	Average Day Flow	0.04 MGD
2.	Maximum Month Flow	0.06 MGD
3.	Peak Day Flow	0.08 MGD
4.	BOD	65 pounds/day
5.	TSS	15 pounds/day
6.	Total Phosphorous	8 pounds/day
7.	Total Kjeldahl Nitrogen	34 pounds/day
8.	Alkalinity as CaCO3	120 mg/l
9.	Temperature – Minimum	12 degrees Celsius
10.	Temperature – Maximum	25 degrees Celsius
11.	Site Elevation (AMSL)	930 feet

C. Effluent Requirements

1.	BOD	45 mg/l
2.	Total Nitrogen - Average	23 mg/l
3.	Total Nitrogen – Maximum	30 mg/l

1.4 SHOP DRAWINGS AND ENGINEERING DATA

A. Submit complete shop drawings and engineering data to the Engineer prior to fabricating equipment in PDF format. Shop drawings shall include the following information:

1. Manufacturer's product data sheets giving detailed functional description.
2. Construction and material specifications.
3. Performance specifications.
4. Electrical requirements and wiring diagrams.
5. Exploded assembly diagrams and component lists.
6. Plan and elevation drawings with dimensions in English units.
7. Process and instrumentation diagrams.
8. List of spare parts to be furnished.

B. Submit complete installation, assembly, and erection drawings and detailed installation and adjustment instructions to the Contractor. Information shall include weights of equipment and anchor bolt location and arrangement. Equipment lifting points shall be provided, along with recommendations for short-term and long-term storage.

1.5 TRANSPORTATION

A. Provide transportation of all equipment, materials, and products furnished under this section to the job site. Coordinate transportation with Contractor's installation schedule.
B. Suitably box, crate, or otherwise protect all equipment during transportation.
C. Ship and deliver all equipment in the largest assembled sections practical or permitted by carrier regulations to minimize the number of field connections.
D. Ensure that the equipment is assembled and transported in such a manner so as to clear buildings, power lines, bridges, and similar structures encountered during shipment or delivery to the site of the work.
E. Small items and appurtenances such as gauges, valves, switches, instruments, and probes which could be damaged during shipment shall be removed from the equipment prior to shipment and packaged and shipped separately. All openings shall be plugged or sealed to prevent the entrance of water or dirt.

1.6 OPERATION AND MAINTENANCE DATA

A. Submit one preliminary copy (PDF format) and four final printed copies of a complete operation and maintenance manual covering all equipment and products furnished under this section. Manuals shall be assembled in tabbed and indexed 3-ring binders with typed table of contents. Organize manuals into separate sections for each piece of related equipment. Final operation and maintenance manuals shall be furnished in electronic (PDF) format as well as hard copy.

1.7 WARRANTY

A. Provide a written warranty against defective workmanship and materials on the package textile based fixed growth treatment system and components for a period of 36 months following substantial completion of the construction contract. This warranty shall be in addition to any implied warranties and shall cover both parts and labor.

B. When work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the original warranty on the failed item of equipment by written endorsement.

C. Complete warranty work as soon as possible following receipt of notice from the Owner for a warranty claim.

D. In the event of multiple equipment failures of major consequence during the warranty period, disassemble, inspect, and modify or replace the affected equipment as necessary to prevent further occurrences and reinstate the original warranty.

1.8 PATENTS

A. Pay all patent fees and royalties and bear all costs incident to the use of any design, process, or product, which is the subject of patent or copyright by others.

B. Indemnify, defend, and hold harmless the Owner and Engineer and their employees and agents from and against all claims, damages, losses, and expenses (including attorney's fees and court costs) arising out of the infringement of any patent rights or copyrights incident to the performance of the work.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. The Manufacturer shall be Orenco Systems, Inc. or Engineer approved equal. The Manufacturer shall furnish a complete factory built advanced treatment system. The Manufacturer shall supply detailed installation and O&M instructions. and evidence of an adequate service provider network shall be submitted to the Engineer. The Manufacturer shall also submit evidence that the local supplier has spare parts, equipment repair ability, and experienced service personnel. The Manufacturer shall also provide the services of a Professional Engineer or personnel under the direct supervision of a professional engineer dedicated to supporting the project through design, construction, and O&M.

2.2 EQ TANK

A. An equalization tank shall be provided as shown on the drawings and as specified in Section 33 1616.
B. Two (2) model PF75012 pumps as manufactured by Orenco Systems, Inc or Engineer approved equal shall be provided. Include a duplex FRP flow inducer assembly. The FRP Flow Inducer Towers shall be Orenco FITD-D102 or Engineer approved equal. Include float trees with 4 floats, splice boxes with cord grips, and high-pressure hose and valve assemblies. Check valves shall be ball type.
C. One mixer shall be provided. Mixer shall be of the submersible type, 2 HP. Include all slide rail assemblies as shown on the drawings and to provide for a functional assembly. All slide rail assemblies and supports shall be manufactured from 304SS and FRP.
D. Include all accessories for a complete and functional system.
E. All electrical devices shall be rated for Class 1 Division 1 service in accordance with NFPA and NEC standards.

2.3 TREATMENT PUMPS

A. The pump must be approved for use in the treatment unit as described in these specifications. Pump shall be 3/4 to 2.0 hp, 230 VAC, single phase, 60 Hz, three-wire

motor, with 30-foot-long extra heavy duty (SOOW) electrical cord with ground. The pumps must be submersible High-Head Effluent pumps. Pumps shall be UL and CSA listed for use with effluent. The pumps must have a minimum 24-hour run dry capability without water lubrication. The pumps shall have a 1/8-inch bypass orifice to ensure flow circulation for motor cooling and to prevent air bind. The pump shall have a floating impeller design to protect against up thrust and increase pump life. The pumps liquid ends must be repairable (by replacing impellers and/or diffusers) for better long-term cost of ownership. The motor must be rated for continuous use and frequent cycling, at least 100 cycles per day. The motor cable must be suitable for Class 1, Division 1 and 2 applications. The pumps shall be lightweight for easy removal and maintenance. The pump intake screen must be 1/8-inch mesh polypropylene. The pump shall have internal thermal overload protection and internal lightning protection. All pumps shall undergo 3-point (Dead head, Design Flow, and Design Flow + 30%) wet testing at the factory to confirm performance. The pump shall be Orenco PF751012 or Engineer approved equal.

2.4 AX-MAX ADVANTEX® TREATMENT SYSTEM

A. The treatment system shall be an Orenco Systems®, Inc. AdvanTex AX-MAX system or Engineer approved equal. The facility shall be a complete, fully plumbed wastewater treatment system for receiving and processing filtered septic tank effluent. The facility shall include the following units:

1. Stage 1 - AX-MAX300-42 - Unit shall have an overall length of 42 ft, a width of 7.5 ft, and a height of 8ft. The structure shall be constructed of fiberglass-reinforced plastic with a thickness of 4 inches. The unit shall include pumps and a piping network that recirculates water from the recirculation tank atop the hanging textile media. The media shall be hanging textile media with a specific area of over 300 square feet.

