VOLUME I OF

CONTRACT DOCUMENTS

FOR THE

GREEN RIVER VALLEY WATER DISTRICT
CAVE CITY, KENTUCKY

EPA FUNDED CLEARWELL ADDITION
FUND ACTIVITY ID: FGL 2003 0028

WATER MANAGEMENT SERVICES, LLC
2 INTERNATIONAL PLAZA, SUITE 401
NASHVILLE, TENNESSEE 37217
(615) 366-6088
Fax (615) 366-6203

WMS No. 08205

GREEN RIVER VALLEY WATER DISTRICT
CAVE CITY, KENTUCKY

EPA FUNDED CLEARWELL ADDITION
FUND ACTIVITY ID: FGL 2003 0028

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VOLUME II

CONTRACT DRAWINGS (SEE INDEX IN CONTRACT DRAWINGS)

PROPOSAL SECTION

GREEN RIVER VALLEY WATER DISTRICT
CAVE CITY, KENTUCKY

INVITATION TO BID
FOR
CONSTRUCTION OF

EPA FUNDED CLEARWELL ADDITION
FUND ACTIVITY ID: FGL 2003 0028

RECEIPT OF PROPOSALS

Sealed proposals for the construction of Green River Valley Water District, EPA Funded Clearwell Addition will be received at the office of the Green River Valley Water District, 85 E. Les Turner Road, Cave City, Kentucky 42127, ATTENTION: Mr. David Paige, Manager on or before 2:00 P.M. local time on ????, 2009 and immediately thereafter all bids will be publicly opened and read aloud.

Sealed envelopes containing proposals shall be marked "Proposal for the Green River Valley Water District, EPA Funded Clearwell Addition." No proposal will be considered unless it is made on the Proposal form which is included in the Contract Documents. The Proposal must not be removed from the Contract Documents with which it has been bound by the Green River Valley Water District.

This proposal must be addressed as indicated in the previous paragraph. It shall be the Bidder's responsibility that the envelope be properly addressed to ensure that the proposal is received on or before the appropriate time.

The project will include the following described construction:

> Furnishing and installation for the construction of new 500,000 gallon clearwell, backwash pumping and high service pumping station, together with all required piping, valves, equipment, electrical, grading, and appurtenances for a complete operating system.

EPA SPECIAL APPROPRIATIONS GRANT FUNDING

This project is being funded in part with an EPA Special Appropriations Grant as part of the FY 2008 Appropriations Act.

Bidders must comply with the following:

a. Title VI of the Civil Rights Act of 19964, the Anti-Kickback Act, and the Contract Work Hours Standard Act.

b. President's Executive Order No. 11246 as amended, which prohibits discrimination in employment regarding race, creed, color, sex or national origin.

c. Certification of prior work under Executive Order 11246 (Equal Employment Opportunity) as amended.

d. Bidders shall supply a statement that the Contractor/Subcontractor will comply with 41 CFR 60-4, in regard to affirmative action, to insure equal opportunity to females and minorities and will apply the time tables and goal set forth in 41 CFR 60-4. In addition the statement shall include verbiage that the bidders will make positive efforts to use small, minority, women owned and disadvantaged businesses.

CONTRACT DOCUMENTS

All work must be performed in accordance with the Contract Documents which are available for inspection at the following locations:

Green River Valley Water District
85 E. Les Turner Road
Cave City, Kentucky 42127

F. W. Dodge Corporation
1604 Elm Hill Pike, Suite 200
Nashville, Tennessee 37210

Water Management Services, LLC
2 International Plaza, Suite 401
Nashville, Tennessee 37217

F. W. Dodge Corporation
1812 Taylor Avenue
Louisville, Kentucky 40213

Associated General Contractors of America
2321 Fortune Drive, Suite 112
Lexington, Kentucky 40509

Copies may be obtained at the office of Water Management Services, LLC, 2 International Plaza, Suite 401, Nashville, Tennessee 37217 (telephone: (615-366-6088). A deposit of $150.00 must be made for each set obtained. The deposits of all bidders, except the successful bidder, will be refunded without any deduction upon return of the Bid Documents (drawings and specifications) to Water Management Services in good condition and within 15 calendar days subsequent to the opening of bids. Non-bidders and bidders who have taken out additional sets will be refunded $50.00 under the same conditions of return.

Subcontractors, equipment suppliers, and others who do not submit a formal bid to the Owner will be refunded the same as non-bidders provided they return their plans in good condition and within 15 calendar days subsequent to the opening of bids.

BID SECURITY

Each Proposal shall be accompanied by a certified or cashier's check or a satisfactory bid bond, payable to the Green River Valley Water District, in amount not less than five (5) percent of the Base Bid as a guarantee that the bidder will, within fifteen (15) days after the date of the award of the Contract, execute an Agreement and file bonds and insurance as required by the Contract Documents if his Proposal is accepted.

If an intended awardee fails to execute and file an Agreement, bonds and insurance as required by the Contract Document, the entire amount of the security submitted with the Proposal shall be forfeited.

HOLDING OF PROPOSAL

No bid shall be withdrawn after the opening of the proposals without the consent of the Green River Valley Water District for a period of ninety (90) days after the scheduled time of the closing of bids. The bid securities of all bidders, except those submitted with the three lowest acceptable bidders, will be returned within fifteen (15) days after the time of the opening of the bids. The bid security accompanying the three lowest acceptable proposals may be held by the Green River Valley Water District until a construction contract has been executed and a satisfactory Performance Bond in the sum of the full amount of the Contract has been delivered to the Green River Valley Water District.

TIME FOR COMPLETION

The successful bidder shall be required to fully complete all work within 300 consecutive calendar days from and including the date to start work established in a written order from the Green River Valley Water District.

NOTE: The Contractor's attention is directed to the Provisions for Liquidated Damages as provided in the Special Conditions and the Contract Agreement.

AWARD OF CONTRACT

The award of any Contract will be made by the Green River Valley Water District to the lowest responsive, responsible bidder. Responsible bidder will be defined as one who furnished satisfactory evidence that the bidder has the experience and the ability and that he has sufficient capital and facilities to enable him to perform the work successfully and to complete the work within the time specified in the Contract Document.

At a minimum, a responsible and responsive bidder shall be have provided the required bid bond, have the capability of meeting the bond and insurance requirements, and be in compliance with Federal, State and local laws and regulations applicable to the project.

The Green River Valley Water District reserves the right to reject any proposal for failure to comply with all requirements of the notice or of any of the Contract Documents; however, it may waive any minor defects or informalities at its discretion. The Green River Valley Water District further reserves the right to reject all proposals.

Plans and specifications for this project were prepared by Water Management Services, LLC.

GREEN RIVER VALLEY WATER DISTRICT
BY: David Paige, Manager

GREEN RIVER VALLEY WATER DISTRICT
CAVE CITY, KENTUCKY

EPA FUNDED CLEARWELL ADDITION
FUND ACTIVITY ID: FGL 2003 0028

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FOR
INSTRUCTIONS TO BIDDERS

INSTRUCTIONS TO BIDDERS

1. EXAMINATION OF PROCUREMENT DOCUMENTS AND SITE

1.1 Before submitting a Bid, each Bidder must (a) examine the Procurement Documents thoroughly, (b) become familiar with federal, state, and local laws, ordinances, rules, and regulations that may in any manner affect cost, progress or furnishing the Goods and Special Services, (c) study and carefully correlate Bidder's observations with the Procurement Documents, and (d) if specified, or if, in Bidder's judgment, any local condition may in any manner affect cost, progress or furnishing the Goods and Special Services, visit the site to become familiar with local conditions.

1.2 Upon request Owner will provide each Bidder access to the site to conduct such investigations and tests as each Bidder deems necessary for submission of his Bid.

1.3 The submission of a Bid will constitute an incontrovertible representation by the Bidder that he has complied with every requirement of this Article 1 and that the Procurement Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for furnishing the Goods and Special Services.

2. EASEMENTS

Portions of the improvements under this project will be constructed on private property for which easements have been secured by the Owner. Work performed on, or use of such easements, shall be subject to the provisions of the easement agreements on file and open to inspection in the office of the Owner.

3. INTERPRETATION OF CONTRACT DOCUMENTS

Questions regarding documents, discrepancies, omissions, or intent of the Specifications or drawings shall be submitted in writing to the Owner, through the Engineer, at least 10 days prior to opening of bids to provide time for issuing and forwarding an addendum. Any interpretation of the Contract Documents will be made only by addendum duly issued or delivered by the Owner to each person receiving a set of documents. The Owner will not be responsible for any other explanations or interpretations of the Contract Documents.

4. MATERIAL SUBSTITUTION

Each bidder shall base his bid upon the materials and equipment as described in the bidding documents and no substitutions shall be allowed in the bid proposal unless approved by an addendum. The successful contractor will not be allowed to make any substitutions on his own imitative but, in each instance, will be required to obtain authorization from the Owner before installing any work in variance with the requirements of the Contract Documents. Substitutions if allowed shall conform to paragraph 8.1 of the General Conditions (RUS Bulletin 1780-13, Attachment 9).

5. APPROXIMATE QUANTITIES

The construction of this project is based on a lump sum for the completed project. The unit prices are for supplemental work as directed by the Engineer. On all items on which bids are to be received on a unit price basis, the quantities stated in the bid will not be used in establishing final payment due the Contractor. The quantities stated, on which unit prices are invited, are approximate only. Bids will be compared on the basis of number of units stated in the bidding schedule. Payment on the Contract on unit price items will be based on the actual number of units installed in the completed work.

6. PREPARATION OF BID

Only bids which are made out on the bid form included in the official (numbered) bid document will be considered. The bid form must not be separated from this document. Amounts are to be shown in both words and figures. In case of discrepancy between words and figures, the words shall prevail unless it clearly appears, in Owner's opinion, that the words rather than the figures are in error. If any portion of the bid is required to be given in unit prices and totals, the unit prices shall prevail unless it clearly appears, in Owner's opinion, that the unit prices rather than the totals are in error. If a discrepancy exists between the total base bid and the true sum of the individual bid items, the true sum shall prevail. A bid will be rejected if it does not contain a price for each and every item named in the bidding schedule. Bidders are warned against making any erasures or alterations of any kind, and bids which contain omissions, erasures, conditions, alterations, or additions not called for may be rejected.

The lump sum (base bid) in the Bidding Schedule shall be based manufacturers named by the bidder in the Tabulation of Major Equipment Items. The bidder is required to include on the tabulation the name of the manufacturer on which the bidder based his bid. Failure to list a manufacturer for each item of major equipment may render the bid non-responsive.

7. SIGNING OF BID

If the bidder is a corporation, the legal name of the corporation shall be set forth together with the signature of the officer or officers authorized to sign contracts on behalf of the corporation. If bidder is a partnership, the true name of the firm shall be set forth together with the signatures of all the partners. If the bidder is an individual, his signature shall be inscribed. If signature is by an agent, other than an officer of a corporation or a member of a partnership, a power of attorney must be on file with the Owner prior to opening bids or submitting bids; otherwise, the bid may be regarded as irregular.

8. BID SECURITY

No bid will be considered unless accompanied by a bid security as defined in the Invitation to Bid as a guarantee that if the bid is accepted, the bidder will execute the Agreement and file bonds and insurance as required by the Contract Documents within 15 days from the date of the award of the Contract.

9. RETURN OF BID SECURITIES

The security of the three lowest bidders will be returned after the execution of the Agreement with the successful bidder and the approval of his bonds and insurance. The security of all other bidders will be returned promptly after the bids have been opened and reviewed by the Owner. If all bids are rejected, the securities will be returned at the time of rejection.

10. AGREEMENT, BONDS, INSURANCE

The attention of bidders is specifically directed to the General Conditions of the Contract and to the forms of agreement and bonds to be executed and types of insurance to be taken out in the event a Contract award is made.

The attention of bidders is specifically directed to the General Conditions of the Contract relative to the Certificate of Insurance requirements. If the Surety declines to provide the Certificate of Insurance containing the specified cancellation clause verbiage, the Surety shall be required to provide a separate letter to the Owner/Engineer stating the Surety shall notify the Certificate holder in writing thirty (30) days prior to cancellation, reduction, or change in coverage on this project.

11. BID SUBMITTAL

Each bid, properly signed, together with the bid security and all documents bound herewith, shall be enclosed in a sealed envelope addressed and entitled as specified in the Invitation to Bid and delivered to the office designated in the Invitation to Bid. All addenda issued shall be included with the documents at the time of bid submittal.

12. WITHDRAWAL OF BID

Any bid may be withdrawn at any time prior to the hour fixed in the invitation to bid for the opening of bids, provided that a request in writing, executed by the bidder or his duly authorized representative, for the withdrawal of such bid is filed with the Owner prior to the time specified for opening of bids. The withdrawal of a bid will not prejudice the right of a bidder to file a new bid.

13. DESIGNATION OF SUBCONTRACTORS

Each bidder shall list on the form included in these documents the names and addresses of all subcontractors who will perform work or labor or render service to the bidder on or about the construction site in addition to any and all requirements of Chapter 6 of Title 62 of the Tennessee Codes Annotated. Each bidder shall show on the form the portion of the work to be done by each subcontractor.

14. QUALIFICATION OF BIDDERS

It is the intention of the Owner to award a Contract only to a bidder who furnishes satisfactory evidence that he has sufficient capital, facilities, and plant to enable him to prosecute the work successfully and promptly and to complete the work within the time specified in the Contract Documents. Furthermore, it is the intention of the Owner to award a Contract only to a bidder with a satisfactory record of performance, skill, integrity and judgment. Each bidder shall submit with his bid a listing of past projects including references. A form is provided in the Proposal for listing of this information.

15. DISQUALIFICATION OF BIDDERS

More than one bid for the same work described in this document from an individual, firm or partnership, a corporation or an association under the same of different names will not be considered. Reasonable grounds for believing that any bidder is interested in more than one bid for the work contemplated will cause the rejection of all bids in which such bidder is interested. If there are reasonable grounds for believing that collusion exists among the bidders, the bids of the participants in such collusion will not be considered. In addition, if at any time it shall be found that the person, firm, or corporation to whom the Contract has been awarded has, in presenting any bid or bids, colluded with any other party or parties, then the Contract so awarded shall be null and void, and the Contractor and his sureties shall be liable to the Owner for all loss or damage which the Owner may suffer thereby, and the Owner may advertise for new bids for said work. The attention of each bidder is directed to the Non-Collusion form in the Proposal and each bidder shall submit an executed affidavit with his bid.

16. PRE-BID CONFERENCE

Bidders are advised that a pre-bid conference may be held for the purpose of explaining affirmative action, equal employment opportunity, and minority business enterprise requirements for this project and to give instructions on the proper manner of filling out the required forms. If such a conference is held, the time and place will be established by addendum.

17. BID OPENING

Bids will be opened and the prices bid will be read aloud publicly at the time and place indicated in the Invitation to Bid. Bidders or their agents are invited to be present.

18. AWARD OF CONTRACT

The award of any contract or contracts will be made to the lowest responsive responsible bidder or bidders. The Owner reserves the right to reject any or all bids or to waive irregularities or informalities at its discretion.

19. EFFECTIVE DATE OF AWARD

If a contract is awarded by the Owner, such award shall be effective when formal notice of such award, signed by the authorized representative of the Owner, has been delivered to the intended awardee or mailed to him at the main business address shown on his bid by some officer or agent of the Owner duly authorized to give such notice.

20. EXECUTION OF AGREEMENT

Copies of the agreement, in the number stated in the form of Agreement, shall be executed by the successful bidder and returned, together with the required bonds and insurance, within 15 days from and after the date of the award of the Contract. Effective date of bonds shall be the same or later than the date of the Agreement. Failure of a successful bidder to execute the Agreement and file required bonds and insurance within the required time shall be just cause for the annulment of the award. On failure of a successful bidder to execute the Agreement and file the required bonds and insurance within the required time, he shall forfeit his bid security as agreed hereinbefore. Upon annulment of an award as aforesaid, the Owner may then award a Contract to the next lowest, responsible bidder.

21. COMMENCEMENT AND COMPLETION OF WORK

The successful bidder shall commence work within 15 calendar days from and after the issuance by the Owner of a written Notice to Proceed and shall complete all work in accordance with the terms and conditions of the Contract Documents within 300 calendar days from and after the date of the Notice to Proceed. The notice to proceed will be issued within 10 days after award of Contract.

22. LIQUIDATED DAMAGES

The Contractor's attention is directed to the Provisions for Liquidated Damages as provided in the Special Conditions and in the Contract Agreement.

23. UNCLASSIFIED EXCAVATION

This Contract includes excavation on an unclassified basis and is included in the lump sum amount. Supplemental unit prices will only be paid if so authorized by the Engineer.

This Contract includes excavation on an unclassified basis. The cost of all excavation necessary for the installation of the sewer main and appurtenances required under this Contract will be merged into the price per foot for pipe installed or appurtenances thereto. Not distinction will be made insofar as payment is concerned between earth and rock. The bid item for unclassified excavation covers additional excavation required by removing unsuitable material (subgrade) authorized by the Engineer in the field.

24. UNDERGROUND FACILITIES

The information and data shown or indicated in the Contract Drawings with respect to existing underground facilities is based on available information and record drawings. The Owner/Engineer shall not be responsible for the accuracy or completeness of such information or record drawings. The Contractor shall have full responsibility for reviewing and checking all such information and data for locating all underground facilities shown or indicated on the Contract Drawings, for coordinating of the work with the Owner and for the safety and protection thereof and repairing any damage thereto resulting from the work, the cost of which will be considered as having been included in the Contract price.

If underground facilities are uncovered or revealed which were not shown or indicated in the Contract Drawings and which Contractor could not reasonably have been expected to be aware of, Contractor shall promptly, after becoming aware thereof and before performing any work affected thereby, give written notice to the Owner/Engineer. The Engineer will promptly review the underground facility to determine the extent to which the Contract Documents should be modified to reflect and document the consequences of the existence of the underground facility and the Contract Document will be amended or supplemented to the extent necessary.

25. EPA SPECIAL APPROPRIATIONS GRANT FUNDING

This project is being funded in part with an EPA Special Appropriations Grant as part of the FY 2008 Appropriations Act.

Bidders must comply with the following:

a. Title VI of the Civil Rights Act of 19964, the Anti-Kickback Act, and the Contract Work Hours Standard Act.

b. President's Executive Order No. 11246 as amended, which prohibits discrimination in employment regarding race, creed, color, sex or national origin.

c. Certification of prior work under Executive Order 11246 (Equal Employment Opportunity) as amended.

d. Bidders shall supply a statement that the Contractor/Subcontractor will comply with 41 CFR 60-4, in regard to affirmative action, to insure equal opportunity to females and minorities and will apply the time tables and goal set forth in 41 CFR 60-4. In addition the statement shall include verbiage that the bidders will make positive efforts to use small, minority, women owned and disadvantaged businesses.

26. NOTICE OF INTENT FOR STORM WATER DISCHARGES

The Bidder's attention is directed to the requirement for executing a Notice of Intent (NOI) for storm water discharges upon award of this project. This NOI is included in the Agreement Section. The Owner will pay required fee and transmit the NOI package to the State for review and approval.

27. PREVAILING WAGE DETERMINATION

The Contractor shall be aware and take into consideration wage rates which will be in effect for this project. These rates can be found in the Special Conditions of this document.

28. 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.

PROPOSAL TO

GREEN RIVER VALLEY WATER DISTRICT
CAVE CITY, KENTUCKY

EPA FUNDED CLEARWELL ADDITION
FUND ACTIVITY ID: FGL 2003 0028

Full Name of Bidder _____

Main Business Address _____

Place of Business _____

TO: THE GREEN RIVER VALLEY WATER DISTRICT (hereinafter called "Owner")

The undersigned, as bidder, declares that the only person or parties interested in this Proposal as principals are those named herein, that this Proposal is made without collusion with any other person, firm or corporation; that he has carefully examined the location of the proposed work, the proposed forms of Agreement and Bonds, and the Contract Drawings and Specifications for the above-designated work, all of which are on file in the Green River Valley Water District, and all other documents referred to or mentioned in the Contract Documents, the Contract Drawings and Specifications, including Addenda No. _____, _____, _____, and _____ issued thereto; and he proposes and agrees if this Proposal is accepted that he will contract with the Green River Valley Water District in the form of the copy of the Agreement included in these Contract Documents to provide all necessary machinery, tools, apparatus and other means of construction, including utility and transportation services necessary to do all the work, and furnish all the materials and equipment specified or referred to in the Contract Documents in the manner and time herein prescribed and according to the requirements of the Owner as therein set forth, furnish the Contractor's Bonds and Insurance specified in the General Conditions of the Contract, and to do all other things required of the Contractor by the Contract Drawings, and that he will take in full payment therefore the sums set forth in the following Bidding Schedule.

I. BIDDING SCHEDULE

A. LUMP SUM ITEMS

Item No. 1 - Lump Sum (Base Bid)

The base bid for the furnishing of all labor, materials and equipment for the Construction Work of the EPA Funded Clearwell Addition required for a complete operating installation as described in the Contract Documents and including all Items of Major Equipment named in the following Tabulation of Major Equipment Items, the lump sum of

_____
(in writing)

_____ Dollars and _____ Cents

TOTAL $ _____
(in figures)

B. UNIT PRICED CONSTRUCTION ITEMS

Item No. 2

225 square yards of 3 1/2-inch C.W. Binder Course, complete in place.

@_____ Dollars &_____Cents

$ _____ $ _____
per square yard Total

Item No. 3

600 square yards of 6-inches of Class A compacted aggregate stone base, complete in place.

@_____ Dollars &_____Cents

$ _____ $ _____
per square yard Total

C. SUPPLEMENTAL UNIT PRICED FOUNDATION ITEMS ORDERED BY ENGINEER

Item No. 4

500 cubic yards of supplemental unclassified excavation, complete in place.

@_____ Dollars & _____Cents

$ _____ $ _____
per cubic yard Total

Item No. 5

500 cubic yards of granular refill material, complete in place.

@_____ Dollars &_____Cents

$_____ $_____
per cubic yard Total

Item No. 6

500 cubic yards of Class C concrete refill material, complete in place.

@_____ Dollars &_____Cents

$_____ $_____
per cubic yard Total

Item No. 7

7,500 pounds of ductile iron fittings, complete in place.

@_____ Dollars &_____Cents

$_____ $_____
per pound Total

C. TOTAL BASE BID

The sum of Item Numbers 1 through 7 is

_____
(in writing)

_____ Dollars and _____ Cents
(in writing)

Total Bid $_____
(in figures)

II. PROPOSAL CONDITIONS

A. It is expressly understood that quantities in the Bidding Schedule for Unit Price Items are approximate only and that payment on a Contract will be made only on the actual quantities of work completed in place, measured on the basis defined in the Contract Conditions and the Contract Specifications.

B. The undersigned has carefully checked the above Bidding Schedule against the Contract Drawings and Specifications before preparing this Proposal and accepts the said quantities to be substantially correct, both as to classification and amount, and as correctly listing the complete work to be done in accordance with the Contract Drawings and Specifications.

C. If this Proposal is accepted and the undersigned shall fail to contract as aforesaid, and to give the bond for faithful performance required by the General Conditions of Contract

and by law, and to provide all insurance as required by the Contract Documents within fifteen (15) days after the date of the award of the Contract, the Green River Valley Water District, at its option, determined that the bidder has abandoned this Contract and thereupon this Proposal and the acceptance thereof shall be null and void, and the forfeiture of such security accompanying this Proposal shall operate and the same shall be the property of the Green River Valley Water District.

III. MAJOR EQUIPMENT ITEMS

The lump sum (base bid) in the Bidding Schedule is based manufacturers named in the following Tabulation of Major Equipment Items. The bidder shall include on the tabulation the name of the manufacturer on which the bidder based his bid. Failure to list a manufacturer for each item of major equipment could render the bid non-responsive.

TABULATION OF
MAJOR EQUIPMENT ITEMS

Section No.	Item No.	Description	Manufacturer Or Supplier
16G	1	Motor Control Centers	_____
17C	1	Butterfly Valves	_____
17C	1	Control Valves	_____
22B	1	Vertical Turbine Pumps	_____

IV. BID SECURITY

Accompanying this Proposal is a _____, in the amount of _____ Dollars ($_____).

Note: (a) Insert the words "Cash," "Cashier's Check," "Certified Check" or "Bid Bond" as the case may be.

(b) Amount must be equal to at least that stated in the Notice to Bidders but not less than that required by State Statutes.

V. GENERAL

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 ninety (90) calendar days after the scheduled closing time for receiving bids.

Upon receipt of written notice of the conditional acceptance of this bid, bidder will execute the formal Contract attached within 15 days and deliver the Surety Bond or Bonds and insurance as

required by the Contract Documents. The bid security attached in the sum of _____Dollars ($_____) is to become the property of the Owner in the event the Contract, Insurance and Bonds are not executed within the time above set forth.

VI. STARTING AND COMPLETION

If awarded a Contract under this Proposal, the Undersigned proposes to start work at the site within fifteen (15) calendar days after the receipt from the Owner of a written notice to proceed. The Undersigned further agrees to fully complete all work covered by this Proposal to the point of final acceptance by the Owner within 300 consecutive calendar days from and including the date of receipt from the Owner of a written notice to proceed.

VII. SIGNATURE

State of _____)
)ss
County of _____)

_____, being first duly sworn on oath deposes and says that the bidder on the above proposal is organized as indicated below and that all statements herein made are made on behalf of such bidder and that this deponent is authorized to make them.

_____, also deposes and says that he has examined and carefully prepared his bid proposal from the Contract Drawings and Specifications and has checked the same in detail before submitting this Proposal or bid; that the statements contained herein are true and correct.

(a) Corporation

The bidder is a corporation organized and existing under the laws of the State of _____, which operates under the legal name of _____, and the full names of its officers are as follows:

President _____
Secretary _____
Treasurer _____
Manager _____

and it (does) or (does not) have a corporate seal. The (name) _____ is authorized to sign construction proposals and contracts for the company by action of its Board of Directors taken on _____, a certified copy of which is hereto attached. (Strike out this last sentence if not applicable.)

(b) Partnership

The bidder is a partnership consisting of individual partners whose full names are as follows:

_____ _____

_____ _____

_____ _____

_____ _____

The partnership does business under the legal name of:

_____.

(c) Individual

The bidder is an individual whose full name is _____ _____, and if operating under a trade name, said trade name is _____.

Dated _____, 200____.

_____
Legal Entity

(Seal - If Corporation)

(Sign Here) By: _____

_____

Telephone No. _____

Subscribed and sworn to before me this _____ day of _____, 200___.

_____
Notary Public

My Commission Expires: _____

CONTRACTOR'S BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we _____ (hereinafter called the Principal) and _____, (hereinafter called the Surety), a corporation chartered and existing under the laws of the State of _____ with its principal offices in the City of _____ and authorized to do business in the State of _____are held and firmly bound unto the Green River Valley Water District (hereinafter called the Owner), in the full and just sum of _____ Dollars ($_____) good and lawful money of the United States of America, to be paid upon demand of the Owner, to which payment well and truly to be made, the Principal and the Surety bind themselves, their heirs, executors, administrators, and assigns, jointly and severally and firmly by these presents.

WHEREAS, the Principal is about to submit or has submitted to the Owner a proposal for furnishing all labor, materials, equipment and incidentals necessary to furnish and complete the water tank improvements at the Green River Valley Water District EPA Funded Clearwell Addition.

WHEREAS, the Principal desires to file this bond in accordance with law, in lieu of a certified bidder's check otherwise required to accompany this Proposal.

NOW, THEREFORE: The conditions of this obligation are such that if the Proposal be accepted, the Principal shall, within fifteen days after the date of receipt of a written notice of award of Contract, execute a Contract in accordance with the Proposal and upon the terms, conditions and prices(s) set forth therein, of the form and manner required by the Owner, and execute a sufficient and satisfactory Contract performance bond payable to the Owner in an amount of One Hundred Percent (100%) of the total Contract price in form and with security satisfactory to said Owner, then this obligation to be void; otherwise to be and remain in full force and virtue in law; and the Surety shall, upon failure of the Principal to comply with any or all of the foregoing requirements within the time specified above, immediately pay to the aforesaid Owner, upon demand, the amount hereof in good and lawful money of the United States of America.

IN TESTIMONY THEREOF, the Principal and Surety have caused these presents to be duly signed and sealed this _____ day of _____, 19_____.

_____
Principal

BY_____
(Seal)

_____
Surety

_____
(Seal)

Countersigned_____

Local Resident Producing Agent for _____

AFFIDAVIT

Each Contractor submitting a bid must fill out the following Affidavit:

STATE OF _____)
) ss
COUNTY OF _____)

Affiant,_____,

makes oath that he is the_____ of the _____; and that the only parties directly or indirectly interested in this Contract are named herein; and that neither the Mayor, Alderman, Commissioner or any other City Official is directly or indirectly interested in this Contract or the proceeds thereof; and that the undersigned affiant has not given or donated or promised to give or donate directly or indirectly to any official or employee of the Green River Valley Water District or to anyone else for his benefit any sum of money or other thing of value for aid or assistance in obtaining this Contract.

_____

Subscribed and sworn to before me

this _____ day of _____, 19_____.

_____

LIST OF SUBCONTRACTORS

PROJECT _____

The undersigned states that the following is a full and complete list of the proposed subcontractors on this Project and the class of work to be performed by each, and that such list will not be added to nor altered without written consent of the Owner.

Subcontractor and Address	Class of Work to be Performed
(1) _____	_____
_____	_____
(2) _____	_____
_____	_____
(3) _____	_____
_____	_____
(4) _____	_____
_____	_____
(5) _____	_____
_____	_____
(6) _____	_____
_____	_____
(7) _____	_____
_____	_____

Dated _____

_____
Bidder

By _____

STATEMENT OF EXPERIENCE OF BIDDER

The bidder is requested to state below that work of similar magnitude in order to judge his experience, skill and business standing and of his ability to conduct the work as completely and as rapidly as required under the terms of the contract.

Project and Location	Reference
(1) _____	_____
_____	_____
(2) _____	_____
_____	_____
(3) _____	_____
_____	_____
(4) _____	_____
_____	_____
(5) _____	_____
_____	_____
(6) _____	_____
_____	_____
(7) _____	_____
_____	_____

Dated _____

_____
Bidder

By _____

THE FOLLOWING CERTIFICATIONS ARE REQUIRED FOR UNITED STATES ENVIRONMENTAL PROTECTION AGENCY GRANT

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**

EPA-R4-0017 (5-73)

CERTIFICATION REGARDING DEBARMENT, SUSPENSION AND OTHER RESPONSIBILITY 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 judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining. attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement. theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(c) Are not presently indicted for or otherwise criminally or civilly charged by a government entity (Federal. State, or Local) with commission of any of the offenses enumerated in paragraph (1)(b) of this certification; and

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

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.