2. The number of units shall be as shown on the drawings.

3. The units shall include anti-buoyancy flanges.

2.5 AX MAX VENTILATION SYSTEM

A. Individual Unit Fans

An Orenco Systems, Inc. ventilation system shall be provided in the AX-MAX Series Treatment Facility or approved equal. The fan shall be UL recognized, 0.8 Hp, 115/230VAC, 1.4A/0.7A, 3400 RPM, and provide up to 245 CFM at 0” H2O. The exhaust from the ventilation fan shall be forced through an enclosure with an adequate amount of activated carbon to remove any odors for a period of over one (1) year.

B. Forced Air Ventilation

Ventilation fan shall be Cincinnati Fan Model LMF-6 or engineer-approved equal mounted in the control building. Housing shall be constructed of commercial grade 319-cast aluminum for increased strength and AMCA Type C spark-resistance. Fan

shall be rated for continuous duty with an RPM of 3450 and capable of delivering a minimum of 100 CFM per AX-Max unit.

2.6 SPLICE BOX CONDUIT SEALS AND SEALANTS

A. As part of the treatment package, all AX-MAX units will include re-installed splice boxes and UL listed waterproof butt splice connectors. The use of a UL-approved conduit seal kit accessible above ground shall be required to prevent the passage of gases, vapors, or flames through the conduit to the control panel. An additional UL classified sealant shall be added to the splice box coupling to prevent condensation accumulation in the splice box. The following UL approved sealants shall be used:

1. UL classified moisture-cure polyurethane quick drying foam or Engineer approved equal with an R-5 rating for each inch of foam.
2. UL classified silicone sealant or Engineer approved equal consisting of a neutral cure silicone, non-acetic, non-corrosive silicone able to withstand temperatures to 450° F.

2.7 CONTROLS

A. Controls and alarms shall be listed per UL 508. Panels shall be repairable in the field without the use of soldering irons or substantial disassembly. Controls including motor starters and circuit protection shall be provided for the EQ tank mixer and pumps, the treatment system, the chemical feed system including the pH probes.

B. A cellular router shall be installed. Panel is required to allow real-time connectivity with the telemetry control panel and alarm communication.

C. Panel shall be Orenco Systems®, Inc. TCOM™ control panel or Engineer approved equal, meeting the following:

1. Data Collection and Utilization: Logs data for system conditions and events such as daily flows, pump run time, pump cycles, and alarm conditions. Logs shall store data for at least a year.
2. Downloadable Logs: Download logs into a *.dif or ASCII format for simple conversion to common spreadsheet or word processor programs.
3. Multi-Level Password Security: Only qualified personnel can remotely access site.
4. Program Logic Rules: Simple “If … then” declarations.
5. Rules can be written based on several operands, including the following:
6. Input/output status
7. Point status
8. Date: mm/dd/yy format
9. Time of day: 24 hour clock
10. Timers
11. Historical data (allows for control optimization or detection of trends)
12. Schedule functions to control digital “Points” based on date or day of week/time.
13. Automatic daylight savings time adjustment.

14. Automatic call-out to pagers during alarm conditions when panel detects trends that could lead to system failure.
15. Panel shall allow for a user adjustable and displayable setpoint adjustments on the recirculation pump operation. The controls shall provide for automatic (based on influent flow rate), by a user input flow, and by manual timer adjustments. A high-water condition shall override the timer settings.

D. In addition, the unit shall have the capability of real-time direct connection to the panel via laptop serial port, to allow the operator real-time access to detailed logged data and the ability to change point values.

1. Standard Components
    a. Motor-Start Contactor: 10 FLA, 1 hp, 60 Hz; 10 million at 50% of FLA for 230VAC.
    b. HOA 3- Way Toggle Switch: Single-pole switch, Hands (manual) Off, Auto ON. 20 amps, 1 hp.
    a. Controls Circuit Breaker: 10 amps, OFF/ON switch. Single-pole 120 VAC. DIN rail mounting with thermal magnetic tripping characteristics.
    b. Pump Circuit Breaker: 20 amps, OFF/ON switch. Single-pole for 120 VAC or double-pole for 230 VAC. DIN rail mounting with thermal magnetic tripping characteristics.
    c. Audio Alarm: 80 dB at 24", warble-tone sound. Provide in a separate NEMA 4x enclosure to be field mounted.
    d. 120VAC Ground Fault Interrupter (GFI)
    e. Current Sensor: 120 VAC with adjustable high & low alarm set points.
    f. Surge Arrestor: AG2401 120/230V, three 18” leads, rated for a maximum of 32,000amps, UL/CSA listed.
    g. Visual Alarm: 7/8" diameter red lens, “push-to-silence.” NEMA 4, 1-watt bulb, 115 VAC. Provide in a separate NEMA 4x enclosure to be field mounted.
    h. Panel Enclosure: NEMA 4, constructed of steel; hinges and latch are stainless steel. Conduit couplings provided. Powder coat.
    i. Remote Telemetry Unit: ATRTU-Net; self powered 24 VDC at 10 mA max, 8 digital inputs, 8 analog inputs expandable to 16 with expansion board. On-board modem (9600 baud), Ethernet port (10 base T, RJ45jack) and Modbus port (R5422/485 terminals).
    j. Touch Screen Display: interface module with 5.7 color touch screen.
    k. Flow Meter – Siemens, electromagnetic flow meter model MAG 3100, with 5000/6000 series transmitter. In addition to logging daily flows, flow meter shall log flows on an hourly basis.
    l. InRouter615-S cellular router. Cellular Router shall be capable of integrating 3G, 4G, and LTE cell service for remote accessibility.

2. Additional Components
    a. Pump Run Light: 7/8" green lens. NEMA 4, 1-watt bulb, 120 VAC.
    b. Flashing Light: Lexan lens, flanged base, red, UL-recognized. Light to be shipped loose.
    c. Heater: Anti-condensation heater. Self-adjusting, radiates additional wattage as temperature drops.
    d. Event Counter: 120 VAC, 6-digit, non-resettable.

e. Elapsed Time Meter: 120 VAC, 7-digit, non-resettable. Limit of 99,999 hours; accurate to 0.01 hours

2.8 CHEMICAL FEEDER

A. LIQUID CHEMICAL FEEDER: Liquid chemical feeder shall be an Orenco Systems, Inc. model LCF3636-AG or Engineer approved equal. Feeder shall be manufactured from corrosion-resistant stainless steel and durable fiberglass parts. Feeder shall include a 1/3 Hp 1750 rpm, direct-driver mixer to keep slurries in suspension. Alkalinity feed rates shall be controlled by a peristaltic pump with a maximum rate of 0.9 gallons per hour to the injection point. Pump speed control shall be provided by a 4-20 m/A, 0-10VCD, and pulse inputs. Pump shall inject alkalinity mix into the Flow Equalization/Pre-Anoxic Tank.

B. Provide a Hach SC200 digital controller and two (2) Hach PD1P1 pH probes. Configure SC200 to provide feed rate control to the chemical feed pump to provide for a pH setpoint.

2.9 SPARE PARTS

A. The Manufacturer shall provide a spare nozzles, spare pumps, and spare control panel parts. A quantity of 10% of that installed shall be provided with the exception of the pump. A single spare pump shall be included for each type/size provided.

2.10 OPERATION AND MAINTENANCE TOOLS

A. AX Lateral Brush Cleaning Kit

Manufacturer shall provide a minimum of one (1) AX Lateral Brush Cleaning Kit. This kit shall include 90-inch lateral cleaning brush used to clean 1-1/4” diameter laterals and shall be Orenco Systems, Inc., OM-AX-LAT BRUSH CLEANING KIT or Engineer approved equal.

B. AX Sheet Cleaning Wand

Manufacturer shall provide a minimum of one AX sheet-cleaning wand. Wand shall be Orenco Systems, Inc. model OM-AX-CLEANING WAND or Engineer approved equal. Cleaning wand shall have the ability to connect to a standard garden hose and fit in between AX sheets to spray off debris.

C. Field Test Kit

Manufacturer shall provide a field test kit to monitor the following parameters:

1. pH
2. Alkalinity
3. Ammonia (NH3-N)
4. Nitrate/Nitrite (NO3-N / NO2-N)
5. Dissolved Oxygen (DO)

6. Chlorides
7. Turbidity
8. Temperature

The field test kit shall include:

1. pH test strips (0-14 pH)
2. Alkalinity test strips (0-240 ppm)
3. Ammonia (NH3-N) test strips (0-6 ppm)
4. Nitrate/Nitrite (NO3-N / NO2-N) test strips (0-50 ppm)
5. Dissolved Oxygen (DO) kit (1-12 ppm)
6. Chloride titrators (30-600 ppm & 300-6000 ppm)
7. Turbidity kit (0-200 NTUs)
8. Thermometer (0-240° F)

D. Biotube Cartridge Cleaning Cradle

Manufacturer shall include a minimum of one (1) Biotube cleaning cradle. Cradle shall be Orenco Systems®, Inc. Model OM-BIOTUBE CRADLE or Engineer-approved equal **for** housing the Biotube Effluent Filter cartridges for cleaning and maintenance.

E. Biotube Cartridge Cleaning Brush

Manufacturer shall include a minimum of one (1) Biotube brush. Brush shall be Orenco Systems®, Inc. Model OM-BIOTUBE BRUSH or Engineer approved equal for cleaning the Biotube Effluent Filter cartridges.

F. Scum Measuring Device

Manufacturer shall provide a minimum of one (1) scum measuring utility gauge. The gauge shall consist of a minimum 3/8" diameter stainless steel rod with an incremental scale for measuring scum levels. The rod shall be bent at a 90-degree angle at the base to aid in identifying the scum "by feeling." The gauge shall be Orenco Systems®, Inc. Model SMUG or Engineer approved equal.

G. Sludge Measuring Device

Manufacturer shall provide a minimum of one (1) SLUDGE JUDGE ULTRA or Engineer-approved equal. Unit shall be constructed of polycarbonate treated with an ultraviolet stabilizer, durable in cold temperatures, and can withstand heat up to 280° F. The measuring device shall be ¾" diameter and marked with tape to designate 1 ft increments.

PART 3 - EXECUTION

3.1 SELLER REQUIREMENTS DURING CONSTRUCTION

A. Supplier Assistance

1. Supplier shall provide assistance to the Engineer during the construction of the project. Construction assistance shall include, but not be limited to the following:

    a. Providing reviews for the final construction drawings and specifications related to the equipment specified herein.
    b. Providing written comments to the Engineer.
    c. Providing telephone and e-mail support during the construction process.
    d. Providing detailed installation drawings, including anchor rod placement, for supports required for the Supplier provided equipment.

3.2 INSTALLATION

A. Comply with all handling and installation procedures recommended by the Supplier. Mount the electrical controls and perform necessary wiring to connect the equipment to the electrical service. Install controls and enclosures as indicated on the Drawings.

3.3 INSTALLATION CHECK-OUT AND START-UP SERVICES

A. Installation and Check-Out

1. Provide the services of a factory-trained engineer who has at least three (3) years' experience in systems described above to supervise and check out the installation by the Contractor. Provide a minimum of 2 trips and 4 (four) 8-hour days at the job site.

B. Start-Up and Training

1. Provide the services of a factory-trained engineer who has at least three (3) years' experience in systems described above to start up the system and provide training to the Owner's operators. Provide a minimum of 1 trip and 4 (four) 8-hour days at the job site for startup and 1 trip and 2 (two) 8-hour days for training.

2. These visits are separate and in addition to any follow-up visits for warranty work.

C. Follow-Up Visits

1. Provide the services of a factory-trained engineer who has at least three (3) years' experience in systems described above to inspect the system and provide follow-up training to the Owner's operators. Provide a minimum of 2 trips and (2) days 8-hour days at the job site. The first follow-up visit shall occur no later than 6-months following commissioning. The second visit shall occur 12-months following commissioning. Demonstrate compliance with the specified effluent limitations during these visits. The Owner shall be responsible for any associated laboratory testing with the Suppliers instructions.

2. These visits are separate and in addition to any follow-up visits for warranty work.

END OF SECTION

SECTION 46 0753.20

PACKAGE PLASTIC MEDIA BASED TREATMENT SYSTEM

PART 1 - GENERAL

1.1 SCOPE

A. Under this Section furnish and deliver a complete package plastic media based fixed growth treatment system capable of performing as specified herein. Equipment components shall conform to the specific requirements of this section. The source of influent to the treatment system is from a STEP collection system serving domestic wastewater sources.

B. It is the intent that the Supplier furnish and deliver to the job site all equipment and accessories and all necessary services for a complete system as specified herein. The scope of supply shall include, but is not limited to, the following major items:

1. FRP treatment tanks with plastic media
2. Pumps and valves
3. Piping
4. Chemical storage and feed system
5. Controls
6. Electrical connection boxes
7. Field services

C. The package plastic media based fixed growth treatment system components shall be completely serviceable, with easy access to the pump(s), effluent screen, treatment system, and floats. The pump shall be designed for removal without removing the effluent screen and floats.

D. The following items or services will be provided by others or the Contractor:

1. Offloading of the equipment
2. Storage and protection
3. Installation

1.2 RELATED SECTIONS

A. The following Sections are referenced, inclusive of the Contract Documents and Specifications:

1. 01 3323 Shop Drawings, Product Data, Samples
2. 01 4219 Applicable Codes and Standards
3. 01 6500 Transportation and Handling
4. 01 7823 Warranties and Bonds
5. 01 7843 Spare Parts

1.3 SUPPLIER

A. Qualifications

1. The package plastic media based fixed growth treatment system and all of its components shall be furnished by a single Supplier regularly engaged in the design and manufacture of wastewater equipment and systems.
2. The Supplier shall have at least 10 years of experience in the application, design, and furnishing of wastewater equipment of the size and type specified herein.
3. The Supplier shall have at least 25 installations of similar or larger size and of similar type.
4. The Supplier shall have an established ISO 9001 certified quality management system or a written quality assurance program.

B. Relationship with Installing Contractor. The package plastic media based fixed growth treatment system furnished under this Section will be purchased, unloaded, and installed by a Contractor selected by the Owner in accordance with detailed drawings and installation instructions furnished by the Supplier.

1.3 PERFORMANCE AND DESIGN REQUIREMENTS

A. The package plastic media based fixed growth treatment system shall be designed to and treat filtered septic tank effluent. The treated effluent will be disinfected via ultraviolet disinfection and disposed of via subsurface drip irrigation (by others).