Attachment Number 11

CERTIFICATION REGARDING LOBBYING
Certification for Contracts, Grants, Loans, and Cooperative Agreements

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

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

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for 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 sub-awards at all tiers (including subcontracts, sub-grants, and contracts under grants, loans, and cooperative agreements) and that all sub-recipients 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.

_____
TYPED NAME & TITLE OF AUTHORIZED REPRESENTATIVE

_____
SIGNATURE OF AUTHORIZED REPRESENTATIVE DATE

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

MINORITY AND WOMEN'S BUSINESS ENTERPRISE PARTICIPATION POLICY

MBE/WBE DATA SHEET I

PROJECT NAME: _____ **BID DATE:** _____

1. Name, address and telephone number of contact person on all MBE, WBE matters.

   Contractor's Name: _____

   Address: _____

   Telephone Number: _____

2. Has the bidder met at least the minimum 3% and 5% goals?

   ☐ Yes (submit MBE/WBE DATA SHEET II, including certifications and subcontracts (or letters of intent signed by both parties, identifying the type of work and the dollar amount) within 21 days)

   ☐ No (submit MBE/WBE DATA SHEET III, including all documentation to support a good faith effort within 21 days)

   If no, please provide an explanation of the bidders inability to achieve the required goals and list any uncommitted areas of work.

AGREEMENT SECTION

GREEN RIVER VALLEY WATER DISTRICT
CAVE CITY, KENTUCKY

EPA FUNDED CLEARWELL ADDITION
FUND ACTIVITY ID: FGL 2003 0028

SPECIAL CONDITIONS OF CONTRACT

TABLE OF CONTENTS

SPECIAL CONDITIONS OF CONTRACT

1. Construction Operations and Material Storage

The Contractor must carry on all his construction operations, including storage of materials, in such a way as to interfere as little as possible with the operation and maintenance of existing wastewater treatment facilities.

2. Soil Erosion and Sediment Control

2.1 The Contractor shall plan and control his construction operations to minimize all soil erosion and the siltation of drains and streams resulting from such erosion. All methods used for such control shall be approved by the Engineer.

2.2 Where the Contractor's operations subject soil to erosion by the wind, he shall control such erosion by approved methods until affected areas can be seeded and mulched.

3. Project Signs

3.1 The Contractor shall furnish and erect one sign at an appropriate place on the project site as approved by the Engineer. The Contractor shall be responsible for protecting and maintaining the sign in good condition throughout the life of the project.

3.2 The sign will be fabricated of good quality 1-inch exterior plywood with suitable frames and posts. A 4" x 1-1/4" molding strip shall be placed around the outer edge projecting over the face of the sign. The entire woodwork shall be given a priming coat oil base primer and two coats of oil base white paint. The sign shall be not less than 4 feet by 8 feet and shall contain, at a minimum, the name of the Owner and its Officials, Project Name and Number, Contractor and Engineer. Layout of the sign shall be approved by the Engineer before painting. Lettering shall be done by a professional painter.

4. Contract Drawings

The Drawings applicable to the work to be performed under this Contract are referred to in this document as Contract Drawings and described as follows:

GREEN RIVER VALLEY WATER DISTRICT
CAVE CITY, KENTUCKY

EPA FUNDED CLEARWELL ADDITION
FUND ACTIVITY ID: FGL 2003 0028

The sheet index and titles of all drawings appear on the index sheet of the Contract Drawings.

5. Arrangement and Charge for Water and Electrical Power

Where the Contractor desires a water and electrical power supply in connection with any construction work, he shall make complete and satisfactory arrangements with the Green River Valley Water District.

Payments shall be made by the Contractor in accordance with the Utility Agency's official rates and policies.

6. Use of Fire Hydrants

The Contractor shall not open, turn on, or make any connection to any hydrant unless prior written permission of the Green River Valley Water District or local utility is obtained.

7. Barricades and Warning Signs

The Contractor shall furnish, erect and maintain such barricades, fences, lights and danger signals, and take such other precautionary measures that will ensure the protection of persons, property and the work.

Traffic control devices shall meet the requirements of the "Manual of Uniformed Traffic Control Devices" (MUTCD).

8. Use of Explosives

Should the Contractor elect to use explosives in the prosecution of the work, the Contractor shall employ only workmen familiar and skilled in the use of explosives, carefully cover the explosion with suitable timber, matting and/or excavation, and exercise the utmost care so as not to endanger life or property.

The Contractor shall obtain all necessary permits and/or licenses and carry on such work in compliance with all local ordinances and State of Kentucky Laws.

Whenever explosives are stored or kept they shall be stored in a safe and secure manner and all storage places shall be plainly marked "DANGEROUS -- EXPLOSIVES."

9. Restoration of Disturbed Areas

The Contractor shall be required to restore all areas disturbed by his operation to a condition equal to or better than the condition prevailing prior to construction.

10. Vegetation Damage

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.

11. Coordination of Work

The Owner may award other separate contracts in connection with this project requiring work on or near the project site and may progress simultaneously with the work relating to the construction under this Contract. It is, therefore, a requirement that each contractor, including the Contractor for this Contract, coordinate his operations with those of other contractors, especially where connections must be made between contracts.

12. Sequence of Operations

The work designated to be performed under this Contract shall be coordinated in such

manner that there shall be a minimum of interference with traffic and existing utilities. Existing water, gas, electric and communications shall not be interrupted without prior arrangements having been made with the management of the utility involved.

Backfilling and clean-up work shall be continuously prosecuted to the point that satisfactory ingress and egress to roadways can be maintained.

During the period required for construction under this Contract, it will be necessary that any existing wastewater treatment facilities, sanitary sewers, force mains, and pumping stations, be maintained in operation. The Contractor shall prepare and submit to the Owner and the Engineer a schedule of operations for approval. The Contractor shall dispose of all storm water and sewage accumulated in a manner acceptable to the Engineer.

13. Time for Completion and Liquidated Damages

The successful bidder shall commence work within 15 calendar days from and after the issuance by the Owner of a Written Notice to Proceed and shall complete all work in accordance with the terms and conditions of the Contract Documents within 300 consecutive calendar days for the Raw Water Intake, from and after the date of the Notice to Proceed. The Notice to Proceed will be issued within 10 days after award of the Contract.

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 Agreement, not a penalty but as liquidated damages for 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.

Provided, that the Contractor shall not 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

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 unusually severe weather; and

c. To any delays of subcontractors or suppliers occasioned by any of the causes specific 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 causes of the delay and notify the Contractor within a reasonable time of its decision in the matter.

14. Maintenance and Access of Traffic

Portions of the work may be located in developed areas requiring the access for fire and other departments to be provided for, and at least on free lane shall be available for all traffic. Contractors are to arrange operations in these areas to meet these requirements and secure approval of operating procedures Kentucky DOT.

15. Property Damage Claims

Any and all property damage claims received by the Owner, their agents, or the Contractor resulting from any alleged operation of the Contractor shall be investigated promptly (within 14 days) by the Contractor or insurance carrier. Any such claims made to the Owner shall be forwarded to the Contractor in writing and the Contractor shall subsequently forward such claims to his insurance carrier.

Before final payment is made by the Owner to the Contractor, a summary of the Contractor's disposition of all such claims shall be provided to the Owner. Nothing contained in this paragraph shall be interpreted by the Contractor to lessen the requirements of the General Conditions and, in particular, paragraph 3.16 of the General Conditions entitled "Responsibility for Damage."

16. Wastewater Bypassing

The Contractor shall insure that no wastewater bypassing will occur due to construction activities unless a schedule is approved by the State of Kentucky.

17. Supervision and Emergency Procedures

The Contractor shall man this project with adequate and qualified foremen and superintendents at all times. During weekends and night time hours, the Contractor shall have someone who can be on call (with names and telephone numbers) to be furnished to the Engineer and Columbia Power and Water Systems for emergency measures such as backfilling open holes, placing of barricades, and correction of other potential problems and/or hazards. During regular working hours, the Contractor should arrange for a local office and someone to receive phone calls and instructions and/or questions.

18. Work in City and State Road Rights-of-Way

When ordered by the Engineer or Owner's Representative, the Contractor shall place temporary cold mix in street trench cuts. This temporary pavement shall be properly maintained by the Contractor until such time as final pavement restoration is completed.

At various locations on this project (in addition to what might be specifically shown on the Contract Drawings), the nature of construction and traffic conditions will require that the Contractor utilize and maintain heavy steel plates to facilitate traffic. These steel plates shall be of sufficient size and thickness to be utilized for varying trenching conditions.

The Contractor shall make every possible effort to backfill all excavations at the end of each day's construction operations. To accomplish this procedure, the Contractor shall mark and/or reference the end of the pipe each day for reopening trench the next morning. In some cases the use of "sand or gravel bags" will facilitate this procedure, especially where major roads or highways must be crossed one lane at a time.

The Contractor shall remove equipment and other materials from and near the street or highway at the end of each day's construction operations. See previous provisions concerning barricades and warning signs.

All costs associated with furnishing, placing, maintaining and using these steel plates shall be merged into the Contractor's unit price bid for sewer mains.

19. Deletions by Owner

Portions of this work may be deleted by the Owner at their discretion during the course of construction operations because of unforeseen or unknown difficult construction conditions which may arise during the course of the work which this Contract does not cover.

20. Field Office for Contractor

Throughout the course of the project, the Contractor shall maintain a suitable office at the site of the work which shall be the headquarters of the foreman or superintendent authorized to receive drawings, instructions, or other communications, articles, or things from the Owner or its agents; and any such thing given to the said foreman or superintendent or delivered to the Contractor's office at the site of the work in his absence shall be deemed to have been given to the Contractor. The Contractor shall maintain a phone in his office.

21. Field Office for Engineer

The Contractor shall provide, at his own expense, a field office at the site for the exclusive use of the Engineer. The office shall be at least 10 feet by 10 feet, with a minimum ceiling height of 8 feet. The office shall be of weather-tight construction and shall have an air conditioner, windows, outside entrance, and heating facilities. The door shall have a cylinder lock and the Engineer shall be furnished at least two keys. The office facilities shall also have a bathroom and the following equipment:

1 - 3-foot by 4-foot drawing board (3/4-inch plywood)
1 - Stool of suitable height
1 - 110-volt service for two 200-watt incandescent lights and a 500-watt and 1,600-watt convenience outlet.
1 - Office desk with chair
1 - 4-drawer legal size files (locking type)

The field office shall be provided at the start of the work in a location as approved by the Engineer and shall not be removed from the site until final acceptance of the work.

22. Payment For Unit Priced Construction Items

1. 3 1/2-Inch C.W. Binder Course (Unit Price Item No. 2)

Compensation for C.W. Binder Course shall be based upon the Contract Unit Price multiplied by the measured square yards or fraction thereof placed as detailed on the Contract Drawings for new pavement areas. This item shall consist of a 2-inch layer, prime coat, and a 1 ½-inch layer. Pavement repairs for pipe installation shall be included in the lump sum item.

2. 6-Inch Aggregate Stone Base (Unit Price Item No. 3)

Compensation for aggregate stone base shall be based upon the Contract Unit Price multiplied by the measured square yards or fraction thereof placed as detailed on the Contract Drawings for new pavement areas. Pavement repairs for pipe installation shall be included in the lump sum item.

23. Payment For Unit Price Items Ordered By Engineer

Unit items as ordered by the Engineer are supplemental items only. Lump sum bid for the completed project shall include all unclassified excavation and backfill. Measurement for payment and compensation for unit price items will be as follows:

1. Supplemental Unclassified Excavation (Unit Price Item No. 4)

Compensation for supplemental unclassified excavation ordered removed shall be based upon the Contract Unit Price multiplied by the measured cubic yards or fraction thereof removed. For payment, the limit of unclassified excavation shall be a line 3 feet outside the wall or 12 inches outside the footing, whichever is greater. The depth of excavation under this item shall be to the depth directed by the Engineer.

Compensation shall include payment for all costs including, but not limited to, removing and disposing of the excavated material, wet or dry, and all other costs related to the excavation including any required dewatering.

2. Granular Refill (Unit Price Item No. 5)

Compensation for granular refill ordered placed shall be based upon the Contract Unit Price multiplied by the measured cubic yards placed. For payment, the limit of granular refill shall be a line 3 feet outside the wall or 12 inches outside the footing, whichever is greater and up to the bottom elevation of the structure or to the bottom of the gravel layer if such is indicated on the Contract Drawings. Such gravel layers, if indicated on the Contract Drawings, shall be included under the appropriate lump sum item. No sand layer will be required nor placed.

3. Class C Concrete (Unit Price Item No. 6)

Compensation for Class C concrete refill ordered placed shall be based upon the Contract Unit Price multiplied by the measured cubic yards placed.

Compensation shall include payment for all costs including, but not limited to, placing and grading of the Class C concrete refill.

Such gravel layers, if indicated on the Contract Drawings, shall be included under the appropriate lump sum item. No sand layer will be required nor placed.

4. Ductile Iron Pipe and Fittings (Unit Price Item No. 7)

Compensation for ductile iron pipe and fittings used for minor adjustments to existing

piping or additions to proposed piping shall be based upon the Contract Unit Price multiplied by the actual weight of the pipe/fittings installed. Compensation shall include all costs including, but not limited to, additional supports, if any, and painting.

24. Repair of Existing Water Mains and Services

Should the Contractor through his construction operations break or otherwise damage an existing water service or water main, the Contractor may undertake to make the necessary repairs as long as the following conditions are met:

A. Notify the local Utilities Board of the damage and coordinate with the Board on the operation of any valves.

B. Complete the repair in compliance with requirements of the local Utilities Board.

C. Furnish and install materials, fittings and sleeves in compliance with the standards of the local Utilities Board.

D. Store and have available on the project proper materials of sizes and type needed to avoid unnecessary repair delays.

Any repairs which are completed by the forces of the local Utilities Board shall be billed to the Contractor based on the Board's Standard invoicing procedures.

25. Prevailing Wage Determination

The Contractor shall be required to fully comply with the current Prevailing Wage Determination No. _____ dated _____ for Hart County. This wage determination and all work on this project has been designated Project No. _____, Heavy/Highway Project as indicated on the following pages.

26. Construction Activities and Compliance with Permits

The Contractor shall plan and control his construction activities to minimize all soil erosion and siltation of drains and streams. In addition, the Contractor shall comply with all requirements of the Commonwealth of Kentucky, US Corp of Engineers, and all other agencies.

Enclosed herewith and made a requirement of this Contract are permits and approvals from the various agencies involved. The Contractor shall review the following data or specific data obtained from the agency and comply with all conditions.

27. Contract Supplements/Change Orders (if required)

Any change order to the Contract, if required, shall comply with Federal Procurement Regulations as set forth in 40 CFR 31. Documentation of cost and pricing shall be submitted for review for any change orders exceeding $25,000. This documentation shall be certified as accurate by the Contractor.

SUPPLEMENTAL GENERAL CONDITIONS

FOR

CLEAN WATER STATE REVOLVING FUND

DRINKING WATER STATE REVOLVING FUND

EPA SPECIAL APPROPRIATION GRANTS
(Drinking Water and Wastewater)

Project Name: _____

Project Number: _____

The attached instructions and regulations as listed below shall be incorporated into the Specifications and comprise Special Conditions.

	Attachment No.
SRF/EPA Special Provisions	**1**
Requirements for Sub-agreements Awarded by Prime Contractors	**2**
40 CFR 31.36 (Procurement)-grants only	**3A**
KRS Chapter 45A-Kentucky Model Procurement Code-loans only	**3B**
Equal Employment Opportunity (EEO) Documents:	
Notice of Requirement for Affirmative Action	**4**
Contract Specifications (Executive Order 11246)	**5**
EEO Goals for Region 4 Economic Areas	**6**
Special Notice #1 - Check List of EEO Documentation	**7**
Employer Information Report EEO-1 (SF 100)	**8**
Labor Standards Provisions for Federally Assisted Construction, EPA Form 5720-4	**9**
Certifications	
Debarment, Suspension and Other Responsibility Matters	**10**
Anti-lobbying	**11**
Utilization of Small, Minority and Women's Businesses	**12**
Region 4 Disadvantaged Business Enterprise (DBE) Negotiated Rates	**13**
Bonds and Insurance	**14**
Outlay Management Schedule	**15**
Storm Water General Permit	**16**
Wage Rates	**17**

These special conditions shall supersede any conflicting provisions of this contract.

EPA SPECIAL PROVISIONS

a) The construction of the project shall conform to the applicable requirements for state, territorial and local laws and ordinances to the extent that such requirements do not conflict with Federal laws.

b) The EPA shall have access to the site and the project.

c) Any contract(s) awarded under this invitation for Bids are expected to be funded in part by a grant from the U.S. Environmental Protection Agency. Neither the United States nor any of its departments, agencies or employees are or will be a part to this Invitation for Bids or any resulting contract.

d) The Method of Award is to the lowest responsible responsive bidder.

e) A statement that the bidder must make positive efforts to use small and minority owned business and women business enterprises.

SRF SPECIAL PROVISIONS

(a) Line crossings of all roads and streets shall be done in accordance with the Kentucky Transportation Cabinet requirements as may be set forth in the Special Conditions.

(b) Construction is to be carried out so as to prevent by-passing of flows during construction unless a schedule has been approved by the State or EPA, whichever is applicable.

(c) Siltation and soil erosion must be minimized during construction. All construction projects with surface disturbance of more than 1 acre during the period of construction must have a KPDES Storm Water General Permit. To apply, the contractor must submit the "Notice of Intent" form at least 48 hours prior to start of construction. See Attachment 16 for the "Notice of Intent" form.

(d) Restore disturbed areas to original or better condition.

(e) Use of Chemicals: 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 DOW or EPA. Use of all such chemicals and disposal of residues shall be in conformance with instructions on the manufacturer's label.

(f) The construction of the project, including the letting of contracts in connection therewith, shall conform to the applicable requirements of state, territorial, and local laws and ordinances to the extent that such requirements do not conflict with Federal laws and this subchapter.

(g) The owner shall provide and maintain competent and adequate supervision and inspection.

(h) The Kentucky Infrastructure Authority and Kentucky Division of Water shall have access to the site and the project work at all times.

(i) In the event Archaeological materials (arrowheads, stone tools, stone axes, prehistoric and historic pottery, bottles, foundations, Civil War artifacts, and other types of artifacts) are uncovered during the construction of this project, work is to immediately cease at the location and the Kentucky Heritage Council shall be contacted. The telephone number is (502) 564-7005. Construction shall commence at this location until a written release is received from the Kentucky Heritage Council. Failure to report a find could result in legal action.

GRANT REQUIREMENTS FOR SUB-AGREEMENTS AWARDED BY A PRIME CONTRACTOR

A contractor must comply with the following provisions in its award of sub-agreements. (This section does not apply to a supplier's procurement of materials to produce equipment, materials and catalog, off-the-shelf, or manufactured items.)

(a) 40 CFR Part 32 (Debarment and Suspension Under EPA Assistance Programs);

(b) The limitations and sub-agreement award in 40 CFR 31.35, and 31.36(i) (3,4,6,10,12) ;

(c) The requirement for small, small rural, minority, women's and labor surplus area business in 40 CFR 31.36(e);

(d) The specifications requirements of 40 CFR 31.36(c) (1);

(e) The Federal cost principles in 40 CFR 31.22 and 31.36(f)(3);

(f) The prohibited types of sub-agreements in 40 CFR 31.36(f)(4);

(g) 40 CFR Part 34 (Anti-Lobbying under EPA Assistance Programs).

TITLE 40--PROTECTION OF ENVIRONMENT
CHAPTER I--ENVIRONMENTAL PROTECTION AGENCY

PART 31--UNIFORM ADMINISTRATIVE REQUIREMENTS FOR GRANTS AND COOPERATIVE AGREEMENTS TO STATE AND LOCAL GOVERNMENTS

Subpart C--Post-Award Requirements

Sec. 31.36 Procurement.

(a) States. When procuring property and services under a grant, a State will follow the same policies and procedures it uses for procurements from its non-Federal funds. The State will ensure that every purchase order or other contract includes any clauses required by Federal statutes and executive orders and their implementing regulations. Other grantees and sub-grantees will follow paragraphs (b) through (i) in this section.

(b) Procurement standards. (1) Grantees and sub-grantees will use their own procurement procedures which reflect applicable State and local laws and regulations, provided that the procurements conform to applicable federal law, the standards identified in this section, and if applicable, Sec. 31.38.

(2) Grantees and sub-grantees will maintain a contract administration system which ensures that contractors perform in accordance with the terms, conditions, and specifications of their contracts or purchase orders.

(3) Grantees and sub-grantees will maintain a written code of standards of conduct governing the performance of their employees engaged in the award and administration of contracts. No employee, officer or agent of the grantee or sub-grantee shall participate in selection, or in the award or administration of a contract supported by Federal funds if a conflict of interest, real or apparent, would be involved. Such a conflict would arise when:

(i) The employee, officer or agent,

(ii) Any member o f his immediate family,

(iii) His or her partner, or

(iv) An organization which employs, or is about to employ, any of the above, has a financial or other interest in the firm selected for award. The grantee's or sub-grantee's officers, employees or agents will neither solicit nor accept gratuities, favors or anything of monetary value from contractors, potential contractors, or parties to sub-agreements. Grantee and sub-grantees may set minimum rules where the financial interest is not substantial or the gift is an unsolicited item of nominal intrinsic value. To the extent permitted by State or local law or regulations, such standards or conduct will provide for penalties, sanctions, or other disciplinary actions for violations of such standards by the grantee's and sub-grantee's officers, employees, or agents, or by contractors or their agents. The awarding agency may in regulation provide additional prohibitions relative to real, apparent, or potential conflicts of interest.

(4) Grantee and sub-grantee procedures will provide for a review of proposed procurements to avoid purchase of unnecessary or duplicative items. Consideration should be given to consolidating or breaking out procurements to obtain a more economical purchase. Where appropriate, an analysis will be made of lease versus purchase alternatives, and any other appropriate analysis to determine the most economical approach.

(5) To foster greater economy and efficiency, grantees and sub-grantees are encouraged to enter into State and local intergovernmental agreements for procurement or use of common goods and services.

(6) Grantees and sub-grantees are encouraged to use Federal excess and surplus property in lieu of purchasing new equipment and property whenever such use is feasible and reduces project costs.

(7) Grantees and sub-grantees are encouraged to use value engineering clauses in contracts for construction projects of sufficient size to offer reasonable opportunities for cost reductions. Value engineering is a systematic and creative analysis of each contract item or task to ensure that its essential function is provided at the overall lower cost.

(8) Grantees and sub-grantees will make awards only to responsible contractors possessing the ability to perform successfully under the terms and conditions of a proposed procurement.
Consideration will be given to such matters as contractor integrity, compliance with public policy, record of past performance, and financial and technical resources.
(9) Grantees and sub-grantees will maintain records sufficient to detail the significant history of a procurement. These records will include, but are not necessarily limited to the following:
rationale for the method of procurement, selection of contract type, contractor selection or rejection, and the basis for the contract price.
(10) Grantees and sub-grantees will use time and material type contracts only--
(i) After a determination that no other contract is suitable, and
(ii) If the contract includes a ceiling price that the contractor exceeds at its own risk.
(11) Grantees and sub-grantees alone will be responsible, in accordance with good administrative practice and sound business judgment, for the settlement of all contractual and administrative issues arising out of procurements. These issues include, but are not limited to source evaluation, protests, disputes, and claims. These standards do not relieve the grantee or sub-grantee of any contractual responsibilities under its contracts. Federal agencies will not substitute their judgment for that of the grantee or sub-grantee unless the matter is primarily a
Federal concern. Violations of law will be referred to the local, State, or Federal authority having proper jurisdiction.
(12) Grantees and sub-grantees will have protest procedures to handle and resolve disputes relating to their procurements and shall in all instances disclose information regarding the protest to the awarding agency. A protestor must exhaust all administrative remedies with the grantee and sub-grantee before pursuing a protest with the Federal agency. Reviews of protests by the Federal agency will be limited to:
(i) Violations of Federal law or regulations and the standards of this section (violations of
State or local law will be under the jurisdiction of State or local authorities) and
(ii) Violations of the grantee's or sub-grantee's protest procedures for failure to review a complaint or protest. Protests received by the Federal agency other than those specified above will be referred to the grantee or sub-grantee.
(c) Competition. (1) All procurement transactions will be conducted in a manner providing full and open competition consistent with the standards of Sec. 31.36. Some of the situations considered to be restrictive of competition include but are not limited to:
(i) Placing unreasonable requirements on firms in order for them to qualify to do business,
(ii) Requiring unnecessary experience and excessive bonding,
(iii) Noncompetitive pricing practices between firms or between affiliated companies,
(iv) Noncompetitive awards to consultants that are on retainer contracts,
(v) Organizational conflicts of interest,
(vi) Specifying only a ``brand name'' product instead of allowing ``an equal'' product to be offered and describing the performance of other relevant requirements of the procurement, and
(vii) Any arbitrary action in the procurement process.
(2) Grantees and sub-grantees will conduct procurements in a manner that prohibits the use of statutorily or administratively imposed in-State or local geographical preferences in the evaluation of bids or proposals, except in those cases where applicable Federal statutes expressly mandate or encourage geographic preference. Nothing in this section preempts State licensing laws. When contracting for architectural and engineering (A/E) services, geographic location may be a selection criteria provided its application leaves an appropriate number of qualified firms, given the nature and size of the project, to compete for the contract.
(3) Grantees will have written selection procedures for procurement transactions. These procedures will ensure that all solicitations:
(i) Incorporate a clear and accurate description of the technical requirements for the material, product, or service to be procured. Such description shall not, in competitive procurements, contain features, which unduly restrict competition. The description may include a statement of the qualitative nature of the material, product or service to be procured, and when necessary, shall set forth those minimum essential characteristics and standards to which it must conform if it is to satisfy its intended use. Detailed product specifications should be avoided if at all possible. When it is impractical or uneconomical to make a clear and accurate description of the technical requirements, a ``brand name or equal'' description may be used

as a means to define the performance or other salient requirements of a procurement. The specific features of the named brand which must be met by offerers shall be clearly stated; and
(ii) Identify all requirements which the offerers must fulfill and all other factors to be used in evaluating bids or proposals.
(4) Grantees and sub-grantees will ensure that all pre-qualified lists of persons, firms, or products which are used in acquiring goods and services are current and include enough qualified sources to ensure maximum open and free competition. Also, grantees and sub-grantees will not preclude potential bidders from qualifying during the solicitation period.
(5) Construction grants awarded under Title II of the Clean Water Act are subject to the following ``Buy American'' requirements in paragraphs (c)(5) (i)-(iii) of this section. Section 215 of the Clean Water Act requires that contractors give preference to the use of domestic material in the construction of EPA-funded treatment works.
(i) Contractors must use domestic construction materials in preference to non-domestic material if it is priced no more than 6 percent higher than the bid or offered price of the non-domestic material, including all costs of delivery to the construction site and any applicable duty, whether or not assessed. The grantee will normally base the computations on prices and costs in effect on the date of opening bids or proposals.
(ii) The award official may waive the Buy American provision based on factors the award official considers relevant, including:
(A) Such use is not in the public interest;
(B) The cost is unreasonable;
(C) The Agency's available resources are not sufficient to implement the provision, subject to the Deputy Administrator's concurrence;
(D) The articles, materials or supplies of the class or kind to be used or the articles, materials or supplies from which they are manufactured are not mined, produced or manufactured in the United States in sufficient and reasonably available commercial quantities or satisfactory quality for the particular project; or
(E) Application of this provision is contrary to multilateral government procurement agreements, subject to the Deputy Administrator's concurrence.
(iii) All bidding documents, sub-agreements, and, if appropriate, requests for proposals must contain the following ``Buy American'' provision: In accordance with section 215 of the Clean Water Act (33 U.S.C. 1251 et seq.) and implementing EPA regulations, the contractor agrees that preference will be given to domestic construction materials by the contractor, subcontractors, material-men and suppliers in the performance of this sub-agreement.
(d) Methods of procurement to be followed--(1) Procurement by small purchase procedures. Small purchase procedures are those relatively simple and informal procurement methods for securing services, supplies, or other properties that do not cost more than the simplified acquisition threshold fixed at 41 U.S.C. 403(11) (currently set at $100,000). If small purchase procedures are used, price or rate quotations shall be obtained from an adequate number of qualified sources.
(2) Procurement by sealed bids (formal advertising). Bids are publicly solicited and a firm-fixed-price contract (lump sum or unit price) is awarded to the responsible bidder whose bid, conforming with all the material terms and conditions of the invitation for bids, is the lowest in price. The sealed bid method is the preferred method for procuring construction, if the conditions in 31.36(d)(2)(i) apply.
(i) In order for sealed bidding to be feasible, the following conditions should be present:
(A) A complete, adequate, and realistic specification or purchase description is available;
(B) Two or more responsible bidders are willing and able to compete effectively and for the business; and
(C) The procurement lends itself to a firm fixed price contract and the selection of the successful bidder can be made principally on the basis of price.
(ii) If sealed bids are used, the following requirements apply:
(A) The invitation for bids will be publicly advertised and bids shall be solicited from an adequate number of known suppliers, providing them sufficient time prior to the date set for opening the bids;
(B) The invitation for bids, which will include any specifications and pertinent attachments, shall define the items or services in order for the bidder to properly respond;
(C) All bids will be publicly opened at the time and place prescribed in the invitation for bids;
(D) A firm fixed-price contract award will be made in writing to the lowest responsive and responsible bidder. Where specified in bidding documents, factors such as discounts, transportation cost, and life

cycle costs shall be considered in determining which bid is lowest. Payment discounts will only be used to determine the low bid when prior experience indicates that such discounts are usually taken advantage of; and
(E) Any or all bids may be rejected if there is a sound documented reason.
(3) Procurement by competitive proposals. The technique of competitive proposals is normally conducted with more than one source submitting an offer, and either a fixed-price or cost-reimbursement type contract is awarded. It is generally used when conditions are not appropriate for the use of sealed bids. If this method is used, the following requirements apply:
(i) Requests for proposals will be publicized and identify all evaluation factors and their relative importance. Any response to publicized requests for proposals shall be honored to the maximum extent practical;
(ii) Proposals will be solicited from an adequate number of qualified sources;
(iii) Grantees and sub-grantees will have a method for conducting technical evaluations of the proposals received and for selecting awardees;
(iv) Awards will be made to the responsible firm whose proposal is most advantageous to the program, with price and other factors considered; and
(v) Grantees and sub-grantees may use competitive proposal procedures for qualifications-based procurement of architectural/engineering (A/E) professional services whereby competitors' qualifications are evaluated and the most qualified competitor is selected, subject to negotiation of fair and reasonable compensation. The method, where price is not used as a selection factor, can only be used in procurement of A/E professional services. It cannot be used to purchase other types of services though A/E firms are a potential source to perform the proposed effort.
(4) Procurement by noncompetitive proposals is procurement through solicitation of a proposal from only one source, or after solicitation of a number of sources, competition is determined inadequate.
(i) Procurement by noncompetitive proposals may be used only when the award of a contract is infeasible under small purchase procedures, sealed bids or competitive proposals and one of the following circumstances applies:
(A) The item is available only from a single source;
(B) The public exigency or emergency for the requirement will not permit a delay resulting from competitive solicitation;
(C) The awarding agency authorizes noncompetitive proposals; or
(D) After solicitation of a number of sources, competition is determined inadequate.
(ii) Cost analysis, i.e., verifying the proposed cost data, the projections of the data, and the evaluation of the specific elements of costs and profits, is required.
(iii) Grantees and sub-grantees may be required to submit the proposed procurement to the awarding agency for pre-award review in accordance with paragraph (g) of this section.
(e) Contracting with small and minority firms, women's business enterprise and labor surplus area firms.
(1) The grantee and sub-grantee will take all necessary affirmative steps to assure that minority firms, women's business enterprises, and labor surplus area firms are used when possible.
(2) Affirmative steps shall include:
(i) Placing qualified small and minority businesses and women's business enterprises on solicitation lists;
(ii) Assuring that small and minority businesses, and women's business enterprises are solicited whenever they are potential sources;
(iii) Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by small and minority business, and women's business enterprises;
(iv) Establishing delivery schedule s, where the requirement permits, which encourage participation by small and minority business, and women's business enterprises;
(v) Using the services and assistance of the Small Business Administration, and the Minority Business Development Agency of the Department of Commerce; and
(vi) Requiring the prime contractor, if subcontracts are to be let, to take the affirmative steps listed in paragraphs (e)(2) (i) through (v) of this section.
(f) Contract cost and price.
(1) Grantees and sub-grantees must perform a cost or price analysis in connection with every procurement action including contract modifications. The method and degree of analysis is dependent on the facts surrounding the particular procurement situation, but as a starting point, grantees must make independent

estimates before receiving bids or proposals. A cost analysis must be performed when the offerer is required to submit the elements of his estimated cost, e.g., under professional, consulting, and architectural engineering services contracts. A cost analysis will be necessary when adequate price competition is lacking, and for sole source procurements, including contract modifications or change orders, unless price reasonableness can be established on the basis of a catalog or market price of a commercial product sold in substantial quantities to the general public or based on prices set by law or regulation. A price analysis will be used in all other instances to determine the reasonableness of the proposed contract price.