B. Characteristics – Influent and Site

1.	Average Day Flow	0.04 MGD
2.	Maximum Month Flow	0.06 MGD
3.	Peak Day Flow	0.08 MGD
4.	BOD	65 pounds/day
5.	TSS	15 pounds/day
6.	Total Phosphorous	8 pounds/day
7.	Total Kjeldahl Nitrogen	34 pounds/day
8.	Alkalinity as CaCO3	120 mg/l
9.	Temperature – Minimum	12 degrees Celsius
10.	Temperature – Maximum	25 degrees Celsius
11.	Site Elevation (AMSL)	930 feet

C. Effluent Requirements

1.	BOD	45 mg/l
2.	Total Nitrogen - Average	23 mg/l
3.	Total Nitrogen – Maximum	30 mg/l

1.4 SHOP DRAWINGS AND ENGINEERING DATA

A. Submit complete shop drawings and engineering data to the Engineer prior to fabricating equipment in PDF format. Shop drawings shall include the following information:

1. Manufacturer's product data sheets giving detailed functional description.
2. Construction and material specifications.
3. Performance specifications.
4. Electrical requirements and wiring diagrams.
5. Exploded assembly diagrams and component lists.
6. Plan and elevation drawings with dimensions in English units.
7. Process and instrumentation diagrams.
8. List of spare parts to be furnished.

B. Submit complete installation, assembly, and erection drawings and detailed installation and adjustment instructions to the Contractor. Information shall include weights of equipment and anchor bolt location and arrangement. Equipment lifting points shall be provided, along with recommendations for short-term and long-term storage.

1.5 TRANSPORTATION

A. Provide transportation of all equipment, materials, and products furnished under this section to the job site. Coordinate transportation with Contractor's installation schedule.
B. Suitably box, crate, or otherwise protect all equipment during transportation.
C. Ship and deliver all equipment in the largest assembled sections practical or permitted by carrier regulations to minimize the number of field connections.
D. Ensure that the equipment is assembled and transported in such a manner so as to clear buildings, power lines, bridges, and similar structures encountered during shipment or delivery to the site of the work.
E. Small items and appurtenances such as gauges, valves, switches, instruments, and probes which could be damaged during shipment shall be removed from the equipment prior to shipment and packaged and shipped separately. All openings shall be plugged or sealed to prevent the entrance of water or dirt.

1.6 REFERENCE STANDARDS

A. American Concrete Institute (ACI) standard ACI 318, Building Code Requirements for Structural Concrete.

B. ANSI/AWWA D120 - Thermosetting Fiberglass-Reinforced Plastic Tanks.

C. IAPMO/ANSI Z1000 - Prefabricated Septic Tanks.

D. Tank manufacturer shall be recognized by Underwriters Laboratories as a manufacturer of tanks listed to the UL-1316 standard.

1.7 OPERATION AND MAINTENANCE DATA

A. Submit one preliminary copy (PDF format) and four final printed copies of a complete operation and maintenance manual covering all equipment and products furnished under this section. Manuals shall be assembled in tabbed and indexed 3-ring binders with typed table of contents. Organize manuals into separate sections for each piece of related equipment. Final operation and maintenance manuals shall be furnished in electronic (PDF) format as well as hard copy.

1.7 WARRANTY

A. Provide a written warranty against defective workmanship and materials on the package plastic media based fixed growth treatment system and components for a period of 36 months following substantial completion of the construction contract. This warranty shall be in addition to any implied warranties and shall cover both parts and labor.

B. When work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the original warranty on the failed item of equipment by written endorsement.

C. Complete warranty work as soon as possible following receipt of notice from the Owner for a warranty claim.

D. In the event of multiple equipment failures of major consequence during the warranty period, disassemble, inspect, and modify or replace the affected equipment as necessary to prevent further occurrences and reinstate the original warranty.

1.8 PATENTS

A. Pay all patent fees and royalties and bear all costs incident to the use of any design, process, or product, which is the subject of patent or copyright by others.

B. Indemnify, defend, and hold harmless the Owner and Engineer and their employees and agents from and against all claims, damages, losses, and expenses (including attorney's fees and court costs) arising out of the infringement of any patent rights or copyrights incident to the performance of the work.

PART 2 - MATERIALS

2.1 SUPPLIER

A. The Supplier of the Bioclere process system shall be Aquapoint of New Bedford, MA or Engineer approved equal.

2.2 EQ TANK

A. An equalization tank shall be provided as shown on the drawings and as specified in Section 33 1616.

B. Two (2) model X188 pumps as manufactured by Zoeller or Engineer approved equal shall be provided. The equalization pumps shall be solids handling submersible pumps. The pumps shall contain built in thermal protection and shall be rated for intermittent or continuous duty when fully submerged at 32°F-104°F. The pumps shall be controlled using a fully adjustable timer.

C. Include 304SS slide rail assemblies and quick disconnect base elbows. Include float trees with 4 floats, splice boxes with cord grips, and isolation and check valve

assemblies. Check valves shall be ball type.

D. One mixer shall be provided. Mixer shall be of the submersible type, 2 HP. Include all slide rail assemblies as shown on the drawings and to provide for a functional assembly. All slide rail assemblies and supports shall be manufactured from 304SS and FRP.

E. Include all accessories for a complete and functional system.

F. Include a control panel for operation of the equalization tank system. control panel shall be furnished with an audio and visual alarm for pump failure and tripped circuit breaker conditions, an exterior alarm silence button, and an on/off/test power/alarm toggle switch. Within the NEMA 4X enclosed fiberglass panel an equalization pump timer, pump elapsed time meters, relays, terminal strip, on/off/test switches, run lights, pump alternator, circuit breakers and current sensors shall be provided. Four control float switches located in the tank govern the following functions:

1. Low level Alarm float: The low-level alarm float will act as a redundant pump shut off and will activate an audio/visual alarm signal when the float switch is in the extended position (open circuit).

2. Low level float: In the extended position this float switch shall create an open circuit and prevent operation of the pumps. When the circuit is closed the float switch shall allow activation of the timer and the pumps shall alternate between cycles, transferring wastewater to the downstream treatment reactor(s).

3. Mid-level float: Upon closure the mid-level float switch shall activate the lag pump and the two pumps shall draw down the liquid in the equalization tank until the mid-level float is an open. Upon this occurrence, a counter shall be triggered to alert the operator that a high-level condition has occurred and that the timer "on" setting may need adjusting.

4. High level float: The high-level float switch shall activate the audio/visual alarm when the circuit is closed.

G. All electrical devices in the EQ tank shall be rated for Class 1 Division 1 service in accordance with NFPA and NEC standards.

2.3 FRP SPLITTER MANHOLE

A. The FRP splitter manhole internal walls, external walls, baffles and weir plates shall be ¼” thick fiberglass.

B. The FRP splitter manhole shall be 5’ in diameter. The overall height of the manhole is shown on the drawings.

C. The FRP splitter manhole shall have a 36” x 36” access opening with a hinged FRP lid. The lid shall be insulated with 1” polyurethane foam core.

D. The splitter manhole shall incorporate PVC inlet and outlet pipe(s) to accept the

influent and effluent field plumbing. The diameter(s) of the splitter manhole inlet and outlet pipe(s) are shown on the drawings. The Contractor must supply the appropriately sized flexible couplings to connect the incoming and outgoing sewer pipe(s) to the splitter manhole fitting(s). Flexible couplings shall be of the shielded type using 304SS materials.

E. The Contractor shall supply and install the ball valves on the splitter box outlet piping as required to take one train of treatment reactors offline. In addition, the contractor shall supply the necessary pipe and fittings to complete all external sewer connections.

F. The splitter box shall contain (3) 60-degree V notch weirs or (3) rectangular weirs per the Drawings and Aquapoint's standard details.

2.4 PRIMARY / RECIRCULATION TANKS

A. Tank Design - Fiberglass reinforced plastic (FRP) tanks:

1. The tank size, fittings and accessories shall be as shown on the drawings.
2. Tank shall be manufactured with structural ribs which are fabricated as in integral part of the tank wall.
3. Tank shall be manufactured with a laminate consisting of resin and glass fiber reinforcement only. No sand/silica fillers or resin extenders shall be used.
4. Tank shall be vented to atmospheric pressure.
5. Tank shall be capable of handling liquids with specific gravity up to 1.1
6. Tank shall be compatible with liquids identified in the manufacturer's standard limited warranty.

B. Loading Conditions - Tank shall meet the following design criteria:

1. Internal Load: Tank shall be designed to withstand a 5-psig (35 kPa) air-pressure test with a 5:1 safety factor.
2. Surface Loads: Tank shall be designed to withstand surface H-20 and HS-20 axle loads when properly installed according to manufacturer's current Installation Manual and Operating Guidelines.
3. External Hydrostatic Pressure: Tank shall be designed for 7 feet (2.1 m) of overburden over the top of the tank, the hole fully flooded, and a safety factor of 5:1 against general buckling.

C. Tank Design: Single-Wall vessel as specified and shown on the Drawings.

D. Tank Accessories – Water & Wastewater Storage Applications:

1. Tank Anchoring:

    a. Anchor straps shall be as supplied by tank manufacturer and designed for a maximum load of 25,000 lbs (11340 kg).
    b. Galvanized turnbuckles shall be supplied by the tank manufacturer.

E. Access Openings: Access openings shall have a diameter of 24 inches, 30 inches, 36 inches, 42 inches or 48 inches (610 mm, 762 mm, 914 mm, 1067 mm and 1219 mm respectively), complete with riser, lid and necessary hardware.

F. Attached Access Risers:

1. Attached access risers shall be PVC or FRP as supplied by tank manufacturer.
2. Attached 24-inch and 30-inch diameter access risers shall be PVC.
3. Attached 36-inch, 42-inch and 48-inch diameter access risers shall be FRP.
4. PVC and FRP access risers shall be available in 2-foot, 3-foot, 4-foot, 5-foot and 6-foot lengths. Appropriate lengths shall be specified on the site plans.
5. Access risers ship loose and shall be attached to access openings during installation utilizing adhesive or FRP bonding kits as supplied by the tank manufacturer.

G. Piping and Fittings:

1. Tank shall be equipped with factory-installed threaded fittings, or pipe stubs.
2. PVC piping shall at a minimum meet the requirements of ANSI Schedule 40.
3. All flanged nozzles shall be flanged and flat-faced and conform to Class 150 bolting patterns as specified in ANSI/ASME/ B16.5.
4. Carbon steel and stainless-steel NPT fittings shall withstand a minimum of 150 foot-pounds (203 NM) of torque and 1,000 foot-pounds (1356 NM) of bending, both with a 2:1 safety factor.

H. Manway Openings:

1. The standard manway shall be flanged, 22 inches (559 mm) I.D. and complete with gaskets, bolts and cover.
2. Manway openings shall be designed to withstand 5-psig (35 kPa) test pressure with a 5:1 safety factor.
3. Manway openings shall be used to support top mount agitator assemblies as required for process mixing.

I. Baffles and Partitions: Baffles and Partitions shall be capable of withstanding hydrostatic loads occurring when one compartment is empty, and the remaining compartment(s) is full.

J. Pump/Mixer Platforms & Aeration Grid Supports:

1. 12-inch-long x 36-inch wide flat FRP platforms shall be affixed to the bottom of aeration tank chambers for the purpose of supporting aeration grid assemblies
2. 24-inch, 30-inch or 36-inch square flat FRP platforms shall be affixed to the bottom of pump/mixer chambers for the purpose of supporting pump and mixer slide rail assemblies.
3. All platforms shall be designed to support up to 300 pounds each.

2.5 TREATMENT UNITS

A. General

1. The Bioclere treatment system shall include a trickling filter situated over a final settling tank. The Bioclere treatment system shall be delivered complete from the supplier and shall include random packed PVC manufactured media, ventilation fan, dosing pump(s), sludge return pump, internal piping, wiring and controls for a complete operational treatment system. The trickling filter portion of the tank shall

have fiberglass inner and outer skins with the cavity between filled with polyvinyl chloride foam insulation. The remainder of the unit shall be constructed of FRP or plastic. All internal piping shall be Schedule 40 PVC plastic pipe. The Bioclere unit shall withstand pressures from the interior hydrostatic load and from the soil.

B. Mounting Pad

1. The Contractor shall be responsible for providing the concrete mounting pad upon which to set each Bioclere vessel. The concrete mounting pads shall be as shown on the drawings.

C. Filter Media

1. The PVC randomly packed filter media shall have a void ratio of greater than 95 percent. The media shall be resistant to ultraviolet radiation and resistant to a wide range of aqueous solutions, acids, alkalis, oxidizing agents, oils, fats and alcohols.

D. Settling Tank

1. The settling tank shall be cone shaped and have 60-degree sloped sides to prevent the accumulation of biological and inorganic suspended solids and shall contain the necessary internal baffling to prohibit short-circuiting of the wastewater.

E. Ventilation Fan

1. The CSA approved ventilation fan shall be a 115v/1ph/60hz ball bearing fan with a minimum manufactured rated airflow rate of 240 cubic feet per minute. The fan shall have an aluminum housing and polycarbonate blade.

F. Pumps

1. The two alternating dosing pumps and one recycle pump shall be 200-230v/1ph/60hz stainless steel submersible pumps. All pumps shall have an internal high temperature shut off switch. Each pump shall be capable of 65 gpm at 21 ft. of head. Each pump shall be rated for intermittent or continuous duty when fully submerged between 0°C-55°C. The alternating dosing pumps shall be controlled such that when one pump fails the remaining will complete both dosing cycles.

G. Float Switches

1. The CSA and UL approved low level 115v/1ph/60hz float switch shall be installed to prevent the recycle pump from operating when water levels are abnormally low in the Bioclere. The float switch shall be a mechanically activated wide-angle switch.

H. Power Supply

1. Each Bioclere treatment unit shall have a dedicated 50 amp, 230v/1ph/60hz, power supply.

2.6 CHEMICAL FEED

A. LIQUID CHEMICAL FEEDER: Liquid chemical feeder shall be a Neptune, Inc. model 260PT bottom mounted or Engineer approved equal. Feeder shall be manufactured from corrosion-resistant polyethylene parts. Feeder shall include a 1/3 Hp 1750 rpm, direct-driver mixer to keep slurries in suspension. Alkalinity feed rates shall be controlled by a piston pump with a maximum rate of 0.9 gallons per hour to the injection point. Pump speed control shall be provided by a 4-20 m/A, 0-10VCD, and pulse inputs. Pump shall inject alkalinity mix into the Flow Equalization/Pre-Anoxic Tank.