(2) Grantees and sub-grantees will negotiate profit as a separate element of the price for each contract in which there is no price competition and in all cases where cost analysis is performed.

To establish a fair and reasonable profit, consideration will be given to the complexity of the work to be performed, the risk borne by the contractor, the contractor's investment, the amount of subcontracting, the quality of its record of past performance, and industry profit rates in the surrounding geographical area for similar work.

(3) Costs or prices based on estimated costs for contracts under grants will be allowable only to the extent that costs incurred or cost estimates included in negotiated prices are consistent with Federal cost principles (see Sec. 31.22). Grantees may reference their own cost principles that comply with the applicable Federal cost principles.

(4) The cost plus a percentage of cost and percentage of construction cost methods of contracting shall not be used.

(g) Awarding agency review.

(1) Grantees and sub-grantees must make available, upon request of the awarding agency, technical specifications on proposed procurements where the awarding agency believes such review is needed to ensure that the item and/or service specified is the one being proposed for purchase. This review generally will take place prior to the time the specification is incorporated into a solicitation document. However, if the grantee or sub-grantee desires to have the review accomplished after a solicitation has been developed, the awarding agency may still review the specifications, with such review usually limited to the technical aspects of the proposed purchase.

(2) Grantees and sub-grantees must on request make available for awarding agency pre-award review procurement documents, such as requests for proposals or invitations for bids, independent cost estimates, etc. when:

(i) A grantee's or sub-grantee's procurement procedures or operation fails to comply with the procurement standards in this section; or

(ii) The procurement is expected to exceed the simplified acquisition threshold and is to be awarded without competition or only one bid or offer is received in response to a solicitation; or

(iii) The procurement, which is expected to exceed the simplified acquisition threshold, specifies a ``brand name'' product; or

(iv) The proposed award is more than the simplified acquisition threshold and is to be awarded to other than the apparent low bidder under a sealed bid procurement; or

(v) A proposed contract modification changes the scope of a contract or increases the contract amount by more than the simplified acquisition threshold.

(3) A grantee or sub-grantee will be exempt from the pre-award review in paragraph (g)(2) of this section if the awarding agency determines that its procurement systems comply with the standards of this section.

(i) A grantee or sub-grantee may request that its procurement system be reviewed by the awarding agency to determine whether its system meets these standards in order for its system to be certified. Generally, these reviews shall occur where there is a continuous high-dollar funding, and third-party contracts are awarded on a regular basis.

(ii) A grantee or sub-grantee may self-certify its procurement system. Such self-certification shall not limit the awarding agency's right to survey the system. Under a self-certification procedure, awarding agencies may wish to rely on written assurances from the grantee or sub-grantee that it is complying with these standards. A grantee or sub-grantee will cite specific procedures, regulations, standards, etc., as being in compliance with these requirements and have its system available for review.

(h) Bonding requirements. For construction or facility improvement contracts or subcontracts exceeding the simplified acquisition threshold, the awarding agency may accept the bonding policy and requirements of the grantee or sub-grantee provided the awarding agency has made a determination that

the awarding agency's interest is adequately protected. If such a determination has not been made, the minimum requirements shall be as follows:
(1) 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.
(2) 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.
(3) 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.
(i) Contract provisions. A grantee's and sub-grantee's contracts must contain provisions in paragraph (i) of this section. Federal agencies are permitted to require changes, remedies, changed conditions, access and records retention, suspension of work, and other clauses approved by the Office of Federal Procurement Policy.
(1) 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.
(Contracts more than the simplified acquisition threshold)
(2) Termination for cause and for convenience by the grantee or sub-grantee including the manner by which it will be effected and the basis for settlement. (All contracts in excess of $10,000)
(3) Compliance with Executive Order 11246 of September 24, 1965, entitled ``Equal Employment Opportunity," as amended by Executive Order 11375 of October 13, 1967, and as supplemented in Department of Labor regulations (41 CFR chapter 60). (All construction contracts awarded in excess of $10,000 by grantees and their contractors or sub-grantees)
(4) Compliance with the Copeland ``Anti-Kickback" Act (18 U.S.C. 874) as supplemented in Department of Labor regulations (29 CFR part 3). (All contracts and sub-grants for construction or repair)
(5) Compliance with the Davis-Bacon Act (40 U.S.C. 276a to 276a-7) as supplemented by Department of Labor regulations (29 CFR part 5). (Construction contracts in excess of $2000 awarded by grantees and sub-grantees when required by Federal grant program legislation)
(6) Compliance with Sections 103 and 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 327-330) as supplemented by Department of Labor regulations (29 CFR part 5).
(Construction contracts awarded by grantees and sub-grantees in excess of $2000, and in excess of $2500 for other contracts which involve the employment of mechanics or laborers)
(7) Notice of awarding agency requirements and regulations pertaining to reporting.
(8) Notice of awarding agency 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.
(9) Awarding agency requirements and regulations pertaining to copyrights and rights in data.
(10) Access by the grantee, the sub-grantee, the Federal grantor agency, the Comptroller General of the United States, or any of their duly authorized representatives to any books, documents, papers, and records of the contractor which are directly pertinent to that specific contract for the purpose of making audit, examination, excerpts, and transcriptions.
(11) Retention of all required records for three years after grantees or sub-grantees make final payments and all other pending matters are closed.
(12) Compliance with all applicable standards, orders, or requirements issued under section 306 of the Clean Air Act (42 U.S.C. 1857(h)), section 508 of the Clean Water Act (33 U.S.C. 1368), Executive Order 11738, and Environmental Protection Agency regulations (40 CFR part 15).
(Contracts, subcontracts, and sub-grants of amounts in excess of $100,000)
(13) 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 (Pub. L. 94-163, 89 Stat. 871).
(j) Payment to consultants.
(1) EPA will limit its participation in the salary rate (excluding overhead) paid to individual consultants retained by grantees or by a grantee's contractors or subcontractors to the maximum daily rate for a GS-18. (Grantees may, however, pay consultants more than this amount). This limitation applies to

consultation services of designated individuals with specialized skills who are paid at a daily or hourly rate. This rate does not include transportation and subsistence costs for travel performed; grantees will pay these in accordance with their normal travel reimbursement practices. (Pub. L. 99-591).
(2) Sub-agreements with firms for services which are awarded using the procurement requirements in this part are not affected by this limitation.
(k) Use of the same architect or engineer during construction.
(1) If the grantee is satisfied with the qualifications and performance of the architect or engineer who provided any or all of the facilities planning or design services for a waste-water treatment works project and wishes to retain that firm or individual during construction of the project, it may do so without further public notice and evaluation of qualifications, provided:
(i) The grantee received a facilities planning (Step 1) or design grant (Step 2), and selected the architect or engineer in accordance with EPA's procurement regulations in effect when EPA awarded the grant; or
(ii) The award official approves noncompetitive procurement under Sec. 31.36(d)(4) for reasons other than simply using the same individual or firm that provided facilities planning or design services for the project; or
(iii) The grantee attests that:
(A) The initial request for proposals clearly stated the possibility that the firm or individual selected could be awarded a sub-agreement for services during construction; and
(B) The firm or individual was selected for facilities planning or design services in accordance with procedures specified in this section.
(C) No employee, officer or agent of the grantee, any member of their immediate families, or their partners have financial or other interest in the firm selected for award; and
(D) None of the grantee's officers, employees or agents solicited or accepted gratuities, favors or anything of monetary value from contractors or other parties to sub-agreements.
(2) However, if the grantee uses the procedures in paragraph (k)(1) of this section to retain an architect or engineer, any Step 3 sub-agreements between the architect or engineer and the grantee must meet all of the other procurement provisions in Sec. 31.36.

[53 FR 8068 and 8087, Mar. 11, 1988, and amended at 53 FR 8075, Mar. 11, 1988; 60 FR 19639, 19644, Apr. 19, 1995; 66 FR 3794, Jan. 16, 2001]

KRS Chapter 45A
Kentucky Model Procurement Code

45A.075 Methods of awarding state contracts.
Except as otherwise authorized by law, all state contracts shall be awarded by:
(1) Competitive sealed bidding, pursuant to KRS 45A.080; or
(2) Competitive negotiation, pursuant to KRS 45A.085 and 45A.090 or 45A.180; or
(3) Noncompetitive negotiation, pursuant to KRS 45A.095; or
(4) Small purchase procedures, pursuant to KRS 45A.100.
Effective: June 24, 2003
History: Amended 2003 Ky. Acts ch. 98, sec. 4, effective June 24, 2003. -- Created 1978 Ky. Acts ch. 110, sec. 16, effective January 1, 1979.

45A.080 Competitive sealed bidding.
(1) Contracts exceeding the amount provided by KRS 45A.100 shall be awarded by competitive sealed bidding unless it is determined in writing that this method is not practicable. Factors to be considered in determining whether competitive sealed bidding is not practicable shall include:
(a) Whether specifications can be prepared that permit award on the basis of best value; and
(b) The available sources, the time and place of performance, and other relevant circumstances as are appropriate for the use of competitive sealed bidding.
(2) The invitation for bids shall state that awards shall be made on the basis of best value. In any contract which is awarded under an invitation to bid which requires delivery by a specified date and imposes a penalty for late delivery, if the delivery is late, the contractor shall be given the opportunity to present evidence that the cause of the delay was beyond his control. If it is the opinion of the purchasing officer that there is sufficient justification for delayed delivery, the purchasing officer may adjust or waive any penalty that is provided for in the contract.
(3) Adequate public notice of the invitation for bids shall be given a sufficient time prior to the date set forth for the opening of bids. The notice may include posting on the Internet or publication in a newspaper or newspapers of general circulation in the state as determined by the secretary of the Finance and Administration Cabinet not less than seven (7) days before the date set for the opening of the bids. The provisions of this subsection shall also apply to price contracts and purchase contracts of state institutions of higher education.
(4) Bids shall be opened publicly at the time and place designated in the invitation for bids. At the time the bids are opened, the purchasing agency shall announce the agency's engineer's estimate, if applicable, and make it a part of the agency records pertaining to the letting of any contract for which bids were received. Each bid, together with the name of the bidder and the agency's engineer's estimate, shall be recorded and be open to public inspection. Electronic bid opening and posting of the required information for public viewing shall satisfy the requirements of this subsection.
(5) The contract shall be awarded by written notice to the responsive and responsible bidder whose bid offers the best value.
(6) Correction or withdrawal of bids shall be allowed only to the extent permitted by regulations issued by the secretary.
Effective: July 14, 2000
History: Amended 2000 Ky. Acts ch. 509, sec. 1, effective July 14, 2000. -- Amended 1998 Ky. Acts ch. 120, sec. 10, effective July 15, 1998. -- Amended 1997 (1st Extra. Sess.) Ky. Acts ch. 4, sec. 27, effective May 30, 1997. -- Amended 1996 Ky.Acts ch. 60, sec. 2, effective July 15, 1996. -- Amended 1994 Ky. Acts ch. 278, sec. 1, effective July 15, 1994. -- Amended 1982 Ky. Acts ch. 282, sec. 1, effective July 15, 1982. -- Amended 1979 (1st Extra. Sess.) Ky. Acts ch. 9, sec. 1, effective February 10, 1979. -- Created 1978 Ky. Acts ch. 110, sec. 17, effective January 1, 1979.

45A.085 Competitive negotiation.
(1) When, under administrative regulations promulgated by the secretary or under KRS 45A.180, the purchasing officer determines in writing that the use of competitive sealed bidding is not practicable, and except as provided in KRS 45A.095 and 45A.100, a contract may be awarded by competitive negotiation.
(2) Adequate public notice of the request for proposals shall be given in the same manner and circumstances as provided in KRS 45A.080(3).
(3) Contracts other than contracts for projects utilizing an alternative project delivery method under KRS 45A.180 may be competitively negotiated when it is determined in writing by the purchasing officer that the bids received by competitive sealed bidding either are unreasonable as to all or part of the requirements, or were not independently reached in open competition, and for which each competitive bidder has been notified of the intention to negotiate and is given reasonable opportunity to negotiate.
(4) Contracts for projects utilizing an alternative project delivery method shall be processed in accordance with KRS 45A.180.
(5) The request for proposals shall indicate the relative importance of price and other evaluation factors.
(6) Award shall be made to the responsible offerer whose proposal is determined in writing to be the most advantageous to the Commonwealth, taking into consideration price and the evaluation factors set forth in the request for proposals.
(7) Written or oral discussions shall be conducted with all responsible offerers who submit proposals determined in writing to be reasonably susceptible of being selected for award. Discussions shall not disclose any information derived from proposals submitted by competing offerers. Discussions need not be conducted:
(a) With respect to prices, where the prices are fixed by law or administrative regulation, except that consideration shall be given to competitive terms and conditions;
(b) Where time of delivery or performance will not permit discussions; or
(c) Where it can be clearly demonstrated and documented from the existence of adequate competition or prior experience with the particular supply, service, or construction item, that acceptance of an initial offer without discussion would result in fair and reasonable best value procurement, and the request for proposals notifies all offerers of the possibility that award may be made on the basis of the initial offers.
Effective: June 24, 2003
History: Amended 2003 Ky. Acts ch. 98, sec. 5, effective June 24, 2003. – Amended 1997 (1st Extra. Sess.) Ky. Acts ch. 4, sec. 28, effective May 30, 1997. – Amended 1979 (1st Extra. Sess.) Ky. Acts ch. 9, sec. 2, effective February 10, 1979. – Created 1978 Ky. Acts ch. 110, sec. 18, effective January 1, 1979.

45A.090 Negotiation after competitive sealed bidding when all bids exceed available funds.
(1) In the event that all bids submitted pursuant to competitive sealed bidding under KRS 45A.080 result in bid prices in excess of the funds available for the purchase, and the chief purchasing officer determines in writing:
(a) That there are no additional funds available from any source so as to permit an award to the responsive and responsible bidder whose bid offers the best value; and
(b) The best interest of the state will not permit the delay attendant to a resolicitation under revised specifications, or for revised quantities, under competitive sealed bidding as provided in KRS 45A.080, then a negotiated award may be made as set forth in subsections (2) or (3) of this section.
(2) Where there is more than one (1) bidder, competitive negotiations pursuant to KRS 45A.085(3) shall be conducted with the three (3) (two (2) if there are only two (2)) bidders determined in writing to be the most responsive and responsible bidders, based on criteria contained in the bid invitation. Such competitive negotiations shall be conducted under the following restrictions:

(a) If discussions pertaining to the revision of the specifications or quantities are held with any potential offerer, all other potential offerers shall be afforded an opportunity to take part in such discussions; and
(b) A request for proposals, based upon revised specifications or quantities, shall be issued as promptly as possible, shall provide for an expeditious response to the revised requirements, and shall be awarded upon the basis of best value.
(3) Where, after competitive sealed bidding, it is determined in writing that there is only one (1) responsive and responsible bidder, a noncompetitive negotiated award may be made with such bidder in accordance with KRS 45A.095.
Effective: June 24, 2003
History: Amended 2003 Ky. Acts ch. 98, sec. 6, effective June 24, 2003. – Amended 1997 (1st Extra. Sess.) Ky. Acts ch. 4, sec. 29, effective May 30, 1997. – Created 1978 Ky. Acts ch. 110, sec. 19, effective January 1, 1979.

45A.095 Noncompetitive negotiation.
(1) A contract may be made by noncompetitive negotiation only for sole source purchases, or when competition is not feasible, as determined by the purchasing officer in writing prior to award, under administrative regulations promulgated by the secretary of the Finance and Administration Cabinet or the governing boards of universities operating under KRS Chapter 164A, or when emergency conditions exist. Sole source is a situation in which there is only one (1) known capable supplier of a commodity or service, occasioned by the unique nature of the requirement, the supplier, or market conditions. Insofar as it is practical, no less than three (3) suppliers shall be solicited to submit written or oral quotations whenever it is determined that competitive sealed bidding is not feasible. Award shall be made to the supplier offering the best value. The names of the suppliers submitting quotations and the date and amount of each quotation shall be placed in the procurement file and maintained as a public record. Competitive bids may not be required:
(a) For contractual services where no competition exists, such as telephone service, electrical energy, and other public utility services;
(b) Where rates are fixed by law or ordinance;
(c) For library books;
(d) For commercial items that are purchased for resale;
(e) For interests in real property;
(f) For visiting speakers, professors, expert witnesses, and performing artists;
(g) For personal service contracts executed pursuant to KRS 45A.690 to 45A.725; and
(h) For agricultural products in accordance with KRS 45A.645.
(2) The chief procurement officer, the head of a using agency, or a person authorized in writing as the designee of either officer may make or authorize others to make emergency procurements when an emergency condition exists.
(3) An emergency condition is a situation which creates a threat or impending threat to public health, welfare, or safety such as may arise by reason of fires, floods, tornadoes, other natural or man-caused disasters, epidemics, riots, enemy attack, sabotage, explosion, power failure, energy shortages, transportation emergencies, equipment failures, state or federal legislative mandates, or similar events. The existence of the emergency condition creates an immediate and serious need for services, construction, or items of tangible personal property that cannot be met through normal procurement methods and the lack of which would seriously threaten the functioning of government, the preservation or protection of property, or the health or safety of any person.
(4) The Finance and Administration Cabinet may negotiate directly for the purchase of contractual services, supplies, materials, or equipment in bona fide emergencies regardless of estimated costs. The existence of the emergency shall be fully explained, in writing, by the head of the agency for which the purchase is to be made. The explanation shall be approved by the

secretary of the Finance and Administration Cabinet and shall include the name of the vendor receiving the contract along with any other price quotations and a written determination for selection of the vendor receiving the contract. This information shall be filed with the record of all such purchases and made available to the public. Where practical, standard specifications shall be followed in making emergency purchases. In any event, every effort should be made to effect a competitively established price for purchases made by the state.

Effective: July 15, 2002

History: Amended 2002 Ky. Acts ch. 344, sec. 9, effective July 15, 2002. – Amended 1997 (1st Extra. Sess.) Ky. Acts ch. 4, sec. 30, effective May 30, 1997. – Amended 1990 Ky. Acts ch. 496, sec. 4, effective July 13, 1990. – Created 1978 Ky. Acts ch. 110, sec. 20, effective January 1, 1979.

45A.100 Small purchases.

(1) Procurements may be made in accordance with small purchase administrative regulations promulgated by the secretary of the Finance and Administration Cabinet, pursuant to KRS Chapter 13A, as follows:

(a) Up to ten thousand dollars ($10,000) per project for construction and one thousand dollars ($1,000) for purchases by any state governmental body, except for those state administrative bodies specified in paragraph (b) of this subsection; and

(b) Up to forty thousand dollars ($40,000) per project for construction or purchases by the Finance and Administration Cabinet, state institutions of higher education, and the legislative branch of government.

(2) Procurement requirements shall not be artificially divided so as to constitute a small purchase under this section. At least every two (2) years, the secretary shall review the prevailing costs of labor and materials and may make recommendations to the next regular session of the General Assembly for the revision of the then current maximum small purchase amount as justified by intervening changes in the cost of labor and materials.

(3) The secretary of the Finance and Administration Cabinet may grant to any state agency with a justifiable need a delegation of small purchasing authority, which exceeds the agency's small purchase limit, provided in subsection (1) of this section.

Delegations of small purchasing authority shall be granted or revoked by the secretary of the Finance and Administration Cabinet, in accordance with administrative regulations promulgated by the cabinet pursuant to KRS Chapter 13A. These administrative regulations shall establish, at a minimum, the criteria for granting and revoking delegations of small purchasing authority, including the requesting agency's past compliance with purchasing regulations, the level of training of the agency's purchasing staff, and the extent to which the agency utilizes the Kentucky Automated Purchasing System. The administrative regulations may permit the secretary of the Finance and Administration Cabinet to delegate small purchase procurements up to the maximum amount specified in subsection (1)(b) of this section.

Effective: July 15, 2002

History: Amended 2002 Ky. Acts ch. 320, sec. 2, effective July 15, 2002. – Amended 2000 Ky. Acts ch. 225, sec. 1, effective July 14, 2000. – Amended 1996 Ky. Acts ch. 60, sec. 1, effective July 15, 1996. – Amended 1994 Ky. Acts ch. 323, sec. 1, effective July 15, 1994. – Amended 1990 Ky. Acts ch. 496, sec. 5, effective July 13, 1990. – Amended 1986 Ky. Acts ch. 384, sec. 1, effective July 15, 1986. – Amended 1984 Ky. Acts ch. 384, sec. 1, effective July 13, 1984. – Amended 1982 Ky. Acts ch. 282, sec. 2, effective July 15, 1982. – Amended 1980 Ky. Acts ch. 242, sec. 1, effective July 15, 1980; and ch. 250, sec. 19, effective April 9, 1980.– Created 1978 Ky. Acts ch. 110, sec. 21, effective January 1, 1979.

NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER 11246)

The following excerpts are from 45 FR 65984 (October 3, 1980):

The minority and female goals apply to Federal and federally assisted construction contractors and subcontractors which have covered contracts. The goals are expressed as a percentage of the total hours worked by such a covered or subcontractor's entire onsite construction workforce, which is working on any construction site within a relevant area. The goal applies to each construction craft and trade in the contractor's entire workforce in the relevant area including those employees working on private non-federally involved projects.

Until further notice, the following goals for minority utilization in each construction craft and trade shall be included in all Federal or federally assisted construction contracts and subcontracts in excess of $10,000 to be performed in the respective geographic area. The goals are applicable to each nonexempt contractor's total onsite construction workforce, regardless of whether or not part of that workforce is performing work on a Federal, federally assisted or non-federally related project, contract or subcontract.

Construction contractors which are participating in an approved Hometown Plan (see 41 CFR 60-4.5) are required to comply with the goals of the Hometown Plan with regard to construction work they perform in the area covered by the Hometown Plan. With regard to all their other covered construction work, such contractors are required to comply as follows:

Goals for female participation in each trade.....6.9%
Goals for minority participation in each trade.....Insert goals for each year
(see Attachment Number 6)

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.

The following excerpts are from 45 FR 65977 (October 3, 1980):

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.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction subcontract in excess of $10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address and telephone number of the subcontractor; employer identification number; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the contract is to be performed.

4. As used in this Notice, and in the contract resulting from this solicitation, the covered area is (insert description of the geographical areas where the contract is to be performed giving the state, country, and city, if any).

STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS (EXECUTIVE ORDER 11246)

EEO Specifications

Following is the standard language, which must be incorporated into all solicitations for offers and bids on all Federal and Federally assisted construction contracts or subcontracts in excess of $10,000 to be performed in designated geographical areas:

1. As used in these specifications:
   (a) Covered Area means the geographical area described in the solicitation from which this contract resulted.

   (b) Director means Director, Office of Federal Contract Compliance Program, United States Department of Labor, or any person to whom the Director delegates authority;

   (c) Employer identification number means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.

   (d) Minority includes:

   (i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);

   (ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);

   (iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and

   (iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

2. Whenever the Contractor or any Subcontractor at any tier, subcontracts a 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.

3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take a good faith efforts to achieve the Plan goals and timetables.

4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7-a through p of these specifications. The goals set forth in the solicitation from which this contract resulted

are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. The Contractor is expected to make substantially uniform progress toward its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.

6. In order for the non-working training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

7. The Contractor shall take specific affirmative action 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 actions steps at least as extensively as the following:

a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the contractor or its unions have employment opportunities available, and maintain a record of the organizations responses.

c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the contractor, this shall be documented in the file with the reason therefore, along with whatever additional actions the contractor may have taken.

d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or 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 obligation.

e. 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 complied under 7-b above.

f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with

all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, lay-off, termination or other employment decisions including specific review of these items with on-site supervisory personnel such as Superintendents, General Foreman, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.

i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's workforce.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.

l. Conduct, at least annually, an inventory and evaluation 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.

m. 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 EEO policy and the Contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are non-segregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisor's adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations, which assist in fulfilling one or more of their affirmative actions obligations (7 a through p). The efforts of a contractor association, joint contractor-union, contractor-community, of 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 7 a through p of these specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access

to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be defense for the Contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example: even though the Contractor has achieved its goal for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).

10. The Contractor shall not use the goals and timetables for affirmative action standards to discriminate against any person because of race, color, religion, sex or national origin.

11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and executive Order 11246, as amended.

13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to 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 when 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 locations 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, contractors shall not be required to maintain separate records.

15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

EEO Goals for Economic Areas in Region 4
Source: Appendix B-80 in 45 FR 65984 (October 3, 1980)

Alabama:

047 Mobile, AL
SMSA Counties:
5160 Mobile, AL — 26.9
AL Baldwin; AL Mobile.
6026 Pascagoula - Moss, Point MS — 16.9
MS Jackson.
Non-SMSA Counties — 26.4
AL Choctaw; AL Clarke; AL Conecuh; AL Escambia; AL Monroe; AL Washington; AL Wl cox; MS George; MS Greene.

048 Montgomery, AL:
SMSA Counties
5240 Montgomery, AL — 29.9
AL Autauga; AL El more; AL Montgomery.
Non-SMSA Counties — 29.9
AL Barbour; AL Bullock; AL Butler; AL Coffee; AL Coosa; AL Covington; AL Crenshaw; AL Dale; AL Dallas; AL Geneva; AL Henry; AL Houston.; AL Lowndes; AL Macon; AL Perry; AL Pike; AL Tallapoosa.

049 Birmingham, AL:
SMSA Counties:
0450 Anniston, AL — 14.3
AL Calhoun
1000 Birmingham, AL — 24.9
AL Jefferson, AL St- Clair; AL Shelby; AL Walker; AL Etowah
8600 Tuscaloosa, AL — 20.6
AL Tuscaloosa.
Non-SMSA Counties — 20.7
AL Bibb; AL Blount AL Cherokee; AL Chilton; AL Clay; AL Cleburne; AL Cullman; AL Fayette; AL Greene; AL Hale; AL Lamar; AL Marion; AL Pickens; AL Randolph; AL Sumter: AL Talladega; AL Winston.

050 Huntsville - Florence, AL:
SMSA Counties:
2650 Florence, AL — 11.9
AL Colbert; AL Lauderdale.
3440 Huntsville, AL — 12.0
AL Limestone; AL Madison; AL Marshall.
Non-SMSA Counties — 11.2
AL Franklin; AL Lawrence AL Morgan; TN Lincoln.