B. Provide a Hach SC200 digital controller and two (2) Hach PD1P1 pH probes. Configure SC200 to provide feed rate control to the chemical feed pump to provide for a pH setpoint.

2.7 CONTROLS

A. The UL508 listed control panel shall be furnished with an audio and visual alarm for pump failure and tripped circuit breaker conditions, an exterior alarm silence button, and an on/off/test power/alarm toggle switch. Within the NEMA 4X enclosed fiberglass panel pump timers, relays, terminal strip, on/off/test switches, run lights, elapsed time meters, dosing pump alternator, circuit breakers and current sensors shall be provided. A dry contact shall be installed in each control panel so that a common Bioclere alarm may be wired to a convenient location. Each panel shall include an anticondensation heater and a 32,000-amp surge arrestor. Provide a common alarm light and horn. A complete and functional control panel shall be provided to allow for automatic, unattended operation.

B. A single control panel shall be provided for each train (3 total) to incorporate all of the functions described in this Section.

C. A separate control panel shall be provided for the EQ tank pumps and mixer.

D. Panel shall allow for a user adjustable and displayable setpoint adjustments on the recirculation pump operation. The controls shall provide for automatic (based on influent flow rate), by a user input flow, and by manual timer adjustments. A high-water condition shall override the timer settings.

E. Provide a Misson M850 RTU, or Engineer approved equal. Provide 16 digital inputs, 6 analog inputs, and 2 pulse inputs. The following digital inputs are needed: EQ general alarm, Bioclere train alarm (3), dosing tank low- and high-level alarms, chemical feed general alarms, UV general alarm. The following 4-20 mA analog signals are required: influent flow signal, pH probe (2). The following pulse inputs are required: dosing supply flow meter, dosing return flow meter.

PART 3 - EXECUTION

3.1 SUPPLIER REQUIREMENTS DURING CONSTRUCTION

A. Supplier Assistance

1. Supplier shall provide assistance to the Engineer during the construction of the project. Construction assistance shall include, but not be limited to the following:

   a. Providing reviews for the final construction drawings and specifications related to the equipment specified herein.
   b. Providing written comments to the Engineer.
   c. Providing telephone and e-mail support during the construction process.
   d. Providing detailed installation drawings, including placement, for supports required for the Supplier provided equipment.

3.2 SPARE PARTS

A. Spare Parts. The Manufacturer shall provide a spare nozzles, spare pumps, and spare control panel parts. A quantity of 10% of that installed shall be provided with the exception of the pump. A single spare pump shall be included for each type/size provided.

3.3 INSTALLATION

A. Comply with all handling and installation procedures recommended by the Supplier. Mount the electrical controls and perform necessary wiring to connect the equipment to the electrical service. Install controls and enclosures as indicated on the Drawings.

3.4 INSTALLATION CHECK-OUT AND START-UP SERVICES

A. Installation and Check-Out

1. Provide the services of a factory-trained engineer who has at least three (3) years' experience in systems described above to supervise and check out the installation by the Contractor. Provide a minimum of 2 trips and 4 (four) 8-hour days at the job site.

B. Start-Up and Training

1. Provide the services of a factory-trained engineer who has at least three (3) years' experience in systems described above to start up the system and provide training to the Owner's operators. Provide a minimum of 1 trip and 4 (four) 8-hour days at the job site for startup and 1 trip and 2 (two) 8-hour days for training.

2. These visits are separate and in addition to any follow-up visits for warranty work.

C. Follow-Up Visits

1. Provide the services of a factory-trained engineer who has at least three (3) years' experience in systems described above to inspect the system and provide follow-up training to the Owner's operators. Provide a minimum of 2 trips and (2) days 8-hour days at the job site. The first follow-up visit shall occur no later than 6-months following commissioning. The second visit shall occur 12-months following commissioning. Demonstrate compliance with the specified effluent limitations during these visits. The Owner shall be responsible for any associated laboratory testing with the Suppliers instructions.

2. These visits are separate and in addition to any follow-up visits for warranty work.

END OF SECTION

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DRIP DISPERSAL SYSTEM

PART 1 - GENERAL

1.1 SCOPE

A. Under this Section furnish and deliver a complete wastewater effluent drip dispersal system capable of performing as specified herein. Equipment components shall conform to the specific requirements of this section. Installation shall confirm to these specifications and the drawings.

B. It is the intent that the Supplier furnish and deliver to the job site all equipment and accessories and all necessary services for a complete wastewater effluent drip dispersal system as specified herein. The scope of supply shall include, but is not limited to, the following major items:

1. Drip tubing
2. Fittings
3. Flexible PVC piping
4. Air and vacuum relief valves
5. Solenoid valves
6. Plastic valve boxes
7. Self-Cleaning Filters
8. Hydrometers
9. Ultraviolet (UV) Disinfection Equipment
10. FRP Flow Inducer Towers
11. Submersible Turbine Effluent Pumps & Controls
12. Necessary and incidental PVC valves, fittings, grommets, and accessories for a complete system.
13. Field Services

C. The following items or services will be provided by others or the Contractor:

1. Offloading
2. Storage
3. Installation, including electrical and controls
4. Interconnecting SCH40 PVC piping

1.2 RELATED SECTIONS

A. The following Sections are referenced, inclusive of the Contract Documents and Specifications:

1. 01 3323 Shop Drawings, Product Data, Samples
2. 01 4219 Applicable Codes and Standards

3. 01 6500 Transportation and Handling
4. 01 7823 Warranties and Bonds
5. 01 7843 Spare Parts
6. 33 1616 FRP Wastewater Tanks
7. 40 9513.23 Dosing Control Panel

1.3 SUPPLIER

A. Qualifications

1. The wastewater effluent drip dispersal system and all of its components shall be furnished by a single Supplier regularly engaged in the design and manufacture of wastewater effluent drip dispersal system equipment and systems.
2. The Supplier shall have at least 10 years of experience in the application, design, and furnishing of wastewater effluent drip dispersal system equipment of the size and type specified herein.
3. The Supplier shall have at least 25 installations of similar or larger size and of similar type.

B. Relationship with Installing Contractor. The wastewater effluent drip dispersal system furnished under this Section will be purchased, unloaded, and installed by a Contractor selected by the Owner in accordance with detailed drawings and installation instructions furnished by the Supplier.

1.4 PERFORMANCE AND DESIGN REQUIREMENTS

A. The wastewater effluent drip dispersal system shall be designed to disperse wastewater effluent into the drip zones as indicated on the drawings. The system shall be capable of automatic operation with user adjustable parameters via the Dosing Control Panel as specified in Section 40 9513.23. The system shall be capable of filtering, measuring, and disinfecting the wastewater effluent as specified herein.

B. Characteristics

Average Daily Flow	40,000 gallons per day
Maximum Daily Flow	80,000 gallons per day

C. Performance Requirements

1. The UV disinfection equipment shall be capable of achieving less than 941 colonies E. coli per 100 ml.
2. The system shall be capable of filtering, measuring, disinfecting, dispersing, and flushing of up to 80 gallons per minute.

1.5 SHOP DRAWINGS AND ENGINEERING DATA

A. Submit complete shop drawings and engineering data to the Engineer prior to fabricating equipment in PDF format. Shop drawings shall include the following information:

1. Manufacturer's product data sheets giving detailed functional description.
2. Construction and material specifications.
3. Performance specifications.
4. Electrical requirements and wiring diagrams.
5. Exploded assembly diagrams and component lists.
6. Plan and elevation drawings with dimensions in English units.
7. Process and instrumentation diagrams.
8. List of spare parts to be furnished.

B. Submit complete installation, assembly, and erection drawings and detailed installation and adjustment instructions to the Contractor. Information shall include weights of equipment and anchor bolt location and arrangement. Equipment lifting points shall be provided, along with recommendations for short-term and long-term storage.

1.6 TRANSPORTATION

A. Provide transportation of all equipment, materials, and products furnished under this section to the job site. Coordinate transportation with Contractor's installation schedule.

B. Suitably box, crate, or otherwise protect all equipment during transportation.

C. Ship and deliver all equipment in the largest assembled sections practical or permitted by carrier regulations to minimize the number of field connections.

D. Ensure that the equipment is assembled and transported in such a manner so as to clear buildings, power lines, bridges, and similar structures encountered during shipment or delivery to the site of the work.

E. Small items and appurtenances such as gauges, valves, switches, instruments, and probes which could be damaged during shipment shall be removed from the equipment prior to shipment and packaged and shipped separately. All openings shall be plugged or sealed to prevent the entrance of water or dirt.

1.7 OPERATION AND MAINTENANCE DATA

A. Submit one preliminary copy (PDF format) and four final printed copies of a complete operation and maintenance manual covering all equipment and products furnished under this section. Manuals shall be assembled in tabbed and indexed 3-ring binders with typed table of contents. Organize manuals into separate sections for each piece of related equipment. Final operation and maintenance manuals shall be furnished in electronic (PDF) format as well as hard copy.

1.8 WARRANTY

A. Provide a written warranty against defective workmanship and materials on the wastewater effluent drip dispersal system and components for a period of 12 months following substantial completion of the construction contract. This warranty shall be in addition to any implied warranties and shall cover both parts and labor.

B. When work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the original warranty on the failed item of equipment by written endorsement.

C. Complete warranty work as soon as possible following receipt of notice from the Owner for a warranty claim.

D. In the event of multiple equipment failures of major consequence during the warranty period, disassemble, inspect, and modify or replace the affected equipment as necessary to prevent further occurrences and reinstate the original warranty.

1.9 PATENTS

A. Pay all patent fees and royalties and bear all costs incident to the use of any design, process, or product, which is the subject of patent or copyright by others.

B. Indemnify, defend, and hold harmless the Owner and Engineer and their employees and agents from and against all claims, damages, losses, and expenses (including attorney's fees and court costs) arising out of the infringement of any patent rights or copyrights incident to the performance of the work.

PART 2 – PRODUCTS, MATERIALS, AND EQUIPMENT

2.1 CONTINUOUS SELF-CLEANING, PRESSURE COMPENSATING DRIPLINE

A. Dripline shall consist of nominal sized one-half inch (½") low-density linear polyethylene tubing with internal pressure compensating continuously self-cleaning, integral drippers at a specified spacing. The tubing shall be purple in color and shall conform to an outside diameter (O.D.) of 0.66 inches and an inside diameter (I.D.) of 0.57 inches. Individual pressure compensating drippers shall be welded to the inside wall of the tubing as an integral part of the tubing assembly and shall be impregnated to prevent the buildup of microbial slime. These drippers shall be constructed of plastic with a continuously self-flushing silicon diaphragm capable of flushing dirt or debris that may enter the dripper. Each dripper shall have an individual filter at the inlet, and it shall be integral to the dripper. The dripper shall have a built-in physical root barrier whereby water/effluent shall exit the dripper from a point different than where it shall exit the tubing. This physical barrier shall create an air gap inside the exit portion of the dripper.

B. Discharge rate shall be 0.6 gallons per hour per emitter

C. Each dripper shall have the ability to independently regulate discharge rates, with an inlet pressure between 7 to 58 pounds per square inch (psi), at a constant rate of flow and with a manufacturer's coefficient of variability (Cv) of 0.03 or less. Recommended operating pressure shall be up to 58 psi. The dripper discharge rate shall be controlled utilizing a combination turbulent flow/reduced pressure compensation cell mechanism and diaphragm to maintain uniform discharge rates. The drippers shall be capable of continuously cleaning themselves while in operation. Bending radius shall be 7-inches.

D. Dripline shall be Netafim Model Number 08WRAM0.6-24V, or Engineer approved equal.

2.2 DRIPLINE FITTINGS

A. All fittings shall be constructed of injection molded, brown plastic having a nominal outside dimension of 17mm (0.57”). Female and male threaded ends shall be capable of mating to standard PVC pipe with tapered threads.

B. Fittings shall be Netafim Model Numbers TLTEE, TLCOUP, TL2W075MA, TLELL, TLCROS, TL050MA, TL075MA, TL075FTEE, TLIAPE, and TLIAPVC, or Engineer approved equal.

2.3 AIR/VACUUM RELEASE VALVES

A. The Air/Vacuum Release Valves shall allow for high flow rate air discharge, up to 8 psi differential for the 2" & 3" models and up to 5 psi for the ¾" & 1" model, thus preventing premature closure. It shall be constructed of UV-protected materials as follows:

Part	¾” & 1”	2”	3”
Body	Polypropylene	Reinforced Nylon	Reinforced Nylon
Cover	Polypropylene	Polypropylene	Reinforced Nylon
Disc	-	Reinforced Nylon	Reinforced Nylon
Seal	BUNA-N	E.P.D.M.	E.P.D.M.
Float	Polypropylene	Reinforced Nylon	Polypropylene

B. The ¾” & 1” Air/Vacuum Release Valves shall be available with or without a Schrader valve. The Schrader valve shall allow pressure readings during system operation. The base of the ¾” and 1” valve shall be MPT. The base of the 2” & 3” valve shall be FPT. Maximum working pressure range shall be 3 - 150 psi (0.2 - 10 bar).

C. The Air/Vacuum Release Valves shall be Netafim Model Number 65ARIA100S or Engineer approved equal.

2.4 SOLENOID VALVES

A. The Solenoid Valves shall be Netafim Model Number LVET2GH2 or Engineer approved equal.

2.5 PLASTIC VALVE BOXES

A. The Plastic Valve Boxes shall be NDS 14-inch by 19-inch with a green plastic lid marked sewer or Engineer approved equal. Boxes shall be stackable as necessary to achieve the required depth.

2.6 SELF CLEANING FILTERS

A. The Filter shall have 4” inlet and outlet manifolds with grooved connection ends. The manifolds and filter body shall be made from high density polypropylene. The filter element shall be made of polypropylene discs stacked to a height of 10 ¼ inches. The discs shall have grooves on both sides so that the grooves of one disc and the grooves of the disc immediately below it will cross at an angle of about 45 degrees. The Backflush Valves shall be made of plastic. Each backflush valve shall have a normally closed solenoid installed to its bonnet.

B. The filter shall be capable of filtering suspended particles from water. The maximum operating pressure of the filter is 140 psi. The minimum pressure required for backflush will be 30 psi during backflush. The minimum flow required for flushing is 35 gpm.