Georgia:

035 Augusta, GA:
SMSA Counties:
0600 Augusta, GA – SC — 27.2
GA Columbia; GA Richmond; SC Aiken
Non-SMSA Counties — 32.8
GA Burke; GA Emanuel; GA Glascock; GA Jefferson; GA Jenkins; GA Lincoln; GA McDuffie; GA Taliaferro; GA Warren; GA Wilkes; SC Allendale, SC Bamberg; SC Barnwell; SC Edgefield; SC McCormick

036 Atlanta, GA
SMSA Counties
0520 Atlanta — 21.2
GA Butts; GA Cherokee; GA Clayton; GA Cobb; GA Dekalb; GA Douglas; GA Fayette; GA Forsyth; GA Fulton; GA Gwinnett; GA Henry, GA Newton; GA Paulding; GA Rockdale; GA Walton

Non-SMSA Counties	19.5
GA Banks; GA Barrow; GA Bartow; GA Carroll; GA Clarke; GA Coweta; GA Dawson; GA Elbert; GA Fannin; GA Floyd; GA Franklin; GA Gilmer; GA Gordon; GA Greene; GA Habersham; GA Hall; GA Haralson; GA Hart; GA Heard; GA Jackson; GA Jasper; GA Lamar, GA Lumpkin; GA Madison, GA Morgan; GA Oconee, GA Oglethorpe; GA Pickens; GA Pike; GA Polk; GA Rabun, GA Spalding; GA Stephens; GA Towns; GA Union; GA Upson; GA White.	
037 Columbus, GA:	
SMSA Counties	
1800 Columbus	29.6
AL Russell; GA Chattahoochee; GA Columbus.	
Non-SMSA Counties	31.6
AL Chambers; AL Lee; GA Harris; GA Marion; GA Meriwether; GA Quitman; GA Schley; GA Stewart; GA Sumter; GA Talbot; GA Troup; GA Webster.	
038 Macon, GA:	
SMSA Counties	
4660 Macon, GA	27.5
GA Bibb; GA Houston; GA Jones; GA Twiggs.	
Non-SMSA Counties	31.7
GA Baldwin; GA Bleckley; GA Crawford; GA Crisp; GA Dodge; GA Dooly; GA Hancock; GA Johnson; GA Laurens; GA Macon; GA Monroe; GA Peach; GA Pulaski; GA Putnam. GA Taylor; GA Telfair; GA Treutlen; GA Washington; GA Wheeler; GA Wilcox; GA Wilkinson.	
039 Savannah, GA:	
SMSA Counties:	
7520 Savannah, GA	30.6
GA Bryan; GA Chatham; GA Effingham	
Non-SMSA Counties	29.8
GA Appling; GA Atkinson; GA Bacon; GA Bullock; GA Candler; GA Coffee; GA Evans; GA Jeff Davis; GA Liberty; GA Lon g; GA McIntosh; GA Montgomery; GA Screven; GA Tattinall; GA Toombs; GA Wayne; SC Beaufort; SC Hampton; SC Jasper.	
040 Albany, GA	
SMSA Counties	
0120 Albany, GA	32.1
GA Dougherty; GA Lee.	
Non-SMSA Counties	31.1
GA Baker; GA Ben Hill; GA Berrien; GA Brooks; GA Calhoun; GA Clay; GA Clinch; GA Colquitt; GA Cook; GA Decatur; GA Early; GA Echols; GA Grady; GA Irwin; GA Lanier, GA Lowndes; GA Miller; GA Mitchell; GA Randolph; GA Seminole, GA Terrell; GA Thomas; GA Tift; GA Turner; GA Worth	
Florida:	
041 Jacksonville, FL:	
SMSA Counties	
2900 Gainesville, FL	20.6
FL Alachua	
3600 Jacksonville, FL	21.8
FL Baker; FIL Clay; FL Duval; FL Nassau; FL St. Johns.	
Non-SMSA Counties	22.2
FL Bradford; FL Columbia; FL Dade; FL Gilchrist; FIL Hamilton; FL LaFayetle; FL Levy; FL Marion; FL Putnam; FL Suwannee; FL Union; GA Brantley; GA Camden; GA Charlton; GA Glynn; GA Pierce; GA Ware.	
042 Orlando - Melbourne - Daytona Beach, FL.	
SMSA Counties:	
2020 Daytona Beach, FL	15.7
FL Volusia.	
4900 Melbourne - Titusville - Cocoa, FL	10.7
FL Brevard.	
5960 Orlando, FL	15.5

FL Orange; FL Osceola; FL Seminole.

Non-SMSA Counties	14.9
FL Flagler; FL Lake; FL Sumter.	
043 Miami - Fort Lauderdale, FL:	
SMSA Counties:	
2680 Fort Lauderdale - Hollywood, FL	15.5
FL. Broward.	
5000 Miami, FL	39.5
FL Dade.	
8960 West Palm Beach - Boca Raton, FL	22.4
FL Palm Beach.	
Non-SMSA Counties	30.4
FL Glades; FL Hendry; FL Indian River, FL Martin; FL Monroe:	
FL Okeechobee; FL St. Lucie.	
044 Tampa - St Petersburg, FL	
SMSA Counties:	
1140 Bradenton, FL	15.9
FL Manatee.	
2700 Fort Myers, FL	
15.3	
FL Lee.	
3980 Lakeland - Winter Haven, FL	18.0
FL Polk	
7510 Sarasota, FL	10.5
FL Sarasota.	
8280 Tampa - St. Petersburg, FL	17.9
FL Hillsborough, FL Pasco; FL Pinellas	
Non-SMSA Counties	17.1
FL Charlotte; FL Citrus; FL Collier, FL Desoto; FL Hardee; FL Hernando; FL Highlands.	
045 Tallahassee. FL:	
SMSA Counties:	
8240 Tallahassee, FL	24.3
FL Leon; FL Wakulla.	
Non-SMSA Counties:	29.5
FL Calhoun; FL Franklin; FL Gadsden; FIL Jack son; FL Jefferson: FL Liberty;	
FIL Madison; FL Taylor.	
046 Pensacola - Panama City, FL	
SMSA Counties:	
8615 Panama City, FL	14.1
FIL Bay.	
6080 Pensacola, FL	18.3
FL Escambia; FL Santa Rosa.	
Non-SMSA Counties	15.4
FL Gulf, FIL Holmes; FIL Okaloosa; FL Walton; FL Washington.	
Kentucky:	
056 Paducah, KY:	
Non-SMSA Counties	5.2
IL Hardin; IL Massac; IL Pope; KY Ballard; KY Caldwell; KY Calloway. KY Carlisle;	
KY Crittenden; KY Fulton; KY Graves; KY Hickman; KY Livingston; KY Lyon. KY	
McCracken; KY Marshall.	
057 Louisville, KY:	
SMSA Counties:	
4520 Louisville, KY-IN	11.2
IN Clark; IN Floyd; KY Bullitt; KY Jefferson; KY Oldham.	
Non-SMSA Counties	9.6
IN Crawford; IN Harrison; IN Jefferson; IN Orange; IN Scott; IN Washington;	
KY Breckinridge; KY Grayson; KY Hardin; KY Hart; KY Henry; KY Larue; KY Marion;	
KY Meade; KY Nelson; KY Shelby; KY Spencer; KY Trimble; KY Washington.	
058 Lexington, KY	
SMSA Counties	

4280 Lexington-Fayette, KY 10.8
KY Bourbon; KY Clark; KY Fayette; KY Jessamine; KY Scott; KY Woodford.
Non-SMSA Counties
7.0
KY Adair KY Anderson; KY Bath; KY Boyle; KY Breathitt; KY Casey; KY Clay;
KY Estill; KY Franklin- KY Garrard; KY Green; KY Harrison- KY Jackson; KY Knott;
KY Lee; KY Leslie; KY Letcher; KY Lincoln; KY Madison; KY Magoffin; KY Menifee;
KY Mercer; KY Montgomery; KY Morgan. KY Nicholas; KY Owsley; KY Perry;
KY Powell; KY Pulaski; KY Rockcastle; KY Russell; KY Taylor; KY Wolfe.

Mississippi:
112 Jackson, MS:
SMSA Counties;
3560 Jackson, MS
30.3
MS Hinds; MS Rankin.
Non-SMSA Counties
32.0
MS Attala; MS Choctaw; MS Choctaw; MS Clarke; MS Copiah;
MS Covington; MS Franklin; MS Holmes: MS Humphreys; MS Issaquena;
MS Jasper; MS Jefferson; MS Jefferson Davis; MS Jones; MS Kemper;
MS Lauderdale; MS Lawrence; MS Leake; MS Lincoln; MS Lowndes;
MS Madison; MS Neshoba; MS Newton; MS Noxubee,- MS Oktibbeha;
MS Scott; MS Sharkey; MS Simpson; MS Smith; MS Warren; MS Wayne;
MS Winston; MS Yazoo.

North Carolina:
024 Rocky Mount - Wilson - Greenville NC:
Non-SMSA Counties
31.7
NC Beaufort; NC Carteret; NC Craven,- NC Dare; NC Edgecombe; NC Greene; NC
Halifax; NC Hyde; NC Jones; NC Lenoir', NC Martin; NC Nash; NC Northampton; NC
Pamlico; NC Pitt; NC Tyrrell; NC Washington; NC Wayne; NC Wilson
025 Wilmington, NC:
SMSA Counties:
9200 Wilmington, NC
20.7
NC Brunswick; NC New Hanover.
Non-SMSA counties
3.5
NC Columbus; NC Duplin; NC Onslow; NC Pender.
026 Fayetteville, NC:
SMSA Counties:
2560 Fayetteville, NC
26.2
NC Cumberland.
Non-SMSA Counties
33.5
NC Bladen; NC Hoke; NC Richmond; NC Robeson; NC Sampson; NC Scotland.
027 Raleigh - Durham, NC.
SMSA Counties:
6640 Raleigh – Durham
22.8
NG Durham; NC Orange; NC Wake.
Non-SMSA Counties
24.7
NC Chatham; NC Franklin; NC Granville; NC Harnett; NC Johnston; NC Lee; NC Person;
NC Vance; NC Warren.
028 Greensboro - Winston Sale m - High Point, NC:
SMSA Counties:

1300 Burlington, NC
16.2
NC Alamance.
3120 Greensboro - Winston Salem - High Point NC
16.4
NC Davidson; NC Forsyth; NC Guilford,- NC Randolf; NC Stokes; NC Yadkin.
Non-SMSA Counties
15.5
NC Alleghany; NG Ashe; NC Caswell; NC Davie; NC Montgomery; NC Moore; NC Rockingham; NC Surry; NC Watauga; NC Wilkes.
029 Charlotte, NC:
SMSA Counties:
1520 Charlotte - Gastonia, NC
18.5
NC Gaston; NC Mecklenburg; NC Union.
Non-SMSA Counties
15.7
NC Alexander; NC Anson; NC Burke; NG Cabarrus; NC Caldwell; NC Catawba; NC Cleveland; NC Ire dell; NC Lincoln; NC Rowan; NC Rutherford; NC Stanley; SC Chester; SC Lancaster SC York.
030 Asheville, NC
Non-SMSA Counties:
0480 Asheville, NC 8.5
NC Buncombe; NC Madison.
Non-SMSA Counties 6.3
NC Avery,- NC Cherokee; NC Clay; NC Graham; HC Heywood, NC Henderson; NC Jackson; NC McDowell; NC Macon; NC Mitchell; NC Swain; NC Transylvania; NC Yancey.

South Carolina:
031 Greenville -Spartanburg, SC:
SMSA Counties:
316bGreenville -Spartanburg, SC 16.0
SC Greenville; SC Pickens; SC Spartanburg.
Non-SMSA Counties 17.8
SC Polk; SC Abbeville; SC Anderson; SC Cherokee', SC Greenwood; SC Laurens; SC Oconee; SC Union.
032 Columbia, SC
SMSA Counties:
1760 Columbia, SC 23.4
SC Lexington; SC Richland.
Non-SMSA Counties 32.0
SC Calhoun SC Clarendon; SC Fairfield; SC Kershaw; SC Lee; SC Newberry; SC Orangeburg; SC Saluda; SC Sumter
033 Florence, SC
Non-SMSA Counties 33.0
SC Chesterfield; SC Darlington; SC Dillon; SC Florence; SC Georgetown; SC Horry; SC Marion; SC Marlboro; SC Williamsburg.
034 Charleston - North Charleston, SC
SMSA Counties 30.0
1440 Charleston - North Charleston, SC
SC Berkeley; SC Charleston; SC Dorchester.
Non-SMSA Counties 30.7
SC Collection

Tennessee:
051 Chattanooga, TN:
SMSA Counties
1560 Chattanooga, TN - GA 12.6
GA Catoosa; GA Dade; GA Walker; TN Hamilton; TN Marion; TN Sequatchie.
Non-SMSA Counties 8.6

AL De Kalb; AL Jackson; GA Chattooga; GA Murray; GA Whitfield;
TN Bledsoe; TN Bradley; TN Grundy; TN McMinn; TN Meigs; TN Monroe;
TN Polk; TN Rhea.

052 Johnson City - Kingsport - Bristol, TN-VA:
SMSA Counties'.

3660 Johnson City - Kingsport - Bristol. TN – VA 2.6
TN Carter; TN Hawkins- TN Sullivan; TN Unicoi; TN Washington; VA Scott;
VA Washington; VA Bristol.

Non-SMSA Counties 3.2
TN Greene; TN Hancock; TN Johnson; VA Buchanan; VA Dickenson; VA Lee;
VA Russell; VA Smyth; VA Tazewell; VA Wise; VA Norton; WV McDowell, WV Mercer.

053 Knoxville, TN
SMSA Counties:

3840 Knoxville, TN 6.6
TN Anderson; TN Blount; TN Knox; TN Union.

Non-SMSA Counties 4.5
KY Bell; KY Harlan; KY Knox; KY Laurel; KY McCreary; KY Wayne; KY Whitley; TN
Campbell; TN Claiborne; TN Cooke; TN Cumberland; TN Fentress; TN Grainger,
TN Hamblen; TN Jefferson; TN Loudon; TN Morgan; TN Roane; TN Scott;
TN Sevier.

054 Nashville, TN:
SMSA Counties:

1660 Clarksville - Hopkinsville, TN - KY 18.2
KY Christian; TN Montgomery.

5360 Nashville - Davidson, TN 15.8
TN Cheatham, TN Davidson; TN Dickson; TN Robertson; TN Rutherford; TN Sumner;
TN Williamson; TN Wilson.

Non-SMSA Counties 12.0
KY Allen; KY Barren; KY Butler; KY Clinton; KY Cumberland; KY Edmonson;
KY Logan; KY Metcalfe; KY Monroe; KY Simpson; KY Todd; KY Trigg; KY Warren;
TN Bedford; TN Cannon; TN Clay; TN Coffee; TN DeKalb; TN Franklin; TN Giles;
TN Hickman; TN Houston; TN Humphreys; TN Jackson; TN Lawrence; TN Lewis;
TN Macon; TN Marshall; TN Maury; TN Moore; TN Overton; TN Perry; TN Pickett;
TN Putnam; TN Smith,, TN Stewart; TN Trouslale; TN Van Buren; TN Warren;
TN Wayne; TN White.

055 Memphis, TN:
SMSA Counties:

4920 Memphis, TN-AR-MS 32.3
AR Critteriden; MS Do Soto; TN Shelby; TN Tipton.

Non-SMSA Counties 26.5
AR Clay; AR Craighead; AR Cross; AR Greene; AR Lawrence; AR Lee;
AR Mississippi; AR Phillips- AR. Poinsett; AR Randolph; AR St. Francis; MS Alcorn,
MS Benton; MS Bolivar; MS Calhoun; MS Carroll; MS Chickasaw, MS Clay;
MS Coahoma; MS Grenada; MS Itawamba; MS Lafayette; MS Lee; MS Leflore;
MS Marshall; MS Monroe; MS Montgomery; MS Panola; MS Pontotoc; MS Prentiss;
MS Quitman; MS Sunflower; MS Tallahatchie; MS Tate; MS Tippah; MS Tishomingo;
MS Union; MS Washington; MS Webster. MS Yalobusha; MO Dunklin;
MO New Madrid; MO Perniscot; TN Benton; TN Carroll; TN Chester; TN Crockett;
TN Decatur; TN Dyer; TN Fayette; TN Gibson; TN Hardeman; TN Hardin;
TN Haywood; TN Henderson- TN Henry; TN Lake; TN Lauderdale; TN McNairy;
TN Madison; TN Obion; TN Weakley.

CHECK LIST OF EEO DOCUMENTATION FOR BIDDERS ON GRANT/LOAN CONSTRUCTION (Required by Executive Order 11246 as amended)

The low, responsive responsible bidder must forward the following items, in duplicate, to the owner no later than ten (10) days after bid opening. The owner shall have one (1) copy available for inspection by the Office of Federal Contracts Compliance within 14 days after the bid opening. The web site for the OFCC is http://www.dol.gov/esa/ofcp_org.htm.

1. Project Number. Project Location. Type of Construction.
2. Proof of registration with the Joint Reporting Commission. (See Attachment Number 8.)
3. Copy of Affirmative Action Plan of contractor. Indicate company official responsible for EEO.
4. List of current construction contracts, with dollar amount. List contracting Federal Agency, if applicable.
5. Statistics concerning company percent workforce, permanent and temporary, by sex, race, trade, handicapped, and age. 40 CFR Part 7.
6. List of employment sources for project in question. If union sources are utilized, indicate percentage of minority membership within the union crafts.
7. Anticipated employment needs for this project, by sex, race and trade, with estimate of minority participation in specific trades.
8. List of subcontractors (name, address and telephone) with dollar amount and duration of subcontract. Subcontractor contracts over $10,000 must submit items 1- 8. The following information must be provided for all supplier contracts regardless of contract size: name of company, contact person, address, telephone number, dollar value of the contract, and a list of the materials to be supplied to the prime contractor.
9. List of any subcontract work yet to be committed with estimate of dollar amount and duration of contract.
10. Contract Price. Duration of prime contract.
11. DBE Documents - See special instructions regarding use of Minority, and Women Owned, and Small Businesses.

Attachment Number 8

Employer Information Report EEO-1

Under the direction of the US Equal Employment Opportunity Commission, the Joint Reporting Committee is responsible for the full-length, multi-phase processing of employment statistics collected on the Employer Information Report EEO-1. This report, also termed Standard Form 100, details the sex and race/ ethnic composition of an employer's work force by job category.

The Employer Information EEO-1 survey is conducted annually under the authority of Public Law 88-352, Title VII of the Civil Rights Act of 1964, as amended by the Equal Employment Opportunity Act of 1972. All employers with 15 or more employees are covered by Public Law 88-352 and are required to keep employment records as specified by Commission regulations. Based on the number of employees and federal contract activities, certain large employers are required to file an EEO-1 Report on an annual basis.

The EEO-1 Report must be filed by:

(A) All private employers who are: (1) subject to Title VII of the Civil Rights Act of 1964 (as amended by the Equal Employment Opportunity Act of 1972) with 100 or more employees EXCLUDING State and local governments, primary and secondary school systems, institutions of higher education, Indian tribes and tax-exempt private memberships clubs other than labor organizations; OR (2)subject to Title VII who have fewer than 100 employees if the company is owned or affiliated with another company, or there is centralized ownership, control or management (such as central control of personnel policies and labor relations) so that the group legally constitutes a single enterprise and the entire enterprise employs a total of 100 or more employees.

(B) All federal contractors (private employers), who:(1) are not exempt as provided for by 41 CFR 60-1.5, (2) have 50 or more employees, and (a) are prime contractors or first-tier subcontractors, and have a contract, subcontract, or purchase order amounting to $50,000 or more; or (b) serve as depository of Government funds in any amount, or (c) is a financial institution which is an issuing an paying agent for U.S. Savings Bonds and Notes.

Only those establishments located in the District of Columbia and the 50 states are required to submit the EEO-1 Report. No Reports should be filed for establishments in Puerto Rico, the Virgin Islands or other American Protectorates.

When filing for the EEO-1 Rep ort for the first time, go to the web site at: http://www.mimdms.com/jrc.html and select "Filing for the first time" from the box labeled INFORMATION. File out the electronic questionnaire to enter your company into Joint Reporting Committee (JRC) system. One you have completed the registration process, you will be contacted on how to proceed with the EEO-1 Report. If you have previously registered with the JRC, follow their instructions to update your information.

EPA Form 5720-4 **Attachment Number 9**

Labor Standards Provisions For Federally Assisted Construction

Labor standards provisions applicable to contracts covering federally financed and assisted construction (29 CFR 5.5, Contract Provisions and Related Matters) that apply to EPA Special Appropriations Projects grants are:

(a)(4)(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.

(a)(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.

(a)(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 U.S. Environmental Protection Agency 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.

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

(b) Contractor Work Hours and Safety Standards Act. The Administrator, EPA shall cause or require the contracting officer to insert the following clauses set forth in paragraph (b)(1),(2),(3), and (4) of this section in full in any contract 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 *Section 5.5(a) of this title. 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 work week in which he or she is employed on such work to 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 (b) (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 unliquidated 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 (b)(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 (b)(1) of this section.

(3) Withholding for unpaid wages and liquidated damages. The U.S. Environmental Protection Agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the

contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other Federally- assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such 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 (b)(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 (b)(1) through (4) of this section.

(c) In addition to the clauses contained in paragraph (b), in any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in section 5.1, the Administrator of EPA shall cause or require the contracting officer to 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 worked, deductions made, and actual wages paid. Further, the Administrator of EPA shall cause or require the contracting officer to insert in any such contract a clause providing that 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 U.S. Environmental Protection Agency and the Department of Labor, and the contractor or subcontractor will permit such representatives to interview employees during working hours on the job. (Approved by the Office of Management and Budget under OMB control numbers 1215-0140 and 1215-0017.)

CERTIFICATIONS

Debarred Firms

All prime Construction Contractors shall certify that Subcontractors have not and will not be awarded to any firm that is currently on the EPA Master List of Debarred, Suspended and Voluntarily Excluded Persons in accordance with the provisions of 40 CFR 32.500(c). Debarment action is taken against a firm for noncompliance with Federal Law.

All bidders shall complete the attached certification (Attachment Number 10) and submit to the owner with the bid proposal.

Anti-lobbying Certification

All prime Construction Contractors must certify (Attachment Number 11) that no appropriated funds were or will be expended for the purpose of lobbying the Executive or Legislative Branches of the Federal Government or Federal Agency concerning this contract (contract in excess of $100,000). If the Contractor has made or agreed to make payment to influence any member of Congress in regard to award of this contract, a Disclosure Form must be completed and submitted to the owner with the bid proposal.

All prime Contractors must require all Subcontractors to submit the certification, which must also be submitted to the owner.

CERTIFICATION REGARDING DEBARMENT, SUSPENSION AND OTHER RESPONSIBILITY 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 judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining. attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement. theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(c) Are not presently indicted for or otherwise criminally or civilly charged by a government entity (Federal. State, or Local) with commission of any of the offenses enumerated in paragraph (1)(b) of this certification; and

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

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.

Attachment Number 11

CERTIFICATION REGARDING LOBBYING
Certification for Contracts, Grants, Loans, and Cooperative Agreements

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

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

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for 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 sub-awards at all tiers (including subcontracts, sub-grants, and contracts under grants, loans, and cooperative agreements) and that all sub-recipients 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.

_____
TYPED NAME & TITLE OF AUTHORIZED REPRESENTATIVE

_____
SIGNATURE OF AUTHORIZED REPRESENTATIVE DATE

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

UTILIZATION OF SMALL, MINORITY AND WOMEN'S BUSINESSES

The provisions of PL 102-389 and EPA's implementing regulation 40 CFR 31.36(e) require recipients of Federal assistance to award a fair share of sub-agreements to small, small rural, minority and women's businesses on contracts and sub-agreement performed under EPA Assistance Agreements.

The following procedures are to be followed for procurement under EPA Assistance Agreements.

The successful bidder must submit to the grantee within 10 days after bid opening, evidence of the positive steps taken to utilize small, minority and women's businesses. Information should include the following:

EPA Project Number. Project Location. Type of Construction.

List of current construction contracts, with dollar amount. List contracting Federal Agency, if applicable.

List of subcontractors (name, address and telephone) with dollar amount and duration of subcontract.

List of any subcontract work yet to be committed with estimate of dollar amount and duration of contract.

Contract Price. Duration of prime contract.

Such positive efforts shall include:
(1) Placing qualified small and minority businesses and women's business enterprises on solicitation lists;

(2) Assuring 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 business, and women's business enterprises;

(4) Establishing delivery schedules, where the requirement perm its, which encourage participation by small and minority business, and women's business enterprises;

(5) Using the services and assistance of the Small Business Administration, and the Minority Business Development Agency of the Department of Commerce; and

(6) Requiring each party to a sub-agreement to take the affirmative steps listed in paragraphs 1 through 5 of this section.

For purposes of clarification:

" This requirement applies to any EPA Financially assisted procurement.

" This requirement mandates three responsibilities. Separate solicitations must be made of small, small rural, minority and women's businesses enterprises.

" A minority business is a business, at least 51 percent of which is owned and controlled by minority group members (Black; Hispanic; Asian American; American Indian; and any other designations approved by the Office of Management and Budget that are U.S. citizens. Any specific clarification concerning the ownership and/or control issues will be provided by the EPA Regional Office.

" A women's business is a business, at least 51 percent of which is owned and controlled by one or more women who are U.S. citizens.

" The control determination will revolve around the minority or women owner's involvement in the day-to-day management of the business enterprise.

" Solicitation should allow adequate time for price analysis; EPA recommends that contact be made no later than 15 days before bid opening.

" Efforts taken to comply with this requirement must be documented in detail; maintain records of firms contacted, including any negotiation efforts to reach competitive price levels, and awards to the designated firms.

" Any proposed changes from the approved Minority/Women/Small business participation after EEO/MBE approval shall be reported to EPA prior to initiation of the action, with the reason for the proposed deviation.

" The EPA recommends that the grantee as well as the prime contractor utilize the services of the following agencies to find information on certified Minority/Women/Small business. Use of these services does not absolve the prime contractors from pursuing additional efforts to comply with this requirement.

Minority Business Development Service Centers These Centers are funded by the U.S. Department of Commerce to provide technical, financial and contracting assistance to minority, women's and small rural business enterprises. The locations of the Centers are available by selecting the appropriate Minority Business Development Agency regional office from: http://www.mbda.gov/.

U.S. Small Business Administration Central Contractor Registration (procurement marketing and access network) at http://www.ccr.gov/ .

U.S. Small Business Administration (SBA) Online Women's Business Center. For the Women's Business Center nearest you, go to: http://www.onlinewbc.gov/ and select Women's Business Centers.

For additional information on listings of certified MBE/WBE contractors and subcontractors in the States of Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee, contact Rafael Santamaria in EPA Region 4 at 404 562-8312.

BONDS AND INSURANCE

Bonding requirements for contracts of $100,000 or less are contained in 40 CFR 31.36(h).

Bond requirements for contracts in excess of $100,000 are:

Bid guarantee equivalent to five percent of the bid price. The bid guarantee shall consist of a firm commitment such as a certified check or bid bond submitted with the bid;

Performance bond equal to 100 percent of the contract price, and

Payment bond equal to 100 percent of the contract price. Bonds must be obtained from companies holding Certificates of Authority as acceptable sureties, issued by the U.S. Treasury.

Insurance requirements are contained in the General Conditions of the contract. In addition to the other required insurance, the owner or the contractor, as appropriate, must acquire any flood insurance made available b y the Federal Emergency Management Agency as required by 44 CFR Parts 59-79, if construction will take place in a flood hazard area identified by the Federal Emergency Management Agency. The owner's requirements on Flood Insurance are contained in the Special Conditions Section of the Contracts Documents.

OUTLAY MANAGEMENT

The contractor must provide a contract progress schedule of percentage of work in place and costs against time; and a schedule of projected payments (cumulative) for construction and for the architectural/ engineering contract when the contract is awarded. The payment schedule must be submitted, in a format similar to the attached sample, to the owner for forwarding to the State when the contract is awarded, and whenever actual payments on a project vary beyond -5 percent and +10 percent from the schedule, as determined by the grantee.

Contractor will be required to review each of these contract schedules during the month of June and to submit revised schedules, as necessary, no later that July 1st of each year.

THIS FORMAT IS A SAMPLE ONLY.

CONSTRUCTION AND OUTLAY SCHEDULE

Project No.: _____

Applicant: _____

Contract Identification: _____

Description of Contract: _____

_____

(INSTRUCTIONS FOR USE ON REVERSE SIDE)

SCHEDULE I - CONSTRUCTION SCHEDULE

Date for Advertisement: _____
Date for Opening Bids: _____
Pre-Construction Conference Date: _____
Date of Contract Award: _____
Contract Period: _____ days Projected Contract Completion Date: _____
Total Eligible Contract Amount: _____
Work Order Date: _____
Start Construction Date: _____
Contract Completed: _____
_____

SCHEDULE II - CUMULATIVE OUTLAY SCHEDULE (55% EPA Share) - Projection only for quarters that remain in the fiscal year (FY) plus cumulative annual amount for the next FY.

Cum EPA Amount thru 1st Qtr. Oct./Dec.: $ _____
Cum EPA Amount thru 2nd Qtr. Jan./Mar.: $ _____
Cum EPA Amount thru 3rd Qtr. Apr./June: $ _____
Cum EPA Amount thru 4th Qtr. July/Sept.: $ _____
Cum EPA Amount for Next Fiscal Year: $ _____

INSTRUCTIONS (Construction and Outlay Schedules)

To insure timely achievement of the grant objectives the owner (grantee) must provide EPA with a grants activities schedule, contract construction schedules and corresponding payment outlay schedules for the grant and each contract under the grant. One copy of information similar to that showing the Construction and Outlay Schedule Form will be submitted for the grant schedule with the grant acceptance. A separate form will accompany each contract at time of contract award.

A. The grant activities schedule shall depict the period from grant award through grant closeout and cover all major milestone date. The grant activities schedule shall include Schedule I information items as well as other appropriate items necessary to monitor the grant. Schedule II shall be filled out to estimate the cumulative (all construction and architectural/engineering contracts) payment schedule to be requested by the grantee from EPA during the grant period, and whenever actual outlays vary beyond -5% and +10% from the schedule.

B. Individual contractor's construction schedules for each contract will be submitted to support the grant activities schedule. The Schedule I shall be submitted prior to date of advertisement of each contract and Schedule II along with the contractor's construction schedule shall be submitted seven (7) calendar days prior to the dates of the pre-construction conference. The contractor's construction schedule shall depict the contractor's plan for completing all contract requirements and show work placement in dollars versus contract time. Schedule II shall depict the contract payment outlay by month or quarter. The contract schedule will be coordinated with all parties at the pre-construction conference.

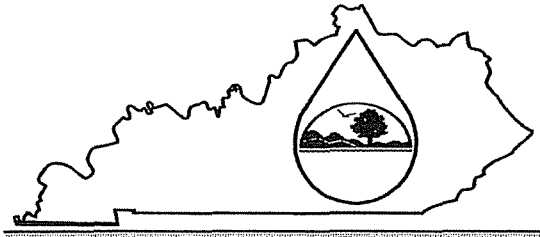
The grants activities schedule, contractor construction schedules, will be the basis for monitoring progress towards completion of the project. The schedules shall be maintained at the available for inspection and updated at least monthly. The schedules shall be revised to incorporate approved change orders as they occur.

All of the schedules will be submitted to the State Division of Water.