C. The filter shall clean itself automatically when a pressure differential (PD) gauge triggers a backflush controller to initiate a backflush. The optimum setting for the PD gauge is 7 psi. The backflush controller will transmit an electric pulse to the 24-volt solenoid that will command the backflush valves to change from filtration mode to backflush mode. During backflush, the disks shall separate, and clean filtered water will spray towards the disks from 3 banks of nozzles that are located on a spine component inside of the disks. The flushing time shall be 20 seconds. During flush, filtered water will continue to be supplied downstream of the filter. The filters will flush one at a time sequentially.

D. The filter shall be Netafim Model Number DFALP202-140AC or Engineer approved equal.

2.7 HYDROMETERS

A. The Hydrometers shall be Netafim Model Number 36HM2TG MEL or Engineer approved equal. A pressure transmitter and pressure gauge shall be provided.

2.8 UV DISINFECTION EQUIPMENT

A. The UV Disinfection Equipment shall be Atlantic Ultraviolet S2400C or Engineer approved equal. 2-inch NPT connections, 316SS, 120 VAC. A total of four (4) units shall be provided and configured in two parallel trains with two units in series per train.

B. The self-cleaning filters, hydrometers, and UV disinfection equipment is intended to come as a pre-assembled skid or table, including all PVC piping and valves such that only the inlet and outlet piping connections are required by the Contractor. Include sample connections and bypass and crossover piping and valves. The skid or table shall be of 304SS construction.

2.9 FRP FLOW INDUCER TOWERS

A. The FRP Flow Inducer Towers shall be Orenco FITD-D102 or Engineer approved equal. Include float trees with 4 floats, splice boxes with cord grips, and high-pressure hose and valve assemblies. Check valves shall be ball type.

2.10 SUBMERSIBLE TURBINE EFFLUENT PUMPS & CONTROLS

A. The Submersible Turbine Effluent Pumps shall be Orenco PF5030 or Engineer approved equal. Three (3) pumps shall be provided.

B. A control panel shall be provided for the dosing pump system. Panel shall be NEMA 4X FRP and include all necessary components for a complete and functional system. Panel shall include circuit breakers, motor contactors, alternator, HOA switches and pilot lights, surge arrestor, elapsed time meters, anticondensation heater. Panel shall be UL508 listed.

C. The control system shall utilize a programmable logic controller. A minimum 10-inch color touch screen shall be provided. Include all necessary input and output modules for the number of drip zones as shown on the drawings. System shall be capable of dosing two zones at a time as well as performing the flushing function. System shall alternate dosing pumps. PLC and touchscreen shall be Rockwell, Schneider Electric, Siemens, or Engineer approved equal.

D. The control system will operate the dosing pumps using a programmable timer. A pump on / high level alarm float will override the timer. A redundant off / low level alarm float will protect the pumps from running dry. An additional float shall be provided for normal operation in conjunction with the programmable timer.

E. The control system shall be capable to accurately totalize flows and flows by zone, pump cycle counting, pump elapsed time, provide for even distribution of effluent to the drip zones, counts of automated flushing events, and alarm events and provide an alarm historian.

PART 3 - EXECUTION

3.1 SUPPLIER REQUIREMENTS DURING CONSTRUCTION

A. Assistance

1. Supplier shall provide assistance to the Engineer during the construction of the project. Assistance shall include, but not be limited to the following:
    a. Attending one (1) coordination meeting at the Engineer's office, including all associated costs for travel, lodging, meals, etc.
    b. Providing reviews for the drawings and specifications related to the equipment specified herein.
    c. Providing written comments to the Engineer.
    d. Providing telephone and e-mail support during the construction process.
    e. Providing detailed installation drawings for the Supplier provided equipment.

3.2 INSTALLATION

A. Comply with all handling and installation procedures recommended by the Supplier. Mount the electrical controls and perform necessary wiring to connect the equipment to

the electrical service and controls. Install controls and enclosures as indicated on the Drawings.

3.3 INSTALLATION CHECK-OUT AND START-UP SERVICES

A. Installation and Check-Out

1. Provide the services of a factory-trained engineer who has at least three (3) years' experience in systems described above to supervise and check out the installation by the Contractor. Provide a minimum of 2 trips and four (8) 8-hour days at the job site.

B. Start-Up and Training

1. Provide the services of a factory-trained engineer who has at least three (3) years' experience in systems described above to start up the system and provide training to the Owner's operators. Provide a minimum of 2 trips and two (2) 8-hour days at the job site for startup and 2 trips and a minimum of two (8) 8-hour days for training.
2. Provide an additional trip (1) for one (1) 8-hour day of training following six (6) months of operation.
3. These visits are separate and in addition to any follow-up visits for warranty work.

B. Remote technical support on the control panel shall be provided at no charge for a period of five (5) years following substantial completion.

3.4 TESTING

A. Hydrostatic pressure testing of the entire drip dispersal system PVC piping network shall occur following installation and prior to startup. Test pressure shall be 100 psi and performed in accordance with AWWA C605.

3.5 REPORTS

A. Following installation, the equipment shall be thoroughly checked out and tested by a qualified field representative of the pump manufacturer. The Supplier or his authorized representative shall submit a report certifying that the equipment has been installed properly, checked out, and is ready for safe operation in the manner intended.

3.6 SPARE PARTS

A. The following spare parts will be supplied

1. Four (4) solenoid valves
2. Two (2) pressure regulator valves
3. Two (2) floats
4. One (1) UV lamp
5. One (1) spare pump

END OF SECTION

APPENDIX

Tracking Number TNR182588

NOTICE OF COVERAGE UNDER THE GENERAL NPDES PERMIT FOR STORMWATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITY (CGP)

Tennessee Department of Environment and Conservation
Division of Water Resources
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 11th Floor
Nashville, TN 37243

Under authority of the Tennessee Water Quality Control Act of 1977 (T.C.A. 69-3-101 et seq.) and the delegation of authority from the United States Environmental Protection Agency under the Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977 (33 U.S.C. 1251, et seq.):

Name of the Construction Project:	**Town of Huntland Wastewater Treatment Plant & Drip Dispersal Facilities (4.88 acres)**
Master Tracking Number at the Site:	**TNR182588**
Permittee Name:	**Town of Huntland**
Project Name:	**Town of Huntland Wastewater Treatment Plant and Drip Dispersal Facilities**
Contractor(s):	**no contractor**
is authorized to discharge:	storm water associated with construction activity
from site located at:	**Located West Side of Elora Road (Old Hwy 122), Franklin County**
to receiving waters named:	**Taylor Creek**

in accordance with effluent limitations, monitoring requirements and other conditions set forth herein.

Likely presence of threatened or endangered species in one mile radius: **NO**
Likely presence of threatened or endangered species downstream: **NO**

Additional pollution prevention requirements apply for discharges into waters which TDEC identifies as:

- **Exceptional Tennessee Waters: NO**

Your coverage under the CGP shall become effective on **March 8, 2021**, and shall be terminated upon receipt of Notice of Termination.

A copy of the CGP can be obtained from
https://www.tn.gov/content/tn/environment/permit-permits/water-permits1/npdes-permits1/npdes-stormwater-permitting-program/npdes-stormwater-construction-permit.html