NOTICE OF INTENT

All construction projects with surface disturbance of more than 1 acre during the period of construction must have a KPDES Storm Water General Permit. The contractor must complete and submit the attached form at least 48 hours prior to start of construction to the address below:

Section Supervisor
Inventory and Data Management Section
KPDES Branch
Kentucky Division of Water
14 Reilly Road, Frankfort Office Park
Frankfort, Kentucky 40601



Kentucky Pollutant Discharge Elimination System (KPDES)
Notice of Intent (NOI)
for Storm Water Discharges
Associated with Industrial Activity Under the KPDES General Permit

ubmission of this Notice of Intent constitutes notice that the party identified in Section I of this form intends to be authorized by a PDES permit issued for storm water discharges associated with industrial activity. Becoming a permittee obligates such discharger to comply with the terms and conditions of the permit.
ALL NECESSARY INFORMATION MUST BE PROVIDED ON THIS FORM (See Instructions on back)

Facility Operator Information

Name:		Phone:	
ddress:		Status of Owner/Operator:	
ity, State, Zip Code:			

Facility/Site Location Information

Name:	
ddress:	
ty, State, Zip Code:	
County:	

te Latitude: egrees/minutes/seconds)		Site Longitude: (degrees/minutes/seconds)	

II. Site Activity Information

S4 Operator Name:							
Receiving Water Body:							
e there existing quantitative data?	Yes ☐ If Yes, submit with this form. No ☐						
C or Designated Activity Code Primary		2nd		3rd		4th	

this facility is a member of a Group Application, enter Group Application Number:

If you have other existing KPDES Permits, enter Permit Numbers:

. Additional Information Required FOR CONSTRUCTION ACTIVITIES ONLY

oject Start Date:		Completion Date:	
Estimated Area to be disturbed (in acres):			
he Storm Water Pollution Prevention Plan in Compliance h State and/or Local Sediment and Erosion Plans?	Yes ☐ No ☐		

ertification: I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in ccordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are ignificant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

nted or Typed Name:			
ignature:		Date:	

Kentucky Pollutant Discharge Elimination System (KPDES)
Instructions
Notice of Intent (NOI) for Storm Water Discharges Associated with Industrial Activity
To Be Covered Under The KPDES General Permit

WHO MUST FILE A NOTICE OF INTENT (NOI) FORM

Federal law at 40 CFR Part 122 prohibits point source discharges of stormwater associated with industrial activity to a water body of the Commonwealth of Kentucky without a Kentucky Pollutant Discharge Elimination System (KPDES) permit. The operator of an industrial activity that has such a storm water discharge must submit a NOI to obtain coverage under the KPDES Storm Water General Permit. If you have questions about whether you need a permit under the KPDES Storm Water program, or if you need information as to whether a particular program is administered by the state agency, call the Storm Water Contact, Industrial Section, Kentucky Division of Water at (502) 564-3410.

WHERE TO FILE NOI FORM

NOIs must be sent to the following address:

Section Supervisor
Inventory & Data Management Section
KPDES Branch, Division of Water
Frankfort Office Park
14 Reilly Road
Frankfort, KY 40601

COMPLETING THE FORM

Type or print legibly in the appropriate areas only. If you have any questions regarding the completion of this form call the Storm Water Contact, Industrial Section, at (502) 564-3410.

SECTION I - FACILITY OPERATOR INFORMATION

Give the legal name of the person, firm, public organization, or any other entity that operates the facility or site described in this application. The name of the operator may or may not be the same as the name of the facility. The responsible party is the legal entity that controls the facility's operation, rather than the plant or site manager. Do not use a colloquial name. Enter the complete address and telephone number of the operator.

Enter the appropriate letter to indicate the legal status of the operator of the facility.

F = Federal M = Public (other than federal or state)
S = State P = Private

SECTION II - FACILITY/SITE LOCATION INFORMATION

Enter the facility's or site's official or legal name and complete street address, including city, state, and ZIP code.

SECTION III - SITE ACTIVITY INFORMATION

If the storm water discharges to a municipal separate storm sewer system (MS4), enter the name of the operator of the MS4 (e.g., municipality name, county name) and the receiving water of the discharge from the MS4. (A MS4 is defined as a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains) that is owned or operated by a state, city, town, borough, county, parish, district, association, or other public body which is designed or used for collecting or conveying storm water.)

If the facility discharges storm water directly to receiving water(s), enter the name of the receiving water.

Indicate whether or not the owner or operator of the facility has existing quantitative data that represent the characteristics and concentration of pollutants in storm water discharges.

If data is available submit with this form.

List, in descending order of significance, up to four 4-digit standard industrial classification (SIC) codes that best describe the principal products or services provided at the facility or site identified in Section II of this application.

If the facility listed in Section II has participated in Part 1 of an approved storm water group application and a group number has been assigned, enter the group application number in the space provided.

If there are other KPDES permits presently issued for the facility or site listed in Section II, list the permit numbers.

SECTION IV - ADDITIONAL INFORMATION REQUIRED FOR CONSTRUCTION ACTIVITIES ONLY

Construction activities must complete Section IV in addition of Sections I through III. Only construction activities need to complete Section IV.

Enter the project start date and the estimated completion date for the entire development plan.

Provide an estimate of the total number of acres of the site on which soil will be disturbed (round to the nearest acre).

Indicate whether the storm water pollution prevention plan for the site is in compliance with approved state and/or local sediment and erosion plans, permits, or storm water management plans.

SECTION V - CERTIFICATION

Federal statutes provide for severe penalties for submitting false information on this application form. Federal regulations require this application to be signed as follows:

For a corporation: by a responsible corporate officer, which means: (i) president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions, or (ii) the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

For a partnership or sole proprietorship: by a general partner or the proprietor; or

For a municipality, state, Federal, or other public facility: by either a principal executive officer or ranking elected official.

WAGE RATES

Federal Davis-Bacon rates are not applicable for these funds. This determination applies only to the grant/loan portion of this project. Please contact the other funding sources, if applicable, for their requirements pertaining to federal wage rates. You must contact the Kentucky Labor Cabinet for determination of applicable state wages.

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FOR
GENERAL CONDITIONS OF THE CONTRACT

GENERAL CONDITIONS OF THE CONTRACT

1. DEFINITIONS

Wherever used in the Contract Documents, the following terms or expressions or pronouns used instead shall have the meanings indicated which shall be applicable to both the singular and plural thereof.

1.1 "As directed," "as permitted," "reviewed," "acceptable," "approved," or words of similar import mean the direction, requirements, permission, approval, or acceptance of the Engineer, unless stated otherwise.

1.2 "As shown." "as indicated." "as detailed." or words of similar import refer to the Contract Drawings unless stated otherwise.

1.3 "Bidder" -- any person, partnership, corporation, association, or affiliation submitting a bid for the work.

1.4 "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.

1.5 "Contract" -- the Contract Documents referred to in the General Conditions of the Contract covering the performing of the work and the furnishing of all labor, equipment, materials, and other property required for the doing of the work and covering the doing of all other things required by said Contract Documents.

1.6 "Contract Drawings" or "Plans" -- drawings which have been prepared by or on behalf of the Owner, as a basis for bids, when duly made a part of this Contract by incorporation or reference. Drawings submitted in pursuance of the terms of this contract by the successful bidder with his bid and by the Contractor to the Owner if and when approved by the Engineer. Drawings submitted by the Engineer to the Contractor during the progress of the work as provided for in the Contract.

1.7 "Contractor" -- the person, partnership, corporation, association, or affiliation with whom the Owner has executed the agreement.

1.8 "Date of award" -- the date formal Notice of Award of the Contract, signed by the Owner, has been delivered to the successful bidder or mailed to him by registered mail (return receipt) at the business address shown in his bid by some officer or agent of the Owner duly authorized to give such notice.

1.9 "Day" -- calendar day.

1.10 "Engineer" -- the firm of Water Management Services, LLC, Nashville, Tennessee, acting through its authorized representatives.

1.11 "Final acceptance" -- the date when the construction of the project is complete in accordance with the Contract Documents so that the entire project can be utilized for the purposes for which it is intended and all monies due the Contractor have been paid him in the final payment estimate.

1.12 "Inspector" -- the engineering or technical inspector duly authorized or appointed by the Engineer or by the Owner, limited to the particular duties entrusted to him.

1.13 "Owner" – Green River Valley Water District.

1.14 "Project" -- the undertaking to be performed as provided in the Contract Documents.

1.15 "Provide" -- means "furnish and install"

1.16 "Subcontractor" – a person, partnership, corporation, association, or affiliation other than the Contractor supplying labor and materials or labor only at the site of the work.

1.17 "Substantial completion" -- the 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.

1.18 "Suppliers" -- any person or organization who supplies materials or equipment for the work, including that fabricated to special design, but who does not perform labor at the site.

1.19 "Work" -- all labor necessary to produce the construction required by the Contract Documents and all material and equipment incorporated or to be incorporated in the project.

2. CONTRACT DOCUMENTS

2.1 General

The Contract Documents comprise the following general classifications of documents, including all additions, deletions, and modifications incorporated therein before the execution of the Agreement.

Bidding documents
Contractual documents
Conditions of the Contract
Specifications
Drawings

2.2 Bidding Documents

The bidding documents issued by the Owner to assist bidders in preparing their bids include:

2.2.1 Invitation to Bid bound herewith.

2.2.2 Instructions to Bidders bound herewith.

2.2.3 The bid which is the offer of a bidder to perform the work described in the Contract Documents, made out and submitted on the prescribed bid form bound herewith, properly signed and guaranteed.

2.2.4 Any addenda issued during the time of bidding or forming a part of the Contract Documents used by the bidder for the preparation of his bid shall be covered in the bid and shall be made a part of the Contract. Receipt of each addendum shall be acknowledged in the bid.

2.3 Contractual Documents

2.3.1 Agreement

The Agreement covers the performance of the work described in the Contract Documents, including all supplemental addenda thereto and all general and special provisions pertaining to the work or materials therefore.

2.3.2 Bonds

The Contractor shall, at the time of his execution of the Agreement, furnish bonds payable to the Owner in the form of bonds set forth herein, secured by a surety company acceptable to the Owner, as follows:

2.3.2.1 Faithful performance bond in an amount equal to 100 percent of the total Contract amount, conditioned upon the faithful performance of all covenants and stipulations under the Contract and holding good for a period of one year after the final acceptance of the work to protect the Owner against the results of defective materials, workmanship, and equipment during that time.

2.3.2.2 Payment bond in an amount equal to 100 percent of the total Contract amount for the payment of all persons, companies, or corporations who perform labor upon or furnish material to be used in the work under this Contract.

2.3.2.3 It is the responsibility of the Contractor to notify all Surety companies and other signers of any of the bonds listed above to familiarize themselves with all of the conditions and provisions of this Contract. All Surety companies and other signers shall waive their right of notification by the Owner of any change or modification of this Contract, or of decreased or increased work, or of the cancellation of this Contract, or of other acts by the Owner or its authorized employees or agents under the terms of this Contract. The waiver by the Surety companies and other signers shall in no way relieve the Surety companies and other signers of their obligations under this Contract.

2.4 Conditions of Contract

2.4.1 Special Conditions of the Contract which shall supplement or amplify the General Conditions of the Contract and which are bound herewith.

2.4.2 *General Conditions of the Contract bound herewith and of which this paragraph is a part.*

2.4.3 Federal laws and regulations applicable to this Contract and bound herewith.

2.5 Specifications and Drawings

2.5.1 Contract Specifications bound herewith, which are listed in the Table of Contents for *these Contract Documents.*

2.5.2 Contract Drawings including, but not limited to, those listed in Volume II of the Contract Documents.

2.6 Discrepancies

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, who shall promptly correct such inconsistencies or ambiguities in writing. Any work done by the Contractor after such findings, until authorized, will be done at the Contractor's risk.

2.7 Interpretation of Specifications and Drawings

The Contract Specifications and the Contract Drawings are intended to be explanatory of each *other. Any work indicated on the Contract Drawings and not in the Contract Specifications, or* vice versa, is to be executed as if indicated in both. In the event of any doubt or question arising respecting the true meaning of the Contract Specifications or Drawings, reference shall be made to the Engineer and his decision thereon shall be final.

2.8 Dimensions

Finished surfaces, in all cases, shall conform with the lines, grades, cross-sections, and dimensions shown on the Contract Drawings. Deviations from the Contract Drawings, as may be required by the exigencies of construction, will in all cases be determined by the Engineer and authorized in writing by the Engineer or Owner. If additional dimensions are required, they shall be requested from the Engineer.

2.9 Titles and Headings

2.9.1 The titles and subheadings printed on the Contract Drawings, in the General Conditions, in the Contract Specifications, and elsewhere in the Contract Documents are inserted for the convenience of reference only and shall not be taken or considered as having any bearing on the interpretation thereof.

2.9.2 *Separation of the Contract Specifications into Divisions and Sections shall not operate to* make the Engineer an arbiter to establish limits of work between the Contractor and Subcontractors or between trades.

2.10 Additional Drawings and Instructions

2.10.1 The Contract Drawings and Specifications are intended to be comprehensive and to indicate, in more or less detail, the scope of the work. Should it appear that the work to be done or any of the matters relative thereto is not sufficiently detailed or explained in these Contract Documents including the Contract Drawings, the Contractor shall apply to the Engineer for such further explanations as may be necessary and shall conform thereto as part of this Contract, so far as may be consistent with the terms of the Contract.

2.10.2 In addition to these explanations, the Engineer may furnish additional drawings and instructions from time to time during the progress of the work to clarify or to define in greater detail the intent of the Contract Specifications and Contract Drawings, and the Contractor shall make his work conform to all such additional drawings and instructions.

2.11 Copies Furnished

2.11.1 The Owner will furnish to the Contractor, free of charge, 5 copies of Drawings and documents.

2.11.2 Additional sets desired will be furnished at printing cost, based upon commercial printing rates.

3. OWNER-CONTRACTOR-ENGINEER RELATIONS

3.1 Rights-of-Way

The Owner will provide all rights-of-way and easements for the work to be constructed by the Contractor under this Contract.

3.2 Surveys and Staking

The Contractor shall be responsible for establishing all construction lines, grades and measurements necessary for the proper prosecution and control of the work contracted for under these Specifications based on monuments and control points shown on the Contract Drawings. The Contractor shall furnish the Engineer "cut-sheets" for all lines showing plan grade, centerline grade, centerline cut, offset grade, and offset cut at manholes prior to excavation and/or drilling operations. The review of the "cut-sheets" by the Engineer does not relieve the Contractor of the responsibility for any errors therein or of proper line and grade in the prosecution of the work.

3.3 Suspension of Work

The Owner may at any time suspend the work, or any part thereof, by giving reasonable notice to the Contractor. The work shall be resumed by the Contractor on the date fixed in a written notice from the Owner to the Contractor. If suspension of the work is due to no fault of the Contractor and not otherwise authorized by other provisions of the Contract Documents, the Owner will reimburse the Contractor for such expense, if any, which is incurred by the Contractor in connection with the work under this Contract as a result of such suspension which would not have been incurred or reasonably required if there had not been such suspension; provided that there shall be no reimbursement if the period of suspension occurs after expiration of the time allowed for completion of the work, exclusive of any extension of time because of avoidable delays.

3.4 Right of Owner to Terminate Agreement

3.4.1 The Owner shall have the right to terminate his agreement with the Contractor after giving five days written notice of termination to the Contractor in the event of any default by the Contractor.

3.4.2 It shall be considered a default by the Contractor whenever he shall:

3.4.2.1 Declare bankruptcy, become insolvent, or assign his assets for the benefit of his creditors.

3.4.2.2 Disregard or violate provisions of the Contract Documents or fail to prosecute the work according to the agreed schedule of completion, including extensions thereof.

3.4.2.3 Fail to provide a qualified superintendent, competent workmen or subcontractors, or proper materials, or fail to make prompt payment therefore.

3.4.3 In the event of termination of the Agreement by the Owner because of default by the Contractor, the Owner may take possession of the work and of all materials and equipment thereon and may finish the work by whatever method and means he may select.

3.5 Emergency Protection

3.5.1 In case of an emergency which threatens loss, damage, or injury to persons or property and which requires immediate action to remedy, in the absence of the Contractor's personnel, then and in that event, the Owner, with or without notice to the Contractor or his Surety, may provide suitable protection to the said property and persons by causing such work to be done and such material to be furnished as shall provide such protection as the Owner may consider necessary and adequate. The cost and expense of such work and material so furnished shall be borne by the Contractor and, if the same shall not be paid on presentation of the bills therefore, then such costs shall be deducted from any amounts due or to become due the Contractor.

3.5.2 The performance of such emergency work under the direction of the Owner shall in no way relieve the Contractor from any damages which may occur during or after such precaution has been taken by the Owner.

3.6 Archaeological Finds

Notwithstanding anything to the contrary herein, in the event any archaeological artifacts within the project are discovered during the course of the work, the Owner shall have and retain all right, title, and interest to such artifacts and shall have the further right during the course of the Contract to examine or cause to have examined, the site of the work for any such artifacts and to perform or have performed archaeological excavations and all other related work to explore for, discover, recover and remove such artifacts from the site of the work. In the event the work of archaeological examination and related work delays the Contractor's work, he shall be entitled to an extension of time to complete the work equal to the number of days he is thus delayed.

3.7 Office of Contractor at Site

See Special Conditions for office requirements.

3.8 Attention to Work

The Contractor shall supervise the work to the end that it shall be prosecuted faithfully, and he shall at all times be represented by a competent superintendent or foreman who shall be present at the work and who shall receive and obey all instructions or orders given under this Contract; and who shall have full authority to execute the same, and to supply materials, tools and labor without delay; and who shall be the legal representative of the Contractor. The Contractor shall be liable for the faithful observance of any instructions delivered to him or to his authorized representative.

3.9 Protection of Existing Structures

Unless otherwise indicated on the Contract Drawings or unless otherwise taken care of by the Owner thereof, all utilities and all structures of any nature, whether below or above ground, that may be affected by the work shall be protected and maintained by the Contractor and shall not be disturbed or damaged by him during the progress of the work.

Should the Contractor disturb, disconnect, or damage any utility or any structure, all expenses of whatever nature arising from such disturbance or the replacement or repair thereof shall be borne by the Contractor.

3.10 Protection of Contractor's Work and Property

3.10.1 The Contractor shall protect his work, supplies, and materials from damage due to the nature of the work, the action of the elements, trespassers, or any cause whatsoever until the completion and acceptance of the work.

3.10.2 Neither the Owner nor any of its officers, employees, or agents assumes any responsibility for collecting indemnity from any persons or person causing damage to the work of the Contractor.

3.11 Surveys

3.11.1 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, and elevations.

3.11.2 The Contractor shall carefully preserve all bench marks, reference points, and stakes established by the Engineer and, in case he causes damage or disturbance, he will be charged for the cost of replacement and shall be responsible for any mistakes that may be caused by their loss.

3.12 Location of Utilities

3.12.1 The elevation and location of all utilities shown on the Contract Drawings were taken from public records. It shall be the duty of the Contractor to make final and exact determination of the location and extent of these utilities, and he will be liable for any expense resulting from damage to them.

3.12.2 Any expenses incurred by the Contractor for repair of damage, relocation, or removal of underground on-site piping and utilities not shown on the Contract Drawings or which cannot be reasonably inferred from visible above ground features will be assumed by the Owner, providing that the Contractor uses reasonable care in his discovery and repair operations. The Contractor shall immediately notify the Engineer of any facility discovered while performing work required by the Contract and which has not been identified on the Contract Drawings.

3.12.3 Because of the nature of the work, minor adjustments may be required in new construction to meet existing conditions. Adjustments, which may be accomplished without expense to the Contractor, shall be made without additional cost to the Owner.

3.13 Subcontractors

3.13.1 No Subcontractor will be recognized as such, and all persons engaged in the work of construction will be considered as employees of the Contractor and he will be held responsible for their work which shall be subject to the provisions of the Contract.

3.13.2 The Contractor shall perform with his own organization and with the assistance of workmen under his immediate supervision work of a value not less than thirty percent of the value of all work embodied in this Contract, except that furnishing and installing items of major equipment will be exempted from this requirement.

3.13.3 The Contractor shall notify the Owner in writing of the names of all Subcontractors he proposes to employ on the Contract and shall not employ any Subcontractors until the Owner's approval in writing covering such Subcontractors has been obtained.

3.13.4 Nothing contained in the Contract Documents shall create any contractual relationship between any Subcontractor and the Owner. It shall be further understood that the Owner will have no direct relations with any Subcontractor. Any such necessary relations between Owner and Subcontractor shall be handled by the Contractor.

3.13.5 Should any Subcontractor fail to perform in a satisfactory manner the work undertaken by him, such subcontract shall be terminated immediately by the Contractor upon notice from the Owner.

3.14 Liability of Contractor

3.14.1 The mention of any specific duty or liability imposed upon the Contractor shall not be construed as a limitation or restriction of any general or other liability or duty imposed upon the Contractor by this Contract, said reference to any specific duty or liability being made merely for the purpose of explanation.

3.14.2 The Contractor shall be responsible to the Owner for the acts and omissions of all his employees and all Subcontractors, their agents and employees, and all other persons performing any of the work under an agreement with the Contractor.

3.15 Assumption of Risks

Until the completion and final acceptance by the Owner of all of the work under or implied by this Contract, except those portions which are under beneficial use by the Owner, all work shall be under the Contractor's care and charge and he shall be responsible therefore. The Contractor shall rebuild, replace, repair, restore, and make good all injuries, damages, re-erection, and repairs occasioned or rendered necessary by causes of any nature whatsoever to all or any portions of the work, except as otherwise stipulated.

3.16 Responsibility for Damage

3.16.1 The Contractor shall assume the defense of and indemnify and save harmless the Owner and each and every officer, employee, and agent thereof, and the Engineer from any and all loss, liability, or damage and from all suits, actions, damages, or claims of every name and description, to which the Owner or any of its officers, employees, or agents or the Engineer may incur or be subjected to put by reason of injury to persons or property in the execution of the work resulting from negligence or carelessness on the part of the Contractor, his employees, subcontractor, or agents in the delivery of materials and supplies; or by or on account of any act or omission of the Contractor, his employees, subcontractors, or agents including, but not limited to, any failure to fulfill the terms of or comply with all laws and regulations which apply to this Contract; and said Owner shall have the rights to estimate the amount of such damage and pay the same, and the amount so paid for such damage shall be deducted from the money due the Contractor under this Contract, or the whole or so much of the money due or to become due the Contractor under this Contract, as may be considered necessary by the Owner, shall be retained by the Owner until such suits or claims for damages shall have been settled or otherwise disposed of, and satisfactory evidence to that effect furnished to the Owner.

3.16.2 The rights of the Owner under this Contract in the control of the quality and completeness of the work shall not make the Contractor an agent of the Owner, and the liability of the Contractor for all damages to persons or to public or private property arising from the Contractor's execution of the work shall not be lessened because of the existence, exercise, or non-exercise of such rights.

3.17 Acceptance of Contractor's Plans

The acceptance by the Engineer of any drawing or any method of work proposed by the Contractor shall not relieve the Contractor of any of his responsibility for any errors therein and shall not be regarded as any assumption of risk or liability by the Owner or any officer or employee thereof; and the Contractor shall have no claim under the Contract on account of the failure or partial failure or inefficiency of any plan or method so accepted. Such acceptance shall be considered to mean merely that the Engineer has no objection to the Contractor's using, upon his own full responsibility, the plans or method proposed.

3.18 Suggestions to Contractor

Any plan or method of work suggested by the Engineer to the Contractor, but not specified or required, if adopted or followed by the Contractor in whole or in part, shall be used at the risk and responsibility of the Contractor, and the Engineer and the Owner shall assume no responsibility therefore.

3.19 Cooperation with Owner and Other Contractors

Any difference or conflict which may arise between the Contractor and other Contractors who may be performing work on behalf of the Owner or between the Contractor and workmen of the Owner in regard to their work shall be adjusted and determined by the Engineer. If the work of the Contractor is delayed because of any acts or omissions of any other Contractor of the Owner, the Contractor shall on that account have no claim against the Owner other than for an extension of time.

3.20 Authority of the Engineer

All work done under this Contract shall be done in accordance with the Contract Documents and in a good workmanlike manner. To prevent disputes and litigation, the Engineer shall, in all cases, determine the amount, quality, acceptability, and fitness of the several kinds of work and materials which are to be paid for under this Contract. The Engineer shall decide all questions relative to the true construction, meaning, and intent of the Contract Specifications and the Contract Drawings; shall decide all questions which may arise relative to the classifications and measurements of quantities and materials and the fulfillment of this Contract; and shall have the power to reject work or material which does not conform to the terms of this Contract. His estimate and decision in all matters shall be a condition precedent to an appeal to the Owner or the right of the Contractor to receive, demand, or claim any money or other compensation under this Contract and a condition precedent to any liability on the part of the Owner to the Contractor on account of this Contract. Whenever the Engineer shall be unable to act, in consequence of absence or any other cause, then such person as the Engineer or the Owner shall designate shall perform any and all of the duties and be vested with any or all of the powers herein given to the Engineer.

3.21 Inspection

Properly authorized and accredited inspectors shall be considered to be the representatives of the Owner with the duties and powers entrusted to them as provided herein but limited by paragraphs 5.11 and 5.12 of this Section. It will be their duty to inspect materials and workmanship of those portions of the work to which they are assigned, either individually or collectively, under instructions of the Engineer and to report any and all deviations from the Contract Drawings, Contract Specifications, and other Contract provisions which may come to their notice. Any inspector shall have the right to order the work to which he is assigned stopped if, in his judgment, such action is necessary to allow proper inspection, avoid irreparable damage to the work, or avoid subsequent rejection of work which could not be readily replaced or restored to an acceptable condition. Such stoppage shall be for a period reasonably necessary for notification of the Engineer and for the Engineer to determine that the work will, in fact, proceed in due fulfillment of all Contract requirements.

3.22 Observation of Completed Work

3.22.1 If any work is covered up without being inspected by the Engineer, it must, if required by the Engineer in writing, be uncovered for examination and properly restored at the Contractor's expense.

3.22.2 Re-examination of any work may be ordered by the Engineer and, if so ordered in writing, the Contractor shall remove or uncover such portions of the completed work as may be directed by the Engineer at any time before acceptance of the work. After examination, the Contractor shall restore the work to the standard required by the Contract Documents. Should the work thus exposed or examined prove acceptable, the uncovering or removing and the restoring of the work shall be paid for as extra work but, should the work exposed or examined prove unacceptable, the uncovering, removing, and restoring of the work shall be at the Contractor's expense.

4. MATERIALS, EQUIPMENT, AND WORKMANSHIP

4.1 General Quality of Materials

Materials and equipment shall be new and of a quality equal to that specified.

4.2 Quality in Absence of Detailed Specifications

Whenever under this Contract it is provided that the Contractor shall furnish materials or manufactured articles or shall do work for which no detailed specifications are set forth, the materials or manufactured articles shall be of the best grade in quality and workmanship obtainable in the market from firms of established good reputation or, if not ordinarily carried in stock, shall conform to the usual standards for first-class materials or articles of the kind required, with due consideration in either situation of the use to which they are to be put. In general, the work performed shall be in full conformity and harmony with the intent to secure the best standard of construction and equipment of the work as a whole or in part.

4.3 Materials and Equipment Specified by Name

Any material or equipment indicated or specified by brand or trade name also lists at least one additional brand or trade name of comparable quality or utility and is followed by the words "or equal" except for those items of material or equipment which may be required by Contract Specifications to match others in use in an existing facility. The Contractor may offer any material or equipment which shall be equal in every respect to that specified, but written acceptance of such equipment or material shall be obtained from the Engineer or the Owner. The decision of the Engineer or Owner shall be final.

4.4 Approval of Materials and Equipment

All materials and equipment offered to be furnished or furnished for the work are subject to inspection and approval or rejection by the Engineer. Insofar as practicable, approval shall be obtained prior to purchase and delivery of materials and equipment to the site of the work.

4.5 Removal of Condemned Materials, Structures, and Work

The Contractor shall remove from the site of the work, without delay, all rejected materials, structures, or work of any kind brought to or incorporated in the work and, upon his failure to do so, or to make satisfactory progress in so doing within two working days after the service of a written notice from the Engineer, the rejected material or work may be removed by the Owner and the cost of such removal shall be taken out of the money that may be due or may become due the Contractor on account of or by virtue of this Contract. No such rejected material shall again be offered for use by the Contractor under this Contract.

4.6 Sunday, Holiday, and Night Work

No work shall be done between the hours of six o'clock P.M. and seven o'clock A.M. nor on Saturdays, Sundays or legal holidays except such work as is necessary for the proper care and protection of work already performed or except in case of emergency and, in any case, only with the permission of the Engineer. It is understood, however, that night work may be established as a regular procedure by the Contractor if he first obtains the written permission of the Engineer and that such permission may be revoked at any time by the Engineer if the Contractor fails to maintain at night adequate force and equipment for reasonable prosecution and to justify inspection of the work.

4.7 Records of Employees

The Contractor and each Subcontractor shall keep an accurate record showing the name, place of residence, occupation, per diem pay, and actual hours worked each day and each calendar week by each person employed in connection with the work. The records shall be available at any time to the Engineer or his duly authorized representative.

4.8 Final Guarantee

4.8.1 All work shall be guaranteed by the Contractor for a period of one year from and after the date of acceptance of the work by the Owner.

4.8.2 If, within the guarantee period, repairs or changes are required in connection with guaranteed work which, in the opinion of the Engineer, is rendered necessary as the result of the use of materials, equipment, or workmanship which are inferior, defective, or not in accordance with the terms of the Contract, the Contractor shall, promptly upon receipt of notice from the Owner and without expense to the Owner, do the following:

4.8.2.1 Place in satisfactory condition in every particular all of such guaranteed work and correct all defects therein.

4.8.2.2 Make good all damage to the building, or site, or equipment, or contents thereof which, in the opinion of the Engineer, is the result of the use of materials, equipment, or workmanship which are inferior, defective or not in accordance with terms of the Contract.

4.8.2.3 Make good any work or material, or the equipment and contents of building, structure, or site disturbed in fulfilling any such guarantee.

4.8.2.4 Submit a work schedule showing the dates of starting and completing the repair work.

4.8.3 If the Contractor, after notice, fails within 10 days to proceed to comply with the terms of this guarantee, the Owner may have the defects corrected, and the Contractor and his Surety shall be liable for all expense incurred; provided, however, that in case of an emergency where, in the opinion of the Owner, delay would cause loss or damage, repairs may be started without notice being given to the Contractor and the Contractor shall pay the cost thereof.

4.8.4 If minor repairs are made by the Owner without notice to the Contractor or if the Owner's personnel are used to assist the Contractor or an equipment supplier in making repairs to defective work, the Contractor will be billed for and shall pay the costs of the minor repairs and the cost associated with the use of Owner's personnel.

4.8.5 If, in order to make required repairs, it is considered necessary by the Contractor or the manufacturer that the repairs be made at the manufacturer's factory, the Contractor shall pay the cost of removing, crating, shipping, repairing, and reinstalling the equipment.

4.8.6 All special guarantees or warranties applicable to specific parts of the work as may be stipulated in the Contract Specifications or other papers forming a part of this Contract shall be subject to the terms of this paragraph during the first year of the life of each such guarantee. All special guarantees and manufacturers' warranties shall be assembled by the Contractor and delivered to the Engineer along with a summary list thereof before the acceptance of the work.

5. INSURANCE, LEGAL RESPONSIBILITY, AND SAFETY

5.1 Insurance

The Contractor shall take out, pay for, and maintain throughout the duration of, and specifically for this Contract the following insurance coverage.

5.1.1 Public Liability and Property Damage Insurance

5.1.1.1 For Contractor

This insurance shall protect the Contractor from claims for bodily injury and property damage (except automotive equipment) which may arise because of the nature of the work or from operations under this Contract.

5.1.1.2 For Owner and Engineer

This separate policy of insurance shall name the Owner, the Engineer, their partners, officers, agents and employees with respect to said work. Both bodily injury and property damage insurance must be on an occurrence basis, and said policy shall provide that the coverage afforded thereby shall be primary coverage to the full limit of liability stated in the declarations and, if said Owner, the Engineer, and their partners, officers, agents and employees have other insurance against the loss covered by said policy, that other insurance shall be excess insurance only. No exclusions shall be permitted by endorsement with the exception of preparation or approval of maps and plans, opinions, reports, surveys, designs, or specifications.

5.1.1.3 Amount of Coverage

Each of the above public liability and property damage policies of insurance shall provide coverage in the following minimum limits of liability:

1.	General Aggregate	$	2,000,000
2.	Products/Completed Operations	$	2,000,000
3.	Each Occurrence	$	1,000,000
4.	Fire/Legal	$	100,000
5.	Medical Payments	$	5,000

5.1.1.4 Subcontractors

The public liability and property damage insurance shall not be deemed to require the Contractor to have his Subcontractors named as co-insureds in his policy of public liability and property damage, but the policy shall protect him from contingent liability which may arise from operations of his subcontractors. Also, the Contractor shall secure certificates of insurance as evidence that each Subcontractor carries insurance to provide coverage under this Contract to the same limits as is required by the Contractor. The Contractor shall submit copies of his Subcontractors insurance certificates to the Owner and the Engineer as evidence of insurance coverage.

All Subcontractors shall secure and provide certificate of insurance coverage for Workmen's Compensation insurance as provided in Paragraph 5.1.2 of this Section.

5.1.1.5 Included Coverage

The above public liability and property damage insurance shall also include the following coverages:

Premises - Operations - Escalators.

Contractor's protective (Subcontractors to the Contractor).

Products - Completed Operations.

Personal Injury (false arrest, libel, wrongful eviction, etc.).

Broad Form Property Damage.

XCU (explosion, collapse, underground damage). Exclusions deleted when applicable to operations performed by the Contractor or his Subcontractors.

Builders Risk

5.1.1.6 Comprehensive Automobile Liability

This insurance shall cover owned, hired, and other non-owned automobiles as shall protect the Contractor from claims for bodily injury or property damage which may arise from the use of motor vehicles engaged in various operations under this Contract. The automobile insurance shall provide minimum limits of liability for bodily injury of $500,000 for each person and $1,000,000 each occurrence, and $500,000 of property damage each occurrence.

5.1.1.7 Umbrella Policy

At the option of the Contractor, primary limits may be less than required with an umbrella policy providing the additional limits needed. This form of insurance will be acceptable provided that the primary and umbrella policies both provide the insurance coverages herein required, and further provide that the umbrella policy minimum limits of coverage are $1,000,000 per occurrence and $2,000,000 aggregate. The umbrella coverage shall not apply to the Owner's and Engineer's protective policy.

5.1.2 Workmen's Compensation Insurance

Before beginning the work, the Contractor shall furnish to the Owner satisfactory proof that he has taken out, for the period covered by the work under this Contract, full Workmen's Compensation insurance for all persons whom he may employ in carrying out the work contemplated under this Contract. In the event that the work of this Contract falls within the jurisdiction of the United States Longshoremans and Harbor Workers Compensation Act and liability under Admiralty and Railroad Employees Federal Liability Act, the Contractor shall extend his Workmen's Compensation insurance to provide and maintain in full force and effect during the period covered by this Contract insurance coverage under one or both of these Acts.

All Subcontractors shall secure and provide certificate of insurance coverage for Workmen's Compensation insurance regardless of the number of employees.

5.1.3 Workman's Occupational Diseases Insurance

Workman's occupational diseases insurance shall be taken out covering all persons whom the Contractor may employ in carrying out the work contemplated under this Contract.

5.2 Certificate of Insurance

The Contractor shall, at the time of execution of his Contract, file with the Owner a Certificate of Insurance in the form set forth herein, and copies of the policies covering all his insurance as required herein, and the policy or policies of insurance covering said Owner, the Engineer, and their partners, officers, agents, and employees. In those states where use of the preprinted Certificate of Insurance form is prohibited, the Contractor shall submit an approved form of Certificate of Insurance providing the coverages herein required. Each such policy and certificate shall be satisfactory to the Owner and shall bear an endorsement precluding cancellation, reduction, or change in coverage without giving the Owner at least 30 days prior notice thereof in writing. (The term "will endeavor to mail" shall not be acceptable.) Nothing contained in the insurance requirements shall be construed as limiting the extent of the Contractor's responsibility for payment of damages resulting from his operations under this Contract.

5.3 Notification of Insurance Companies

It is the responsibility of the Contractor to notify all insurance companies to familiarize themselves with all of the conditions and provisions of this Contract. The insurance companies shall waive their right of notification by the Owner of any change or modification of this Contract, or of decreased or increased work, or of the cancellation of this Contract, or of any other acts by the Owner or its tract. The waiver by the insurance companies shall in no way relieve the insurance companies of their obligations under this Contract.

5.4 Hold Harmless Agreement

Contractor shall indemnify and save harmless the Owner, the Engineer, and all of their partners, officers, agents, and employees from all suits, actions, or claims of any character brought for or on account of any injuries to or death of or damages received by any person, persons, or property resulting from the operations of the Contractor or any of his Subcontractors in prosecuting the work under this Contract, except only such damage, injury, or death as shall have been occasioned by the sole negligence of the Owner or Engineer.

5.5 Injury or Illness Reports

The Contractor shall file with the Engineer three copies of employer's first report of injury or illness immediately following any incident requiring the filing of said report during the prosecution of the work under this Contract. The Contractor shall also furnish to the Engineer three copies of the employer's first report of injury or illness involving any Subcontractor on this project.

5.6 Patents

5.6.1 Except as otherwise provided in these Contract Documents, the Contractor shall assume all costs arising from the use of patented materials, equipment, devices, or processes used on or incorporated in the work, and agrees to indemnify and save harmless the Owner, the Engineer, and their duly authorized representatives or employees from all suits at law, or actions of every nature for, or on account of the use of any patented materials, equipment, devices, or processes.

5.6.2 Should the Contractor, his agents, servants, or employees, or any of them be enjoined from furnishing or using any invention, article, material, or appliance supplied or required to be supplied or used under this Contract, the Contractor shall promptly offer other articles, materials, or appliances in lieu thereof, of equal efficiency, quality, finish, suitability, and market value for review by the Engineer. If Engineer should disapprove the offered substitutes and should elect, in lieu of a substitution, to have supplied and to retain and use any such invention, article, material, or appliance as may by this Contract be required to be supplied, the Contractor shall pay such royalties and secure such valid licenses as may be requisite and necessary for the Owner and officers, agents, and employees, or any of them to use such invention, article, material, or appliance without being disturbed or in any way interfered with by a proceeding in law or equity on account thereof.

Should the Contractor neglect or refuse to make any approved substitution promptly or to pay such royalties and secure such licenses as may be necessary, then, in that event, the Engineer shall have the right to make such substitution or the Owner may pay such royalties and secure such licenses and charge the cost thereof against any money due the Contractor from the Owner, or recover the amount thereof from him and his Sureties notwithstanding that final payment under this Contract may have been made.

5.6.3 Except as otherwise provided in these Contract Documents, Contractor shall pay all such royalties or other monies required to be paid as aforesaid.

5.7 Laws to be Observed

The Contractor shall keep himself fully informed of all existing and future federal, state, county, and municipal laws, ordinances, and regulations which in any manner affect those engaged or employed in the work or the materials used in the work or the conduct of the work or the rights, duties, powers, or obligations of the Owner or of the Contractor or which otherwise affect the Contract, and of all orders and decrees of bodies or tribunals having any jurisdiction or authority over the same. He shall at all times observe and comply with and shall cause all his agents, subcontractors, and employees to observe and comply with all such laws, ordinances, regulations, orders and decrees and shall protect and indemnify the Owner and all of its officers, agents, and employees, and the Engineer against any claim, loss, or liability arising or resulting from or based upon the violation of any such law, ordinance, regulation, order or decree, whether by himself or by his agents, subcontractors, or employees.

5.8 Provisions of Law

It is specifically provided that this Contract is subject to all the provisions of law regulating and controlling the performance of work for the Owner, and that the rules of law shall prevail over any provision contained in any of the Contract Documents which may be in conflict thereto or inconsistent therewith. Each and every provision of law and clause required by law to be inserted in these Contract Documents shall be deemed to be inserted herein and the Contract Documents 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 application of either party, the Contract Documents shall forthwith be physically amended to make such insertion or correction.

5.9 Deliveries to Contractor

Delivery by Owner or any of its agents or representatives to Contractor of any drawings, samples, notices, letters, communications, or other things may be made by personal delivery to Contractor; by personal delivery to Contractor's foreman or superintendent at the site of the work; by delivery to the Contractor's business address specified in the bid or specified in a written notice of changed address delivered to Owner; or by delivery to the Contractor's office at the site of the work. Delivery to the Contractor's above-mentioned business address or to Contractor's office at the site of the work may be made either by personal delivery to such address or office or by depositing the thing to be delivered in the United States mail, postage prepaid, addressed to such address or office.

5.10 Assignment of Contract

This Contract may not be assigned in whole or in part except upon the written consent of the Owner. Any assignment agreement shall be subject to review and approval by the Owner.

5.11 Protection of Persons and Property

5.11.1 The Contractor will be solely and completely responsible for conditions of the job site, including safety of all persons and property during performance of the work. This requirement will apply continuously and not be limited to normal working hours. The Contractor shall furnish such watchmen, guards, fences, warning signs, lights, and walkways and shall take all other precautions as shall be necessary to prevent damage to persons or property. All structures and improvements in the vicinity of the work shall be protected by the Contractor, his employees, subcontractors, or agents and it shall be restored to a condition as good as when he entered upon the work.

5.11.2 The duty of the Engineer to conduct construction inspection of the Contractor's performance does not include any review of the adequacy of the Contractor's safety measures in, on, or near the construction site or sites. The Engineer has not been retained or compensated to provide design and construction review services relating to the Contractor's safety precautions or to means, methods, techniques, sequences, or procedures required for the Contractor to perform his work.

5.12 Liability of Owner's Representatives and Officials

No official or employee of the Owner, nor the Engineer, nor any authorized assistant or agent of any of them shall be personally responsible for any liability arising under this Contract. The Engineer shall not be responsible for construction means, methods, techniques, sequences and procedures, time of performance, or for safety precautions and programs in connection with the construction work. The Engineer shall not be responsible for the Contractor's failure to carry out the work in accordance with the construction Contract. The Engineer shall not be responsible for acts or omissions of the Contractor, any Subcontractors, or any of their agents or employees, or any other persons performing any of the work.

6. PROGRESS AND COMPLETION OF WORK

6.1 Notice of Starting Work

The Contractor shall notify the Owner in writing 48 hours before starting work at the site of the work of his intentions to do so. In case of a temporary suspension of work, he shall give reasonable notice before resuming work.

6.2 Time of Completion

The Contractor shall promptly begin the work and prosecute the same until the work under this Contract shall be completed and ready for full use within the time specified in the Agreement.

6.3 Equipment and Methods

The work under this Contract shall be prosecuted with all materials, tools, machinery, apparatus, and labor, and by such methods as are necessary to complete the execution of everything described, shown, or reasonably implied in the Contract Documents. If at any time before the beginning or during the progress of the work, any part of the Contractor's plant or equipment or any of his methods of execution of the work appear to the Engineer to be inefficient or inadequate to ensure the required quality or rate of progress of the work, he may request and the Owner may order the Contractor to increase or improve his facilities or methods and the Contractor shall comply promptly with such orders, but neither compliance with such orders nor failure of the Owner to issue such orders shall relieve the Contractor from his obligation to secure the quality of the work and the rate of progress required. The Contractor alone shall be responsible for the safety, adequacy, and efficiency of his equipment and methods.

6.4 Unfavorable Weather and Other Conditions

During unfavorable weather and other unfavorable conditions, the Contractor shall pursue only such portions of the work as shall not be damaged thereby. No portions of the work whose satisfactory quality or efficiency will be affected by an unfavorable condition shall be constructed while these unfavorable conditions exist unless, by special means or precautions, the Contractor shall be able to overcome them.

6.5 Alterations, Deletions, and Extra Work

6.5.1 The Owner reserves the right to increase or decrease the quantity of any item or portion of the work, or to omit portions of the work, as may be deemed necessary or advisable by the Owner and, also, to make such alterations or deviations, additions to, or deletions from the work or the Contract Drawings and Specifications as may be determined during the progress of the work to be necessary and advisable for the proper completion thereof. Upon written order of the Owner, the Contractor shall proceed with the work as increased, decreased, or altered. Such work shall be considered a part of and subject to all terms and requirements of the Contract Documents.

6.5.2 The Engineer is authorized to order on behalf of the Owner minor changes in the work which do not involve extra cost to Owner and which do not change the character of the work. He is not authorized to order any other changes, alterations, deletions, additions, or extra work unless they are approved in a Contract Supplement properly authorized in writing by the Owner.

6.5.3 No claim of the Contractor for extra compensation because of any change, alteration, deletion, addition, or extra work will be paid or be payable unless a written order for such change, alteration, deletion, addition, or extra work is signed by the authorized representative of the Owner. All adjustments, if any, in the Contract Price to be paid to Contractor because of any such change, alteration, deletion, addition, or extra work shall be made only to the extent and in the manner provided under the paragraph, "Payment For Extra Work and Work Deleted" in these General Conditions. Such alterations shall in no way affect, vitiate, or make void this Contract or any part thereof, except that which is necessarily affected by such alterations and is clearly the evident intention of the parties to this Contract.

6.5.4 In case of neglect or refusal by the Contractor to perform any extra work which may be authorized by the Owner or to make satisfactory progress in its execution, the Owner may employ any person or persons to perform such work and the Contractor shall not in any way interfere with or molest the person or persons so employed.

6.5.5 When any changes decrease the amount of work to be done, such changes shall not constitute a basis or reason for any claim by Contractor for extra compensation or damages on account of any anticipated profits which he thereby loses on the omitted work, and Contractor shall not be entitled to any compensation or damages therefore.

6.6 Delays

6.6.1 Avoidable Delays

6.6.1.1 Avoidable delays in the prosecution or completion of the work shall include all delays which might have been avoided by the exercise of care, prudence, foresight, or diligence on the part of the Contractor.

6.6.1.2 Delays in the prosecution of parts of the work which may, in themselves, be unavoidable but do not necessarily prevent or delay the prosecution of other parts of the work nor the completion of the whole work within the time herein specified; reasonable loss of time resulting from the necessity of submitting drawings to the Engineer for approval and from the making of surveys, measurements, and inspections; and such interruptions as may occur in the prosecution of the work on account of the reasonable interference of other contractors employed by the Owner, which do not necessarily prevent the completion of the whole work within the time herein specified, will be deemed avoidable delays within the meaning of this Contract.

6.6.2 Unavoidable Delays

Unavoidable delays in the prosecution or completion of the work under this Contract shall include all delays which may result through causes beyond the control of the Contractor and which he could not have provided against by the exercise of care, prudence, foresight, or diligence. Orders issued by the Owner changing the amount of work to be done, the quantity of material to be furnished, or the manner in which the work is to be prosecuted; failure of the Owner to provide rights-of-way; and unforeseen delays in the completion of the work of other contractors under Contract with the Owner will be considered unavoidable delays, so far as they necessarily interfere with the Contractor's completion of the whole of the work.

6.6.3 Notice of Delays

6.6.3.1 Whenever the Contractor foresees any delay in the prosecution of the work and, in any event, immediately upon the occurrence of any delay, he shall notify the Engineer in writing of the probability of the occurrence of such delay and its cause in order that the Engineer may determine whether the delay is to be considered avoidable or unavoidable, how long it continues, and to what extent the prosecution and completion of the work are to be delayed thereby.

6.6.3.2 After the completion of any part or the whole of the work, the Engineer, in approving the amount due the Contractor, will assume that any and all delays which have occurred in its prosecution and completion have been avoidable delays, except such delays as shall have been called to the attention of the Engineer at the time of their occurrence and later found by him to have been unavoidable. The Contractor will make no claims that any delay not called to the attention of the Engineer at the time of its occurrence has been an unavoidable delay.

6.7 Extension of Time

6.7.1 For Unavoidable Delays

For delays which are unavoidable, as determined by the Owner, the Contractor will be allowed, if he applies for the same, an extension of time beyond the time specified for completion, proportionate to such unavoidable delay or delays within which to complete the Contract, and Contractor will not be charged, because of any extension of time for such unavoidable delay, any engineering and inspection costs as are charged in the case of extensions of time for avoidable delays.

6.7.2 For Avoidable Delay

6.7.2.1 If the work called for under this Contract is not finished and completed by the Contractor, in all parts and in accordance with all requirements, within the time specified for completion elsewhere in these Contract Documents, including extensions of time granted because of unavoidable delay; or, if at any time prior to the expiration of said time, it should appear to Owner that Contractor will be unable to finish and complete said work as aforesaid within said time; and, if Contractor's failure or inability to finish and complete said work as aforesaid within said time should be due, as determined by Owner, to avoidable delay or delays, then, in that event, the Owner, if it finds such to be for the best interests of the Owner may, but will not be required to, grant to Contractor an extension or extensions of time within which to finish and complete all said work.

6.7.2.2 *In addition, if the time limit be so extended, the Owner shall charge to Contractor, and* may deduct from the final payment for the work, all engineering and inspection expenses incurred by Owner in connection with the work during the period of such extension or extensions, except that the cost of final surveys and preparation of final estimates will not be included in such charges. Such expenses of Owner shall be computed on the basis of the hourly schedule of charges set forth in these General Conditions of the Contract.

6.7.3 Effect of Extension of Time

The granting of any extension of time on account of delays, which in the judgment of the Owner are avoidable delays, shall in no way operate as a waiver on the part of the Owner of its rights under this Contract.

6.8 Proof of Compliance with Contract

In order that the Engineer may determine whether the Contractor has complied with those requirements of this Contract with which compliance is not readily ascertainable through inspection and tests of the work and materials, the Contractor shall, at any time requested, submit to the Engineer properly authenticated documents or other satisfactory evidence as proof of his compliance with such requirements.

7. PAYMENTS TO CONTRACTOR

7.1 Progress Estimates and Payments

7.1.1 The Contractor shall on the 25th day of each calendar month, together with a representative of the Engineer, make an estimate of the value of the work performed in accordance with this Contract since the last preceding estimate was made. The *Contractor shall then prepare and submit the estimate to the Engineer on the periodical* estimate for partial payment forms. Payment forms will be supplied by the Owner. The number of copies to be submitted will be determined by the Engineer after construction has started.

7.1.2 Upon presentation of certified copies of purchase bills and freight bills, the Owner will permit inclusion in such monthly estimates payment for materials that will eventually be incorporated in the project, providing that such material is suitably stored on the site at the time of submission of the estimate for payment. At the time the next following monthly estimate is submitted, certified copies of receipted purchase and freight bills for the stored materials included in the monthly payment estimate submitted two months previously shall be submitted. If the Contractor fails to submit proof of payment with the monthly payment estimate, those items of stored materials for which no proof of payment has been submitted will be deleted from the current payment estimate. Such materials when so paid for by the Owner will become the property of the Owner and, in case of default on the part of the Contractor, the Owner may use or cause to be used by others these materials in construction of the project. However, the Contractor shall be responsible for safeguarding such materials against loss or damage of any nature whatsoever and, in case of any loss or damage, the Contractor shall replace such lost or damaged materials at no cost to the Owner.

7.1.3 Except as otherwise provided in the immediately preceding paragraph, the first estimate shall be of the value of the work done and of materials proposed and suitable for permanent incorporation in the work, delivered, and suitably and safely stored at the site of the work since the Contractor shall have begun the performance of this Contract; and every subsequent estimate, except the final estimate, shall be of the value of the work done and materials delivered and suitably stored at the site of the work since the last preceding estimate was made.

7.1.4 No estimate shall be required to be made when, in the judgment of the Engineer, the total value of the work done and materials incorporated into the work under this Contract since the last preceding estimate amount to less than $5,000.

7.1.5 The estimates shall be signed by the Engineer and approved by the Owner and, after such approval, the Owner, subject to the foregoing provisions, will pay or cause to be paid an amount equal to the estimated value of the work performed less a retained amount in accordance with the following schedule.

7.1.5.1 Ten percent until construction is substantially complete.

7.1.5.2 When the project is substantially complete (operational or beneficial use as determined by the Engineer), the retained amount will be only that necessary to assure completion of the Contract Work.

7.2 Unit Price Items

7.2.1 Unit price items listed in the Bid Form and in the Agreement Form may be of two types, "Unit price construction items," and "Unit price work items ordered by the Engineer during construction." For all unit price items, quantities as set forth are the best estimates which can be made during design since actual quantities cannot be determined until construction is underway. If any of said quantities is exceeded by not more than 15 percent of the quantity listed, no Contract Supplement for the additional work will be required. If any one of said quantities exceeds the quantity listed by more than 15 percent a Contract Supplement for any work greater than 115 percent will be required before payment for such additional work will be made. Unit prices for quantities in excess of 115 percent are subject to renegotiation of the Contract unit price.

7.2.2 If any work under a unit price item is not performed or if only a small percentage of the quantity listed is used, the Contractor shall not make any claims for not using said item or for higher unit prices because of the small percentage of quantity used.

7.2.3 The Contractor shall study carefully the Specifications to determine the extent and scope of the work included under lump sum items in the Contract. It may be that work under some unit price items is in addition to similar work to be performed under lump sum items and paid for thereunder.

7.2.4 Unit Price Construction Items

Unit price construction items will be used to pay for work not included under a lump sum item but required by the Contract.

7.2.5 Unit Price Work Items Ordered by the Engineer During Construction

These unit price items will be used to pay for designated work not shown on the Contract Drawings when ordered by the Engineer in writing during construction.

7.3 Payment for Extra Work and Work Deleted

7.3.1 Whenever corrections, additions or modifications in the work under this Contract change the amount of work to be done or the amount of compensation due the Contractor except as provided for unit price items, the Owner will prepare a Contract Supplement setting forth the extra work to be performed or work to be omitted. Such a Contract Supplement will also set forth the method of computing the added or reduced compensation to be due the Contractor. The method of computing the added or reduced compensation will be determined under one or more of the following methods as selected by the Owner.

7.3.1.1 By unit prices contained in the Contractor's original bid and incorporated in this construction Contract.

7.3.1.2 By negotiated unit prices for items not included in the Contractor's original bid.

7.3.1.3 By an acceptable lump sum price proposal by the Contractor.

7.3.1.4 By force-account.

7.4 Force-Account Payment

7.4.1 When work is to be paid for on a force-account basis the Contractor will be paid the actual cost of labor, direct overhead, materials, supplies, equipment, and other services necessary to complete the work plus an amount to be agreed upon to cover the cost of general overhead and profit to be negotiated.

7.4.2 It is understood that labor, materials, and equipment may be furnished by the Contractor or by a Subcontractor or by others on behalf of the Contractor. When the work is performed by forces other than the Contractor's organization, the Contractor shall reach agreement with such other forces as to the distribution of the payment made by the Owner for such work and no additional payment therefore will be made by the Owner.

7.4.3 The costs for labor, materials, and equipment will be determined as provided in the following paragraphs.

7.4.4 Labor

7.4.4.1 The actual wages in performing the work, whether the employer is the Contractor, Subcontractor, or other forces, will be the amount paid to workmen including foremen and superintendents devoting their exclusive attention to the work in question. The actual wages shall include payments to, or on behalf of, workmen for health and welfare, pension, vacation, and similar purposes.

7.4.4.2 To the actual wages will be added a percent, as controlled by local conditions, but not to exceed 30 percent, which percentage shall constitute full compensation for all payments imposed by state and federal laws, for Workmen's Compensation, for public liability and property damage insurance, and for all other payments made to, or on behalf of, the workmen other than actual wages.

7.4.5 Materials

7.4.5.1 Only materials incorporated in the work will be paid for, the cost of which will be the cost to the purchaser, whether Contractor, Subcontractor, or other forces, from the supplier thereof. If the Contractor does not furnish satisfactory evidence of the cost of such materials from the supplier thereof or if the cost of such materials is excessive in the opinion of the Engineer, then the cost of such materials shall be deemed to be the lowest current wholesale price at which such materials are available in the quantities concerned delivered to the job site, less any discounts.

7.4.5.2 The Owner reserves the right to furnish such materials as it deems advisable, and the Contractor shall have no claims for costs and profit on such materials.

7.4.6 Equipment

7.4.6.1 The Contractor will be paid for the use of equipment at the rental rates established as provided in the following paragraphs, which rates shall include the cost of fuel, depreciation, storage, insurance, and all incidentals. Operators of rented equipment will be paid for as provided under "Labor."

7.4.6.2 Unless otherwise specified, manufacturer's rating shall be used to classify equipment for the determination of applicable rental rates.

7.4.6.3 For the use of any equipment normally required for the Contract regardless of whether the equipment is already on the work or is to be delivered to the work and regardless of ownership and any rental or other agreement entered into by the Contractor for the use of such equipment, the Contractor will be paid as provided herein at the current local rental rates used by established distributors or equipment rental agencies.

7.4.6.4 Individual pieces of equipment not listed and having a replacement value of 50 dollars or less shall be considered to be tools or small equipment and no payment will be made for their use on the work.

7.4.6.5 In computing the hourly rental of equipment, less than 30 minutes shall be considered 1/2 hour except that the minimum rental time to be paid per day shall be one hour. Rental time will not be allowed while equipment is inoperative due to breakdowns or non-working days.

7.4.6.6 The rental time of equipment to be paid for shall be the time the equipment is in operation on the force-account work being performed and, in addition, shall include the time required to move the equipment to the site of such force-account work and return it to its original location or to another location requiring no more time than that required to return it to its original location, except that moving time will not be paid for if the equipment is used at the site of the force-account work on other than the force-account work. Loading and transporting costs will be allowed when the equipment is moved by means other than its own power, except that no payment will be made if the equipment is used at the site of the force-account work on other than the force-account work. For the use of equipment not required under the Contract and moved in on the work and used exclusively for force-account work, the Contractor will be paid as provided above, except that the rental period shall begin at the time the equipment is unloaded at the site of the force-account work and shall terminate at the end of the day on which the order to discontinue the force-account work is given to the Contractor by the Engineer. The minimum total rental time to be paid for shall be eight hours.

7.4.7 Reporting and Invoicing

All force-account work shall be reported daily and signed by the Contractor and the Engineer, which daily reports shall thereafter be considered the true record of force-account work done. Completely detailed invoices covering the force-account work shall be submitted for payment not later than 15 days after the completion of the work. The charges for work performed by the Contractor, by a Subcontractor, and by an employee of a Subcontractor shall be reported separately. Substantiating invoices from suppliers, vendors and Subcontractors shall be included with the Contractor's invoices. The Contractor shall permit examination of accounts, bills, and vouchers relating to the force-account work when requested by the Engineer.

7.5 Owner's Right to Withhold Certain Amounts

7.5.1 The Owner may withhold from payments to the Contractor, in addition to the retained percentage, such an amount or amounts as may be necessary to cover:

7.5.1.1 Payments that may be earned or due for just claims for labor or materials furnished in and about the work.

7.5.1.2 Defective work not remedied.

7.5.1.3 Failure of the Contractor to make proper payments to a Subcontractor.

7.5.1.4 Reasonable doubt that this Contract can be completed for the balance then unpaid.

7.5.1.5 Damage to another Contractor, where there is evidence thereof.

7.5.1.6 Excess cost of field engineering, inspection, and other expenses.

7.5.2 The Owner will disburse and shall have the right to act as agent for the Contractor in disbursing such funds as have been withheld pursuant to this paragraph to the party or parties who are entitled to payment therefrom. The Owner will render to the Contractor a proper accounting of all such funds disbursed in behalf of the Contractor.

7.5.3 The Owner also reserves the right, even after full completion and acceptance of the work, to refuse payment of the final amount due the Contractor until it is satisfied that all Subcontractors, material suppliers, and employees of the Contractor have been paid in full.

7.6 Payment for Uncorrected Work

If any portion of the work done or material furnished under this Contract proves defective and not in accordance with the Contract Documents; and if the imperfection in the same is not of sufficient magnitude or importance to make the work dangerous or wholly undesirable; or if the removal of such work is impracticable or will create conditions which are dangerous or undesirable, the Engineer shall have the right and authority to retain such work instead of requiring the imperfect work to be removed and reconstructed, but he shall recommend to the Owner such deductions therefore in the payments due or to become due the Contractor as may be just and reasonable, and Owner may make such deductions as are just and reasonable.

7.7 Payment for Work by the Owner Following Termination of the Contract

Upon termination of the Contract by the Owner in accordance with "Right of Owner to Terminate Agreement," no further payments shall be due the Contractor until the work is completed. If the unpaid balance of the Contract Amount shall exceed the cost of completing the work, including all overhead costs, the excess shall be paid to the Contractor. If the cost of completing the work shall exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The cost incurred by the Owner, as herein provided, and the damage incurred through the Contractor's default shall be certified by the Owner.

7.8 Acceptance

Any part of the work may be accepted in writing by the Owner when it shall have been completed in accordance with the terms of the Contract Documents as determined by the Owner and its official representatives. When the work is substantially completed, the Contractor shall notify the Owner, in writing, that the work will be ready for final inspection and test on a definite date which shall be stated in such notice. The notice shall be given at least 10 days in advance of said date and shall be forwarded through the Engineer. The Owner shall cause an inspection to be made in order to determine whether the work has been completed in accordance with the terms of the Contract Documents.

7.9 Final Estimate and Payment

7.9.1 The Contractor shall, as soon as practicable after the final acceptance of the work by the *Owner under this Contract, make a final estimate of the amount of work done thereunder* and the value thereof. Such final estimate shall be checked, approved, and signed by the Engineer and by the official representative of the Owner after approval of the governing body of the Owner. After such approval, the Owner shall pay or cause to be paid to the Contractor, in the manner provided by law, the entire sum so found to be due hereunder after deducting therefrom all previous payments and such other amounts as the terms of this Contract prescribe.

7.9.2 Neither the final payment nor any part of the retained percentage shall become due until the Contractor shall deliver to the Owner a complete release of all claims or liens arising out of this Contract or receipts in full in lieu thereof and, if required in either case, an affidavit that so far as he has knowledge or information the release and receipts include all the labor and materials for which a lien or claim could be filed, but the Contractor may, if a Subcontractor refuses to furnish a release or receipt in full, furnish a bond satisfactory to the Owner to indemnify the Owner against any claim or lien (in cases where such payment is already guaranteed by surety bond). If any claim or lien remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all monies that the latter may be compelled to pay in discharging such a lien, including all costs and a reasonable attorney's fee.

AGREEMENT WITH THE
GREEN RIVER VALLEY WATER DISTRICT
CAVE CITY, KENTUCKY

EPA FUNDED CLEARWELL ADDITION
FUND ACTIVITY ID: FGL 2003 0028

THIS AGREEMENT made this _____ day of _____, 200___, by and between the Green River Valley Water District, hereinafter called the "Owner," and _____, hereinafter called the "Contractor."

WITNESSETH:

WHEREAS, Owner has heretofore solicited bids for all the work and improvements and for the doing of all things included within the hereinafter specified improvements; and

WHEREAS, Owner did on the _____ day of _____, 200___ find that Contractor was the lowest responsible bidder for the hereinafter specified construction work and did award Contractor a contract for said construction work;

NOW, THEREFORE, for and in consideration of their mutual promises, covenants, undertakings and agreements, the parties hereto do hereby agree as follows:

ARTICLE I - WORK TO BE DONE BY CONTRACTOR

Contractor agrees, at his own cost and expense, to do all the work and furnish all the labor, materials, equipment and other property necessary to do, construct, install, and complete all the work and improvements required for the EPA Funded Clearwell Addition, all in full accordance with and in compliance with and as required by the hereinafter specified Contract Documents, including any and all Addenda for said work, and to do, at his own cost and expense, all other things required of the Contractor by said Contract Documents of said work.

ARTICLE II - CONTRACT DOCUMENTS

The Contract Documents herein named include all of the following component parts, all of which are as fully a part of this contract as if herein set out verbatim or, if not attached, as if hereto attached:

1. Invitation to Bid
2. Instructions to Bidders
3. Proposal
4. Special Conditions of Contract
5. General Conditions of Contract
6. Agreement
7. Contract Specifications
8. Contract Drawings
9. All Bonds, Insurance Certificates and Insurance Policies mentioned or referred to in the foregoing documents
10. Any and all other documents or papers included or referred to in the foregoing documents
11. Any and all Addenda to the foregoing

ARTICLE III - CONTRACT AMOUNT

The Contractor agrees to receive and accept the unit prices stated in the Contractor's Proposal included in the Contract Documents and made a part of this Agreement as full compensation for furnishing all materials and equipment and for doing all the work contemplated and embraced in this Contract; also for all loss or damage arising out of the nature of the work aforesaid or from the action of the elements or from any unforeseen difficulties or obstructions which may arise or be encountered in the prosecution of the work until its acceptance by the Owner, and for all risks of every description connected with the work; also for well and faithfully completing the work, and the whole thereof, in the manner and according to and in compliance with the Contract Documents and the requirements of the Engineer under them; also for any and all other things required by the Contract Documents.

The quantities and totals on unit price items and the Total Contract Amount are approximate only, being inserted for the purpose of establishing the face amount of bonds to be provided by the Contractor. Payment of work covered by the unit price items will be made only on the basis of actual quantities of work complete in place as authorized and as measured as provided in the Contract Documents.

A. LUMP SUM BID

1	Lump Sum	$_____

B. UNIT PRICE CONSTRUCTION ITEMS

Item No.	Description	Estimated Quantity	Unit	Price Per Unit	Total
2	3 ½-Inch C.W. Binder Course	225	SY	$_____	$_____
3	6-Inch Compacted Stone Base	600	SY	$_____	$_____

C. UNIT PRICE ITEMS ORDERED BY THE ENGINEER

Item No.	Description	Estimated Quantity	Unit	Price Per Unit	Total
4	Unclassified Excavation	500	CY	$_____	$_____
5	Granular Refill	500	CY	$_____	$_____
6	Class C Concrete	500	CY	$_____	$_____
7	Ductile Iron Pipe Fittings	7,500	LB	$_____	$_____

D. TOTAL LUMP SUM BID $_____

ARTICLE IV - MAJOR EQUIPMENT SELECTION

It is hereby expressly agreed that the Major Equipment Items which Contractor shall and hereby agrees to furnish and install as part of the work and improvements included within Contract, in full compliance with the Contract Specifications and other Contract Documents for said Section, for the Contract prices herein about specified in Article III, and without any other compensation therefore, are the following items of Major Equipment which are manufactured or supplied by the following listed manufacturers or suppliers, to wit:

Section No.	Item No.	Description	Manufacturer or Supplier
16A	1	MCC's	
17C	1	Butterfly Valves	
17C	2	Control Valves	
22A	1	Vertical Turbine Pumps	

ARTICLE V - CONFLICT BETWEEN COMPONENT PARTS OF CONTRACT

In the event that any provision in any of the following component parts of this Contract conflicts with any provision in any other of the following component parts, the provision in the component part first enumerated below will govern over any other component part which follows it numerically, except as may be otherwise specifically stated. Said component parts are the following:

1. Addendum Nos. _____, _____, _____, and _____.
2. Special Conditions of Contract
3. General Conditions
4. Contract Specifications
5. Contract Drawings
6. Instructions to Bidders
7. Invitation to Bid
8. Contractor's Proposals
9. This Instrument

This Contract is intended to conform in all respects to applicable statutes of the state in which the work is to be constructed and, if any part or provision of this Contract conflicts therewith, the said statute shall govern.

ARTICLE VI - STARTING AND COMPLETION

The Contractor shall, and agrees to, commence work at the site within 15 calendar days after the issuance by the Owner of a written notice to proceed, and to fully complete all work to the point of final acceptance by the Owner, and to complete doing all other things required of him by the Contract Documents on or before and not later than 300 calendar days there from. Contractor shall, and agrees to, furnish and deliver to Owner within fifteen (15) days after date of award of this Contract, the Performance Bond, Payment Bond, and the insurance certificates and policies of insurance required of him by the provisions of the Conditions of the Contract, and to do, prior to starting work, all other things which are required of him by the Contract Documents as a prerequisite of starting work.

NOTE: The Contractor's attention is directed to the provisions from liquidated damages as provided in the Special Conditions, in addition to the Excess Cost of Engineering as set forth in Paragraph 7.6 of the General Conditions.

The contractor hereby agrees to commence work on this Project on or before a date to be specified in a written "Notice To Proceed" issued by the Owner and to fully complete the project within 300 consecutive calendars as stipulated in the Special conditions. Bidder further agrees to pay as liquidated damages the sum of $250 per day for each consecutive calendar day thereafter as provided in the Special Conditions.

ARTICLE VII - PAYMENTS TO CONTRACTOR

The Owner agrees with said Contractor to employ, and does hereby employ, the said Contractor to provide the materials and do all the work and do all other things hereinabove mentioned according to the terms and conditions hereinabove contained or referred to for the prices aforesaid, and hereby contracts to pay the same at the time, in the manner and upon the conditions set forth or referred to in the Contract Documents; and the said parties for themselves, their heirs, executors, administrators, successors and assigns, do hereby agree to the full performance of the covenants herein contained.

IN WITNESS WHEREOF, the parties hereto have caused this instrument to be executed in four original counterparts the day and year first above written.

OWNER	CONTRACTOR
_____	_____
_____	_____
Address	Address
_____	_____
_____	_____
_____	_____
Secretary or Other Responsible Officer	Secretary or Other Responsible Officer
_____	_____
Witness	Witness
_____	_____
(SEAL)	(SEAL)

Approved as to Form and Legality

By: _____
Attorney for the Owner

IMPORTANT

NOTE: If the Contractor is a corporation, the legal name of the corporation shall be set forth

above together with a signature of the officer or officers authorized to sign Contracts on behalf of the corporation; if Contractor is a partnership, the true name of the firm shall be set forth above together with the signatures of all the partners; and if Contractor is an individual, his signature shall be placed above. If signature is by an agent other than an officer of a corporation or a member of a partnership, a power-of-attorney must be attached hereto. Signature of Contractor shall also be acknowledged before a Notary Public or other person authorized by law to execute such acknowledgment.

PERFORMANCE BOND

KNOW ALL PERSONS BY THESE PRESENTS: that

_____
(Name of Contractor)

_____
(Address of Contractor)

a _____, hereinafter called
(corporation, partnership or individual)

Principal, and _____
(Name of Surety)

_____
(Address of Surety)

hereinafter called Surety, are held and firmly bound unto the Green River Valley Water District, 85 E. Les Turner Road, Cave City, Kentucky 42127, hereinafter called Owner, in the total aggregate penal sum of _____ Dollars ($_____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas the Principal entered into a certain Contract with the Owner dated the _____ day of _____, 200__, a copy of which is hereto attached and made a part hereof for the construction of the EPA Funded Clearwell Addition.

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

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

PROVIDED, FURTHER, that it is expressly agreed that the bond shall be deemed amended automatically and immediately, without formal and separate amendments thereto, upon amendment to the Contract not increasing the Contract price more than 20 percent, so as to bind the Principal and the Surety to the full and faithful performance of the Contract as so amended. The term "amendment", wherever used in this bond, and whether referring to this bond, the Contract or the Loan Documents shall include alteration, addition, extension, or modification of any character whatsoever.

PROVIDED, FURTHER, that no final settlement between the Owner and the Principal shall abridge the right of the other beneficiary hereunder, whose claim may be unsatisfied. The Owner is the only beneficiary hereunder.

IN WITNESS WHEREOF, this instrument is executed in _____ counterparts, each one of which shall be deemed an original, this the _____ day _____, 200__.

ATTEST:

_____
Principal Secretary

(SEAL)

_____
Principal

BY

_____

_____
(Address)

_____
Witness as to Principal

_____
(Address)

_____
Surety

ATTEST:

_____
Witness to Surety

BY _____
Attorney-in-Fact

_____
Address

_____
Address

NOTE: Date of Bond must not be prior to date of Contract.

If Contractor is partnership, all partners should execute Bond.

Approved as to Form and Legality

By _____
Attorney for the Owner

PAYMENT BOND

KNOW ALL PERSONS BY THESE PRESENTS: that

_____
(Name of Contractor)

_____
(Address of Contractor)

a _____, hereinafter called
(corporation, partnership or individual)

Principal, and _____
(Name of Surety)

_____
(Address of Surety)

hereinafter called Surety, are held and firmly bound unto the Green River Valley Water District, 85 E. Les Turner Road, Cave City, Kentucky 42127, hereinafter called Owner, for labor and/or materials furnished by any and all persons, firms, partnerships, associations, or corporations interested in the total aggregate penal sum of _____ Dollars ($_____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas the Principal entered into a certain Contract with the Owner dated the _____ day of _____, 200__, a copy of which is hereto attached and made a part hereof for the construction of the EPA Funded Clearwell Addition.

NOW, THEREFORE, if the Principal shall promptly make payment to all person, firms, and corporations furnishing materials for or performing labor in the prosecution of the work provided for in such Contract, and any authorized extensions or modifications thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such work, and for all labor cost incurred in such work including that by a subcontractor, and to any mechanic or materialman lienholder whether it acquires its lien by operation of State of Federal law; then this obligation shall be void, otherwise to remain in full force and effect.

PROVIDED, that beneficiaries or claimants hereunder shall be limited to the subcontractors, and persons, firms and corporations having a direct Contract with the Principal or its subcontracts.

PROVIDED, FURTHER, that no suit or action shall be commenced hereunder by any claimant: (a) unless claimant, other than one having a direct Contract with the Principal, shall have given written notice to any two of the following: The Principal, the Owner or the Surety above named within ninety (90) days after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the Principal, Owner or Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer. (b) After the expiration of one (1) year following the date of the Principal ceased work on said Contract, it being understood, however, that if any limitation embodied in the Bond is prohibited by any law controlling the construction hereof, such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

PROVIDED, FURTHER, that it is expressly agreed that the bond shall be deemed amended automatically and immediately, without formal and separate amendments thereto, upon amendment to the Contract not increasing the Contract price more than 20 percent, so as to bind the Principal and the Surety to the full and faithful performance of the Contract as so amended. The term "amendment", wherever used in this bond, and whether referring to this bond, the Contract, or the Loan Documents shall included alteration, addition, extension, or modification of any character whatsoever.

IN WITNESS WHEREOF, this instrument is executed in _____ counterparts, each one of which shall be deemed an original, this the _____ day _____, 200__.

ATTEST:

_____
Principal Secretary

(SEAL)

_____
Principal

BY _____

_____

_____
(Address)

_____
Witness as to Principal

_____
(Address)

_____

_____
Surety

ATTEST:

_____
Witness to Surety

BY _____
Attorney-in-Fact

_____
Address

_____
Address

_____

_____

NOTE: Date of Bond must not be prior to date of Contract.

If Contractor is partnership, all partners should execute Bond.

Approved as to Form and Legality

By _____
Attorney for the Owner

AFFIDAVIT

(To be attached to all Contracts)

STATE OF _____)
)ss
COUNTY OF _____)

_____

being first duly sworn on oath deposes and says that he is

_____
(attorney) (in fact or agent)

of _____
(bonding company)

surety on the attached contract for the EPA Funded Clearwell Addition executed by

_____
(Contractor)

Affiant further deposes and says that no officer, official or employee of the Owner has any interest directly or indirectly, or is receiving any premium, commission fee or other thing of value on account of the same or furnishing of the bond, undertaking or contract of indemnity, guaranty, or suretyship in connection with the above-mentioned Contract.

Signed _____

Subscribed and sworn to before me

this _____ day of _____, A.D., 200_____.

_____

(Notary Public _____ County _____)

My Commission expires: _____

CERTIFICATE OF INSURANCE

ISSUE DATE (MM/DD/YY)

PRODUCER ☐	THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.
	COMPANIES AFFORDING COVERAGE
	COMPANY LETTER [A]
	COMPANY LETTER [B]
INSURED	COMPANY LETTER [C]
	COMPANY LETTER [D]
	COMPANY LETTER [E]

COVERAGES

THIS IS TO CERTIFY THAT POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED, NOTWITHSTANDING ANY REQUIREMENTS, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN. THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS, AND CONDITIONS OF SUCH POLICIES.

CO LTR	TYPE OF INSURANCE	POLICY NO.	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	ALL LIMITS IN THOUSANDS
	GENERAL LIABILITY ☐ COMMERCIAL GENERAL LIABILITY ☐ CLAIMS MADE ☐ OCCURRENCE ☐ OWNERS & CONTRACTORS PROTECTIVE				GENERAL AGGREGATE $ PRODUCTS-COMP/OPS AGGREGATE $ PERSONAL & ADVERTISING INJURY $ EACH OCCURRENCE $ FIRE: DAMAGE (ANY ONE FIRE) $ MEDICAL EXPENSE (ANY ONE PERSON) $
	AUTOMOBILE LIABILITY ☐ ANY AUTO ☐ ALL OWNED AUTOS ☐ SCHEDULED AUTOS ☐ HIRED AUTOS ☐ NON - OWNED AUTOS ☐ GARAGE LIABILITY				CSL $ BODILY INJURY PER PERSON $ PROPERTY DAMAGE $
	EXCESS LIABILITY ☐ UMBRELLA FORM ☐ OTHER THAN UMBRELLA FORM				EACH OCCURRENCE $ / AGGREGATE $
	WORKERS' COMPENSATION AND EMPLOYER'S LIABILITY				STATUTORY $ EACH ACCIDENT $ DISEASE-POLICY LIMIT $ DISEASE-EACH EMPLOYEE
	OTHER				

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES / RESTRICTIONS / SPECIAL ITEMS

CERTIFICATE HOLDER	**CANCELLATION**
	SHOULD ANY OF THE ABOVE DESCRIBED POLICES BE CANCELED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING COMPANY SHALL MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT.
	AUTHORIZED REPRESENTATIVE

WATER MANAGEMENT SERVICES, LLC
2 INTERNATIONAL PLAZA, SUITE 401
NASHVILLE, TENNESSEE 37217

Sheet ____ of ____

Owner: _____

Project Name: _____

Location: _____

Contractor: _____

Contract Supplement No. _____

Date: _____

I. DESCRIPTION OF CHANGES INVOLVED

A.

B.

II. ADJUSTMENTS IN AMOUNT OF CONTRACT

1. Amount of Original Contract $_____
2. Net (Addition) (Reduction) due to all previous Contract Supplements $_____
3. Amount of Contract including all previous Contract Supplements $_____
4. (Addition) (Reduction) to Contract due to this Contract Supplement $_____
5. Amount of Contract including this Contract Supplement $_____

III. CONTRACT SUPPLEMENT CONDITIONS

1. The Contract completion date established in the Original Contract or as modified by previous Contract Supplements is hereby _____.
2. Any additional work to be performed under this Contract Supplement shall be carried out in compliance with the specifications included in the preceding Description of Changes Involved, with the supplemental contract drawings, and under the provisions of the Original Contract, including compliance with applicable Equipment Specifications and Project Specifications for the same type of work.

3. This Contract Supplement, unless otherwise provided herein, does not relieve the Contractor from strict compliance with the guarantee provisions of the Original Contract, particularly those pertaining to performance and operation of equipment.

4. The Contractor expressly agrees that he will place under coverage of his Performance and Payment Bonds and Contractor's Insurance all work covered by this Contract Supplement. The Contractor will furnish to the Owner evidence of increased coverage of his Performance and Payment Bonds for the accrued value of all Contract Supplements which exceeds the Original Contract Price by twenty percent (20%).

RECOMMENDED FOR ACCEPTANCE:

_____
WATER MANAGEMENT SERVICES, LLC

ACCEPTED: CONTRACTOR:

CONTRACTOR

BY: _____

OWNER:

GREEN RIVER VALLEY WATER DISTRICT

BY: _____
Manager

Approved as to Form and Legality

By: _____
Attorney for the Owner

NOTICE OF AWARD

TO: _____

Project Description: _____
_____
_____

The Owner has considered the Bid submitted by you for the above described work in response to its Advertisement for Bids dated _____, 200__, and Instructions to Bidders.

You are hereby notified that your Bid has been accepted for items in the amount of $ _____.

You are required by the Instructions to Bidders to execute the Agreement and furnish the required Contractor's Performance Bond, Payment Bond and Certificate of Insurance within fifteen (15) days from the date of this Notice to you.

If you fail to execute said Agreement and to furnish said bonds within fifteen (15) 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. The Owner 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 _____, 200__.

_____
Owner

By: _____

Title: _____

ACCEPTANCE OF NOTICE

Receipt of the above Notice of Award is hereby acknowledged by _____

_____ this the _____ day of _____, 200__.

By: _____

Title: _____

NOTICE TO PROCEED

TO: _____

Date: _____

Project: _____

You are hereby notified to commence work in accordance with the Agreement dated _____, 200__, on or before _____, 200__, and you are to complete the work within _____ calendar days thereafter. The date of completion of all work is, therefore, _____, 200__.

_____
Owner

By: _____

Title: _____

ACCEPTANCE OF NOTICE

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

_____ this the _____ day of _____, 200__.

By: _____

Title: _____

Employer Identification Number

_____

CONTRACT SPECIFICATIONS

TABLE OF CONTENTS

FOR

DIVISION 1

GENERAL REQUIREMENTS

GENERAL REQUIREMENTS

SECTION 1A

SUMMARY OF WORK

1. WORK COVERED BY CONTRACT DOCUMENTS

The Work to be performed is as described in the Invitation to Bid.

2. CONTRACTOR'S DUTIES

2.1 Except as specifically noted, provide and pay for:

Labor, materials, and equipment;

Tools, construction equipment, and machinery;

Samples, shipping costs, and tests;

Necessary utilities, such as water supply, electrical power, telephones, roads, fences, and sanitary facilities, including maintenance thereof;

Other facilities and services necessary for proper execution and completion of the Work.

2.2 Pay legally required sales, consumer, and use taxes.

2.3 Secure and pay for legally required permits, licenses, and government fees.

2.4 Give required notices.

2.5 Employ workmen and foremen with sufficient knowledge, skill, and experience to perform the work assigned to them.

2.6 Comply with the codes, laws, ordinances, rules, regulations, orders, and other legal requirements. Any necessary changes will be adjusted as provided in the Contract for changes in the Work.

Comply with OSHA (P.L. 91-576) and the Contract Work Hours and Safety Standards Act (P.L. 91-54).

2.7 Submit written notice to Engineer of observed variance of Contract Documents from legal requirements. Any necessary changes will be adjusted as provided in the Contract for changes in the Work.

2.8 Enforce discipline and good order among Contractor and subcontractor employees. Any person employed by Contractor or subcontractors who does not perform his work in a skillful manner, is incompetent, or acts in a disorderly or intemperate manner shall, at the written request of Owner, be removed from the project immediately and shall not be employed again in any portion of the Work without the approval of Owner.

2.9 Provide at all times facilities for access and inspection of the Work by representatives of Owner and of official governmental agencies designated by Owner as having the right to inspect the work.

2.10 Cooperate with other contractors who may be performing work for Owner and with Owner's employees working in the vicinity of the Work done under this Contract.

3. CONTRACTOR'S USE OF PREMISES

3.1 Confine operations at site to areas permitted by law, ordinances, permits, and the Contract Documents.

3.2 Do not load or permit any part of a structure to be subjected to any force that will endanger its safety.

3.3 Comply with and enforce Owner's instructions regarding signs, advertisements, fires, and smoke.

3.4 Assume responsibility for protection and safekeeping of products stored on premises.

3.5 Do not discharge smoke, dust, or other contaminants into the atmosphere, or fluids or materials into any waterway as will violate regulations of any legally constituted authority.

4. EXISTING FACILITIES

4.1 The existing piping and other underground utilities are shown in approximate locations as determined from the Owner's records. Contractor shall be responsible for determining the exact location before commencing work in these areas. The Contractor shall also be fully responsible for any damage to the existing piping and underground utilities.

4.2 The existing facilities will be in continuous operation during the construction period.

4.3 Plan and conduct construction operations to avoid disturbing existing plant structures, piping, equipment, and services in any manner which will interrupt or impair operations, except as approved by Engineer.

4.4 Submit for approval a construction sequence and detailed drawings and written explanations of the temporary facilities and appurtenances intended to be used in maintaining the uninterrupted operation of the existing facilities.

5. PARTIAL OWNER OCCUPANCY

5.1 Owner, at its discretion, may place into service certain portions of the completed Work.

5.2 Provide proper access to Owner's personnel for this purpose.

5.3 Use and operation of a completed portion by Owner will constitute acceptance of that work. Notify Owner when he should cover with his own insurance the work placed in beneficial use.

5.4 Once Owner is ready to put completed work into service, a "Statement of Substantial Completion," as supplied by the Engineer, shall be completed and signed by all concerned parties.

5.5 Liability of Contractor for defects due to facility construction will extend for one year after the Work is placed in service.

GENERAL REQUIREMENTS

SECTION 1B

CUTTING AND PATCHING

1. DESCRIPTION

1.1 Do the cutting and patching required to perform the Work. Cutting and patching shall include the cutting (including excavation), fitting, or patching necessary to:

Remove and replace defective work,

Remove and replace work not conforming to the Contract Documents,

Remove samples of completed Work for specified testing,

Install specified Work in existing construction.

1.2 Cutting and patching work performed when ordered in writing by Engineer shall include cutting and patching necessary for:

Inspection of covered work,

Obtaining samples of completed work for testing,

Alteration of completed work.

1.3 Work performed by another contractor shall not be cut or altered without written consent of Engineer.

2. SUBMITTALS

2.1 Before doing any cutting, submit a written notice to Engineer requesting consent including:

Description of affected work,

Necessity for cutting,

Scope of cutting and patching,

Trades and products to be used and extent of refinishing.

2.2 Prior to doing cutting and patching identified in writing by Engineer as additional work, submit a cost estimate.

2.3 Notify Engineer when work is to be performed.

3. PAYMENT

3.1 Cutting and patching required to perform the Work will not be measured or paid for separately. The cost shall be included in the Contract Price for the items of Work that require cutting and patching.

3.2 Cutting and patching, when instructed in writing by Engineer, will be paid for by negotiated Change Order under the appropriate provisions of the Contract, except work done to correct defective or non-conforming work.

4. MATERIALS

Materials used for replacement of work removed shall comply with the Specifications for the type of work to be done.

5. EXECUTION

5.1 Provide shoring, bracing, and support as required to maintain structural integrity of the project.

5.2 Protect adjacent portions of the work and existing facilities from damage due to cutting and patching operations.

5.3 Execute excavating and backfilling as specified in Section 2B - Earthwork.

5.4 Restore work which has been cut or removed. Install new products to provide completed work meeting all requirements of the Contract Documents.

5.5 Refinish entire surfaces as necessary to provide an even and uniform finish.

GENERAL REQUIREMENTS

SECTION 1C

SUBMITTALS

1. PROGRESS SCHEDULE

1.1 Prepare a detailed Progress Schedule in graphic form showing proposed dates of starting and completing each major division of the Work.

1.2 The schedule shall be consistent with the time and order of work requirements of the Specifications and shall be the basis of Contractor's operations.

1.3 Submit 3 copies to Engineer within 14 days after Notice to Proceed.

1.4 At the end of every month, submit with Payment Request a revised schedule showing the current status of the Work as compared to the projected status. The current application for a progress payment will not be processed until the revised is delivered to Engineer.

2. BREAKDOWN OF CONTRACT AMOUNT

2.1 Submit a typewritten breakdown of contract amount on the form contained in this Document for use in computing and checking periodical payment estimates.

2.2 No payment will be made until the breakdown has been submitted and accepted by Engineer and Owner.

2.3 The breakdown shall be in detail and representative of the proposed work.

3. SHOP DRAWINGS, PROJECT DATA, AND SAMPLES

3.1 General

3.1.1 Submit to Engineer shop drawings, project data, and samples required by the Specifications.

3.2 Shop Drawings

3.2.1 Shop drawings are original drawings prepared by the Contractor, subcontractors, suppliers, or distributors which illustrate some portion of the Work and show fabrication, layout, setting, or erection details of equipment, materials, and components.

3.2.2 Contractor shall submit sufficient number of Shop Drawings to allow the Engineer to retain three (3) sets.

3.3 Project Data

3.3.1 Project data are manufacturers' standard schematic drawings, catalog sheets, brochures, diagrams, schedules, performance charts, illustrations, and other standard descriptive data.

3.3.2 Modify drawings to delete information not applicable and to add information applicable to the project.

3.3.3 Mark copies of printed material to identify pertinent materials, products, or models.

3.3.4 Show dimensions and clearances required, performance characteristics and capacities, and wiring diagrams and controls.

3.3.5 Submittal procedures shall be the same as for shop drawings.

3.4 Contractor Responsibilities

3.4.1 Review and approve shop drawings, project data, and samples before submitting them.

3.4.2 Verify field measurements, field construction criteria, catalog numbers, and similar data.

3.4.3 Coordinate each submittal with the requirements of the Contract Documents.

3.4.4 Submit shop drawings for major equipment items in one package to permit checking complete installation details.

3.4.5 In a clear space above the title block or on the back, hand stamp the following and enter the required information:

Specification Section .....

This document has been checked for accuracy of content and for compliance with the Contract Documents and is hereby approved. The information contained herein has been coordinated with all involved contractors.

Signed .....

3.4.6 Contractor's responsibility for errors, omissions, and deviations from requirements of the Contract Documents in submittals is not relieved by Engineer's review.

3.4.7 Notify Engineer in writing at time of submittal of deviations in submittals from requirements of the Contract Documents.

3.4.8 Do not install materials or equipment which require submittals until the submittals are returned with Engineer's stamp and initials or signature indicating approval.

3.4.9 Revise returned shop drawings as required and resubmit until final approval is obtained. Indicate on the drawings any changes which have been made other than those requested by Engineer.

3.4.10 Submit new project data and samples when the initial submittal is returned disapproved.

3.4.11 No claim will be allowed for damages or extension of time because of delays in the work resulting from rejection of material or from revision and resubmittal of shop drawings, project data, or samples.

3.5 Engineer's Duties

3.5.1 Engineer will review submittals for compliance with the Contract Documents and with the design concept of the project.

3.5.2 Review of a separate item does not constitute acceptance of an assembly in which the item functions.

3.5.3 Engineer will affix a stamp to the returned copy of each submittal. The stamp will be marked to indicate whether the submittal is "Approved," "Approved as Noted," or "Disapproved," and an explanation will be given if the submittal is unsatisfactory. The stamp will be initialed or signed certifying the submittal review.

4. OPERATING AND MAINTENANCE MANUALS

4.1 Furnish 5 copies of manuals of instructions for operation and maintenance of each item of equipment furnished. Each manual shall be bound in a binder for a total of five (5) complete and bound manuals.

4.2 Include instructions for all components of the equipment, whether manufactured by the supplier or not, including valves, controllers, and other miscellaneous components.

4.3 Included Material as follows:

- Parts lists,
- Exploded or sectional views,
- Recommended lubrication and maintenance procedures,
- Internal wiring and piping diagrams,
- Detailed description of process, where applicable,
- Operating procedures,
- Other pertinent information of value to obtain peak performance.

4.4 Equipment Maintenance Schedule

4.4.1 In addition to the equipment operation and maintenance manuals, an equipment maintenance schedule shall be prepared for each piece of equipment. The schedule shall list routine preventive maintenance recommended by the equipment manufacturer. The schedule shall be listed as daily, weekly, monthly, quarterly, semi-annually, and annually.

4.4.2 The items listed in the schedule shall be those maintenance functions that Contractor and equipment suppliers expect the plant operating personnel to follow in order to meet warranty provisions when the equipment is turned over to Owner.

4.4.3 The schedule for each piece of equipment shall be prepared in the same format. No photocopies or reproductions of the various equipment operation and maintenance manuals will be permitted.

GENERAL REQUIREMENTS

SECTION 1D

TESTING

1. GENERAL

1.1 Perform the inspections and tests required by laws, ordinances, rules, regulations, or orders of public authorities.

1.2 Perform the inspections and tests required by the Specifications.

1.3 Provide product certifications as required by the Specifications.

1.4 Test, adjust, balance, and operate mechanical and electrical equipment to demonstrate that they have been properly assembled, aligned, adjusted, wired, and connected. Make any adjustments or replacements found necessary.

1.5 Neither observations by Engineer, nor inspections, tests, or approvals by other than Contractor shall relieve Contractor from his obligation to perform the Work in accordance with the requirements of the Contract Documents.

2. TESTING LABORATORY SERVICES

2.1 Employ and pay for the services of an independent testing laboratory to perform specified services.

2.2 Obtain approval of Owner before employing laboratory.

2.3 Laboratory shall meet "Recommended Requirements for Independent Laboratory Qualification" published by the American Council of Independent Laboratories.

2.4 Laboratory shall meet basic requirements of ASTM E-329, "Standards of Recommended Practice for Inspection and Testing Agencies for Concrete and Steel As Used in Construction."

2.5 Laboratory Duties

2.5.1 Perform specified tests and services.

2.5.2 Comply with specified standards, ASTM, other recognized authorities, and as specified.

2.5.3 Ascertain compliance with requirements of Contract Documents and so note in writing on all reports.

2.5.4 Promptly notify Engineer and Contractor of irregularities or deficiencies of work observed during performance of services.

2.5.5 Promptly submit 3 copies of reports of inspections and tests to Engineer.

2.5.6 Include in the reports date, project title and number, name and signature of inspector, date of inspection or sample, record of temperature and weather, date of test, identification of product and Specification Section, location in project, type of test, and observations regarding compliance with requirements.

2.6 Contractor's Responsibilities

2.6.1 Cooperate with laboratory personnel.

2.6.2 Provide to laboratory samples of materials to be tested in required quantities.

2.6.3 Furnish to the Engineer three copies of mill test results.

2.6.4 Provide facilities for storage and curing of test samples.

2.6.5 Notify Engineer sufficiently in advance of time and place of tests to be made at point of manufacture, assembly, or fabrication to permit Engineer to witness tests if he so desires.

3. TESTING OF TANKS, PIPING, AND EQUIPMENT

3.1 General

3.1.1 Contractor shall be responsible for all labor, tools, equipment, and supplies needed to test. Tests shall be witnessed by representatives of Contractor, Engineer, and (when appropriate) the manufacturer. Written reports, check lists, or test sheets giving pertinent data shall be prepared for each item of mechanical equipment, signed or initialed by required witnesses, and turned over to Engineer.

3.2 Tanks

3.2.1 All concrete and/or steel tanks shall be tested for watertightness prior to backfilling. Concrete tanks shall be tested in accordance with ACI350.1R-93/AWWA 400-93, lastest edition. Other tanks shall be filled with water for a period of 48 hours to determine if leaks exist. Liquid level drop shall not exceed 1/2-inch during this period.

Should leaks exist, they shall be patched and repaired, after which they shall be retested. Such testing shall be done in a manner approved by the Engineer, preferably before backfilling. Water used to fill tanks shall be supplied by the Owner and conveyed to the tank by the Contractor.

3.3 Piping

3.3.1 Piping shall be tested in accordance with Section 17B.

3.4 Equipment

3.4.1 A representative of the equipment manufacturer shall be present to assist with the start-up and testing of all equipment.

3.4.2 Electrical tests shall be conducted on all motors to verify that actual conditions do not exceed nameplate ratings.

3.4.3 Tests shall be made under normal operating conditions except where special test conditions are set out in equipment specifications. Checks shall be made for noise, vibration, direction of rotation, power consumption, overheating, misalignment, operating speed, and such other parameters as may be needed to indicate proper performance of equipment.

3.4.4 Pump performance shall be checked against head-capacity curves submitted and approved.

GENERAL REQUIREMENTS

SECTION 1E

MATERIALS AND EQUIPMENT

1. STORAGE

1.1 Store construction materials on wooden platforms or other hard, clean, dry surfaces.

1.2 Protect perishable materials with weathertight covers as recommended by the material manufacturers.

1.3 Store mechanical and electrical equipment under weather-proof, dry, and temperature controlled conditions as recommended by the manufacturer.

1.4 Equipment installed but not in operation shall be considered in storage.

1.5 Protect stored equipment from condensation by energizing enclosure space heaters, by providing supplementary heat, or by other means as recommended by the equipment manufacturer.

1.6 Fill gear boxes of stored equipment with oil and protect bearings from rusting by rotating shafts regularly and routinely as recommended by the equipment manufacturers.

1.7 Submit details of proposed storage and protective measures, including systems, procedures, and inspection schedules, to Engineer for review with the equipment shop drawing submittals.

1.8 Repair or replace equipment which deteriorates during storage or after installation before it is placed in full operation.

2. EQUIPMENT GUARDS

2.1 All moving parts of equipment shall be provided with removable, rigidly constructed and mounted equipment guards of the types required for operator safety and as required by the provisions of all local, state, and federal codes, ordinances, regulations, and laws.

3. SHOP PRIMERS

3.1 Shop prime assemblies, castings, steel pipe, and fabricated elements with a primer compatible with the final paint system specified in Section 9A.

3.2 If shop primer is not compatible with final paint, completely remove before field painting and replace with compatible prime coat.

3.3 Protect with grease or other means surfaces which are not painted, such as shafts, chains, and bearings.

4. EQUIPMENT ANCHOR BOLTS

4.1 Anchor bolts and nuts for equipment shall be Type 304 stainless steel, ASTM A-320. Bolts shall be sized as recommended by the manufacturer of the equipment.

4.2 Anchor bolts for mounting equipment which requires careful alignment, such as pumps, blowers, and motors, and which have a fixed non-adjustable base or bolt hole drilling, shall be installed in Series 300 stainless steel sleeves with a diameter equal to twice the bolt diameter. Bolts for angle brackets and other similar non-critical alignment supports need not have sleeves but shall, as well, be Series 300 stainless steel.

4.3 All equipment, unless otherwise directed by Engineer, shall be mounted on minimum 4-inch concrete pad. Concrete shall be installed in accordance with Division 3.

5. ADDITIONAL ELECTRICAL WORK

5.1 The electrical work to be performed is shown on the Drawings and is specified in Division 16 of this document.

5.2 Furnish and install with furnished equipment any additional electrical work required for proper operation.

5.3 Motor horsepowers shown on the electrical Drawings are approximate only. Provide or make adjustments to the electrical equipment and wiring required for the motor horsepowers actually furnished.

6. WARRANTY

6.1 Equipment shall be warranted by manufacturer for a period of not less than one (1) year.

GENERAL REQUIREMENTS

SECTION 1F

CLEANING AND DISINFECTION

1. DESCRIPTION

1.1 A program to maintain site free from accumulations of waste, debris, and rubbish caused by construction operations shall be submitted for approval.

1.2 When Work is complete, remove waste materials, rubbish, tools, equipment, machinery, and surplus materials and clean all sight-exposed surfaces. Leave Project clean and ready for occupancy.

2. CLEANING DURING CONSTRUCTION

2.1 Perform cleaning operations daily to ensure that structures, grounds, and public property are maintained free from accumulations of waste materials and rubbish.

3. FINAL CLEANING

3.1 Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from exposed interior and exterior finished surfaces of buildings and interior equipment and from other prominent above ground structures.

3.2 Repair, patch, and touch up marred surfaces to specified finish to match adjacent surfaces.

3.3 Remove all scaffolding, planks, tools, rags, blast media, and all other materials not part of the structural or operating facilities of the tank. Thoroughly clean and wash the walls, floor, roof, and operating facilities by use of a high pressure water jet, sweeping, scrubbing, and other effective means. Flush out and otherwise remove all water, debris, and foreign materials accumulated during this cleaning operation. Thoroughly clean and flush out the bottom of the tank and piping.

3.4 After work under this Contract has been completed, remove all debris and leave site in pre-project condition.

4. DISINFECTION

4.1 After cleaning, but before placing in service, disinfect the inside of the tank, pumping wetwell and piping in accordance with AWWA Standard C-652-02, Section 4.

4.2 Sampling and Testing: After the chlorination is complete and before the tank is placed in service, water from the full facility will be sampled by the Owner and tested in accordance with AWWA Standard C-652-02, Section 5.1 Bacteriological Sampling and Testing.

4.3 The Contractor shall provide on their letterhead to the Owner for record the procedure, including amount of disinfectant used and bacteriological results.

4.4 Chemicals and Equipment: Provide all necessary chlorine bearing compounds, solution tank, pumps, hoses, mops, and other items required for cleaning, disinfecting and flushing operations.

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FOR

DIVISION 2

SITE WORK

SITE WORK

SECTION 2A

CLEARING

1. SHRUB AND TREE REMOVAL

1.1 General

1.1.1 Cut, remove and dispose of trees, stumps, and shrubs which occur in the areas required for construction.

1.1.2 Do not remove or damage trees or shrubs which are indicated to be saved.

1.1.3 Remove stumps and matted roots in area to be occupied by structures or pavements.

1.2 Methods

1.2.1 Remove trees, stumps, bushes, and shrubs to a depth of 12 inches below the elevation of the subgrade, finished earth surface, or ground line.

1.2.2 Trees and shrubs which are shown to be saved shall be protected by temporary enclosures or other methods approved by the Engineer.

1.2.3 Repair or replace trees or shrubs designated to be saved, if damaged during construction, in accordance with standard horticultural practice. Treat wound surfaces one inch or more in diameter with a commercial pruning compound.

1.2.4 Dispose of trees, shrubs, stumps, and roots at an approved off-site location unless an on site disposal area is designated on the Contract Drawings.

SITE WORK

SECTION 2B

EARTHWORK

1. PROTECTION OF PROPERTY

1.1 Arrange with all persons, firms, or corporations owning or using poles, pipes, tracks, conduits, or similar facilities affected by construction to maintain and protect them during construction.

1.2 If existing gas or water pipes, buried electrical, telephone, and telegraph ducts, conduits, sewers, drains, or poles are blocked or interfered with by the excavation required on this project, maintain them in continuous operation and restore them to their original condition.

2. TOPSOIL STRIPPING AND STORAGE

2.1 Remove topsoil, its entire depth, from areas which will be disturbed by construction or grading operations and stockpile in designated areas for reuse.

2.2 Topsoil is defined as friable surface soil similar in quality to productive agricultural soils commonly occurring in the vicinity of the project. Remove sod, grass, roots, weeds, sticks, stones over 2 inches in diameter, and other foreign materials from the topsoil.

2.3 Remove objectionable materials encountered during excavation and bury at locations approved by Owner or remove from the site.

3. EXCAVATION AND BACKFILL

3.1 General

3.1.1 Excavate for structures and roadways and dispose of excess and unsuitable materials off-site as directed by Owner's representative. Backfill structures after they have been completed and have attained sufficient strength to withstand all imposed loads.

3.1.2 Provide necessary cofferdams, wellpoints and pumps, and the sheeting, shoring, and bracing required for safe and efficient operations.

3.1.3 Excavation includes removal of quicksand, hardpan, rock, boulders, clay, rubbish, unforeseen obstacles, underground conduits, pipe, drain tile, trees, roots, timber or masonry structures, pavements, sidewalks and other obstacles encountered. No claim for additional payment will be accepted because of the character of the ground in which the excavation is made. Excavation will be unclassified.

3.1.4 Seal abandoned pipelines cut during excavation at both cut ends with Class C concrete.

3.1.5 Employ qualified professional engineering personnel to lay out the work, check sheeting and shoring, design cofferdams, and for other job conditions requiring skilled technical knowledge. Submit engineer stamped plans and calculationsof shoring, sheeting and cofferdams for review.

3.1.6 Employ qualified independent testing laboratory to perform testing specified herein, with registered professional Engineer in the State of Tennessee to be in responsible charge of all the testing.

3.2 Excavation

3.2.1 Excavate to the elevations, conditions, and dimensions indicated, plus sufficient space for installation of forms, shoring, drain tile, waterproofing, masonry, and for inspection of foundations. Provide temporary sheeting, shoring, timbering, bracing, and piling required for the safe and efficient installation of the work. Remove temporary work when the permanent work is complete.

3.2.2 When excavation to the elevation indicated under the structure is complete, employ an independent testing laboratory, subject to approval of the Engineer, to verify that the soil encountered is suitable for the fill placement and bearing conditions required. Unless noted otherwise, footings shall have minimum 2,500 psf bearing capacity..

3.2.3 The independent testing laboratory shall submit a report of the findings in triplicate. Should the soil encountered not exhibit the design required, the laboratory shall make recommendations concerning the remedial measures necessary to provide a suitable foundation to meet the design requirements.

3.2.4 If unsatisfactory soil is encountered that requires removal to provide a suitable foundation, the unsatisfactory soil shall be removed, as directed by Engineer, and replaced with suitable foundation material, as directed by Engineer. This work will be paid for as described in Special Conditions section.

3.3 Sheeting, Shoring, and Bracing

3.3.1 Install temporary sheeting, shoring, timbering, bracing, or steel sheet piling as required so that the work can be installed in a safe and efficient manner. When the work is complete remove temporary forms, shores, and bracing. Fill vacancies left by the sheeting with sand, and compact.

3.4 Protection Against Water

3.4.1 Do ditching, diking, pumping, well pointing, and bailing; build drains; and do other work necessary to keep water out of excavations while work is in progress and until the finished work is safe from injury.

3.4.2 Dispose of water pumped or drained from the work so that it does not damage adjacent property or other work under construction. Protect construction against flooding.

3.4.3 Provide protection to basements, vaults, reservoirs, and tanks where buoyancy or floor failures may occur due to uplift from storm or ground water.

3.5 Frost Protection

3.5.1 Do not excavate to the full depth required when freezing temperature is expected, unless concrete can be poured immediately after the excavation has been completed. Protect the bottom of excavations from freezing until concrete is placed.

3.6 Backfilling

3.6.1 When excavation is carried beyond the lines and grades shown without authorization of Engineer, refill the extra excavated space as follows. No extra compensation shall be allowed for this work.

3.6.1.1 Excess excavations in earth under structure slabs and pavements shall be backfilled with granular foundation material.

3.6.1.2 Excess excavations in earth under footings shall be backfilled with Class C concrete as specified in Division 3 - Concrete.

3.6.1.3 Excess excavations in rock under structure slabs and footings shall be backfilled with Class C concrete as shown or as directed by Engineer.

3.6.2 Unless noted otherwise, backfill material shall be earth, free of debris, rocks greater than 2 inches in dimension, cinders, combustibles, frost, ice, roots, sod, wood, cellulose, and organic materials except as noted otherwise. Backfill material within building foundation walls and under concrete pads shall be clean, washed natural sand.

3.6.3 At the Contractor's option, backfill material under concrete slabs except base slabs may be crushed stone conforming to ASTM D-448, size #67.

3.6.4 At Contractor's option, backfill material at other locations may be "Crusher Run," conforming to "Tennessee Department of Highways Standards for Bridge and Road Construction," Section 9035, Mineral Aggregate "C" or "D" grading.

3.6.5 Excess excavated material from on the site may be used for backfill provided it meets the requirements of this Section of the Specifications.

3.6.6 Off-site borrow material to be used for backfill shall meet the requirements of this Section of Specifications.

3.6.7 Approvals required: All backfill material shall be subject to the approval of the testing laboratory and the Engineer.

3.6.8 Notifications: For approval of backfill material, notify the testing laboratory and the Engineer at least four working days in advance of intention to install backfill material, designate the proposed borrow area, and permit the testing laboratory to sample as necessary from the borrow area for the purpose of making acceptance tests to prove the quality of the material.

3.6.9 Place sand and crushed stone backfill in maximum 6-inch layers and consolidate to 100% maximum density with minimum 3 passes in opposite 90° directions with vibratory plate.

3.6.10 Place earth and crusher-run backfill in layers not over 8 inches thick, loose measure, and compact to minimum 98 percent of maximum dry density as specified in ASTM-D-698.

3.6.11 Backfill within building and under concrete pads as shown on the Drawings.

3.6.12 Backfill around the sides of structures with cohesive and/or cohesionless soil as shown on the Drawings. Cohesive backfill material shall be earth, free of rocks and debris, uniform and suitable for use as backfill and shall be approved by the soils engineer. Soils engineer shall perform proctor tests on all backfill material. Cohesionless material shall be No. 67 size crushed stone per ASTM D-448. Place the material in layers not over 8 inches thick, loose measure, and compact. Compact cohesive soils to at least 95 percent of maximum dry weight as determined by ASTM D-698. Hand tamp fill immediately adjacent to walls or use hand operated vibratory equipment.

3.6.13 At least one compaction test shall be taken for each 2,500 s.f. of area, with a minimum of two tests for each layer. Additional layers shall not be placed until the density of each layer in place has been approved. Testing lab shall continuously inspect all backfill operations.

3.6.14 Do not place backfill against concrete block walls until they have attained adequate strength.

3.6.15 Place backfill evenly on each side of walls to prevent imposing unbalanced forces against the structures.

4. WASTE MATERIAL DISPOSAL

4.1 Remove and dispose of unsuitable and excess excavated material off the site or on-site at locations designated by the Engineer.

4.2 Waste material shall be hauled in trucks of sufficient capacity and tight construction to prevent spillage. Take necessary measures to prevent the propagation of dust.

4.3 Dispose of waste material in locations and under conditions that comply with federal, state, and local laws and regulations.

5. SITE GRADING

5.1 Grade the project site as indicated. Begin grading after other construction and backfilling is complete. Do not disturb or damage underground construction such as sewers, drainage pipes, or drainage structures.

5.2 Rough grade as follows:

5.2.1 Under pavements and walks, grade to the bottom of the base course or to the bottom of the sub-base course, if a sub-base course is required.

5.2.2 Grade areas to be landscaped to 6 inches below finished grade, and areas with ground cover to 9 inches below finished grade.

5.2.3 Continue construction traffic to designated routes away from areas to be landscaped.

5.2.4 In areas rutted by traffic or eroded by water, regrade, compact, and restore to established rough grade.

5.3 FILLING

Place fill to final elevations (subgrade) as indicated by the Site Grading Plan. Place fill in layer not to exceed 8 inches maximum, when compacted. Fill material shall be earth, free of rocks and debris, suitable for use in material and approved by the testing laboratory employed by the Contractor to monitor fill operations and perform compaction tests. Testing laboratory shall be subject to the approval of the Engineer. Excavated material suitable for use as fill material may be used as fill. Compact fill to the following minimum percent of the maximum percentage as per ASTM D-698, Standard Proctor:

Area Under Structures:	98%	
Area Under Paving:	98%,	except top one foot 100%.
Lawn Areas:	90%	

Strip areas to receive fill of topsoil and existing paving down to firm subgrade. Proof roll subgrade with loaded dump trucks to check for any soft areas in presence of testing laboratory. If any soft areas are encountered, perform remedial work as directed by the Engineer.

Perform compaction test for each 2,500 square feet of area maximum for each lift. Testing laboratory shall continuously inspect all fill operations.

6. FINISH GRADING

6.1 Finish grade the completed work area within the limits designated. All areas disturbed shall be finished graded, seeded, and strawed to produce lawn area with uniform grades and maximum 20% slopes.

6.2 Do not commence finish grading until construction, fill, backfill, and rough grading have been completed and approved.

6.3 Shaped earth shoulder areas, when compacted, shall be one inch below the adjacent pavement.

6.4 Grade areas to be planted, including lawns and planting beds, when compacted, to the elevations and grades shown. Use topsoil previously stripped and stockpiled or obtained from off the site. Furnish topsoil obtained from off the site at no additional cost to Owner.

6.5 Prior to landscaping operations, the landscaper shall inspect the fine grading and notify Contractor and Engineer if additional soil is required.

6.6 Areas that have been finish graded shall be protected from construction traffic. Repair any area that has become rutted or has settled below the correct grade.

SITE WORK

SECTION 2C

TRENCHING

1. GENERAL

1.1 The following requirements of Section 2B, Earthwork, are applicable to trenching work:

Protection of Property,

Topsoil Stripping and Storage,

Earth Removal,

Protection Against Water,

Frost Protection,

Waste Material Disposal.

2. TRENCH WIDTH

2.1 Trenches excavated for pipelines, conduits, duct banks, or other utilities shall be wide enough to permit proper installation of the materials and to provide space for backfilling around and under the installed lines.

2.2 The maximum trench width for unencased pipe or duct lines which will have 4 feet or more of cover shall be 18 inches for 8-inch pipe and smaller, and 1-1/2 times the inside diameter plus 8 inches for larger pipe.

2.3 Maintain these maximum widths from the bottom of the trench to a plane 8 inches above the crown of the pipe. For sheeted trenches, the width shall be measured between inside faces of the sheeting.

2.4 If the width of the trench exceeds the maximum limit specified above, fill the extra width with bedding material up to a plane 8 inches above the crown of the pipe.

3. TRENCH DEPTH

3.1 Trenches shall be excavated a minimum 4 inches deeper (6 inches in rock) than required to install the pipe or duct line at the proper elevation. The space below the pipe shall be filled with bedding material, or with concrete if the pipe or duct is cradled or encased.

4. BEDDING MATERIAL

4.1 Bedding material for pipelines shall be No. 67 (3/4-inch maximum size) crushed aggregate as specified in ASTM D-448. Shape and form the bedding material so that the bottom third of each pipe is uniformly supported along its entire length. Recess the bedding material at the bells, if any, so that they are relieved of any load. Backfill the space between the pipe and the sides of the trench 8 inches above the top of the pipe with bedding material.

4.2 Bedding material below the centerline of the pipe shall be placed in not greater than 12-inch layers and spaded into position below the curve of the pipe.

5. TRENCH BACKFILL

5.1 Backfill trenches above the bedding material with the soil removed, if suitable, or with other Engineer approved material. Do not drop rocks larger than 6 inches in the largest dimension into the trench nor place within 3 feet of the pipe or duct, nor within 4 inches of each other. Backfill shall be placed in 12-inch maximum lifts, loose measure; and compacted.

5.2 Backfill trenches within the limits of existing or proposed paved areas above the bedding material with the same bedding material added in 12-inch maximum lifts, loose measure, and compacted. No extra payment will be made for backfill under pavements shown on the Drawings.

SITE WORK

SECTION 2D

SITE IMPROVEMENTS

1. GENERAL

1.1 The site with existing and finished ground contours, structure(s), location piping and valve location, access road, site drainage and other site-related information is as shown on the Drawings.

1.2 The Contractor shall perform site clearing, excavation, grading, drainage, seeding and paving as required in order to complete the project in accordance with the Drawings and Specifications.

1.3 The Engineer will locate reference points on the building line and bench mark, and the Contractor will establish elevations and locations of all structures and manholes with the approval of the Engineer. The Contractor is to protect all reference points from dislocation or damage. All structures are to be located prior to beginning any excavation.

1.4 Contractor shall be required to stay within the property and easement limits as shown on the Drawings unless arrangements which are satisfactory to the Owner are made with adjacent property owners.

2. SITE GRADING AND EARTHWORK

2.1 The Contractor shall remove and stockpile the topsoil from the construction area for use in finished grading. After the topsoil has been removed, the area shall be graded to the approximate levels indicated on the Drawings, using excavated material which is suitable for use as backfill. Surplus material and material unsuitable for use shall be removed from the site and disposed of at the Contractor's expense.

2.2 Trees, stumps, brush and used construction materials must be removed from the job site and disposed of in accordance with local laws.

3. FINISHED GRADING

3.1 Upon the completion of backfilling, the construction area shall be brought to the desired grade by the use of not less than 6 inches of topsoil. It is anticipated that any surplus excavated material, except for large stones and boulders, may be used to expand the fill area or fill in low areas at the site, but such additional fill must be placed as directed by the Engineer to conform to the desired drainage and landscaping patterns, and such fill must be covered by not less than 6 inches of topsoil.

3.2 Finished grading is to be done in a manner which will result in rounded surface at the top and bottom of abrupt changes in plane, and a uniformly sloping topsoil with no local depressions to form water pockets, and a finished surface which can easily be cared for by hand mowing.

4. EMBANKMENT

4.1 Embankment construction shall conform to the requirements of Section 205, TDoT Standard Specs. and shall be so constructed to provide adequate drainage at all times.

4.2 Embankment materials consisting predominantly of soil shall be placed in layers not exceeding 10 inches in depth before compaction. Each layer shall be compacted to a density not less than 95% of maximum density. Embankment materials consisting predominantly of rock fragments of such size that the material cannot be placed in layers of the normal 10-inch thickness may be placed in layers not exceeding 2 feet (maximum dimension). Each layer shall be leveled and smoothed with suitable leveling equipment and by distribution of spalls, finer gradements of rock, or other satisfactory material.

4.3 Contractor shall be responsible for stability of all embankments and cut slopes until final acceptance and shall replace or repair at his own expense any portions of the work which becomes displaced or damaged before acceptance. If the work has been properly constructed and protected and damage to embankments or cut sloped occurs due to unusual natural causes during the guarantee period, the Contractor will be paid for the materials used in making the necessary repairs. Damage due to poor workmanship during the guarantee period shall be repaired by the Contractor at no cost to the Owner.

5. DRAINAGE PIPES

5.1 Where indicated on the Drawings, Contractor shall furnish and install corrugated metal pipe culvert (CMP) of the sizes indicated. Headwalls, if required, shall be built in accordance with details on the Drawings. CMP shall conform to AASHTO M-190. In rock, pipe shall be bedded on 6 inches of crushed stone. There shall be a minimum of 1 foot from the top of the grade shown (minimum of 1% grade).

SITEWORK

LANDSCAPING

SECTION 2E

1. GENERAL

1.1 Furnish, install and maintain the landscaping materials required for this project.

1.2 Landscaping work shall be performed by a recognized person, company or organization well established and experienced in this field and whose equipment and personnel are adequate to perform the required work. Obtain Engineer's approval before starting any landscape work. Before beginning operations, the landscaper shall inspect the fine grading and notify Contractor and Engineer if additional soil is required.

2. LAWNS

2.1 General

2.1.1 Furnish, plant and maintain lawns at locations designated.

2.1.2 All areas within the limits of finish grading not occupied by permanent construction or other plantings shall be seeded and maintained as lawn areas. Areas outside the limits of finish grading that have been disturbed by construction operations shall be seeded and maintained as lawns, unless otherwise specified.

2.1.3 Slopes steeper than 3 feet horizontal to one foot vertical shall require straw mat or other means to maintain erosion control until grass is established on slopes.

2.2 Materials

2.2.1 Grass seed shall be fresh, clean, new tall fescue crop seed.

2.2.2 Sod shall be 2-year-old nursery grown tall fescue grass, well rooted, and free from obnoxious weeds and other objectionable plants. The grass shall be cut to a length of approximately 2 inches immediately before cutting the sod. Cut sod shall be between 3/4-inch and 1-1/2 inches thick.

2.2.3 Fertilizers shall conform to the state fertilizer laws. Commercial fertilizer for lawns shall be 6 percent nitrogen (1/2 organic, 1/2 inorganic), 12 percent phosphoric acid, and 12 percent potash and trace elements.

2.3 Construction

2.3.1 After topsoil has been spread and final grades established in accordance with other Sections of these Specifications, fine grade the entire lawn area by discing or tilling to a depth of 4 inches. Then drag the area with a plank float to develop a smooth, even surface. Power equipment may be used for these operations, but hand tools shall be used in areas too small for power equipment.

2.3.2 Seeding

Apply fertilizer at the rate of 40 lbs/1,000 sf. Sow grass seed at the rate of 4 lbs/1,000 sf in two operations of equal amounts at right angles to each other. Sow only between April 15 and May 30 and between August 10 and October 1. Do not seed during high winds or when ground surface is too wet for working. Lightly rake or drag seeded areas and then roll with a 200-lb roller. After raking and rolling, water seeded areas with a fine spray until a uniform moisture depth of one inch has been obtained. In lieu of mechanical application of seed and fertilizer, hydraulic application may be used if the fertilizer and seed are applied in separate operations. The seed or fertilizer slurry shall be constantly agitated until pumped from the tank. Do not add seed to the water more than 4 hours before application.

2.4 Maintenance

2.4.1 Maintenance shall consist of watering, weeding, cutting, trimming the grass and performing other work necessary to obtain a good stand of grass reasonably free of weeds or obnoxious grasses.

2.4.2 The maintenance period shall begin immediately after seeding or sodding operations are complete and continue for not less than 45 days or until the grass has been cut twice and, if necessary, until an acceptable stand of grass has been established.

2.4.3 At the end of the maintenance period, apply organic fertilizer containing 6 percent nitrogen and 2 percent phosphorous to lawn areas at the rate of 30 lbs/1,000 sf.

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FOR

DIVISION 3

CONCRETE

CONCRETE

SECTION 3A

GENERAL CONCRETE REQUIREMENTS

1. GENERAL

1.1 This Division covers the description of materials generally utilized in concrete construction and the installation of such materials.

1.2 Individual Sections of this Division and the Drawings designate the specific work, its location, and the type of construction to be used.

1.3 Furnish the labor, material, equipment, tools, and services required for the installation of the concrete work required on this project.

1.4 Make provision for items incorporated in the work which are provided under other Sections.

1.5 Do not subject concrete members to construction or equipment loads until concrete has attained sufficient strength to safely support such loads and without damage to new construction.

2. CONSTRUCTION MATERIALS

Materials and fabricated items shall be furnished by an established and reputable manufacturer or supplier. They shall be new and of first-class ingredients and construction, guaranteed to perform the service required, and in conformance with the cited standards and reference specifications, or the product of the listed manufacturers or similar and equal thereto.

3. SHOP DRAWINGS

Submit shop and setting drawings, as required by subsequent Sections of this Division, even though items to be furnished conform to the exact description stated in the Specifications.

4. MATERIAL TESTS

See Division 1 - General Requirements - of the Specifications and subsequent Sections of this Division for Provisions requiring inspection and testing of materials to be incorporated in concrete work.

5. REFERENCE SPECIFICATIONS

The latest editions of the following reference specifications of the American Concrete Institute (ACI) shall govern, where applicable and unless noted otherwise, the work covered by this Division:

ACI-211.1, Recommended Practice for Selecting Proportions For Concrete

ACI-301, Specifications for Structural Concrete for Buildings.

ACI-304, Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete

ACI-305, Recommended Practice for Hot Weather Concreting

ACI-306, Recommended Practice for Cold Weather Concreting

ACI-308, Recommended Practice for Curing Concrete

ACI-309, Recommended Practice for Consolidation of Concrete

ACI-315, Manual of Standard Practice for Detailing Reinforced Concrete Structures

ACI-318, Building Code Requirements for Reinforced Concrete

ACI-347, Recommended Practice for Concrete Formwork

ACI-512, Recommended Practice for Manufactured Reinforced Concrete Floor and Roof Units.

SP-15, Specifications for Structural Concrete for Buildings (ACI Filed Reference Manual)

Copies of the applicable specifications listed above shall be made available by Contractor at the job site at all times.

6. WATERTIGHTNESS

All concrete structures (tanks, basins, wells, sumps, etc.) which are part of the work shall be so constructed as to be watertight. The Contractor shall place concrete in maximum size sections and areas as indicated and as required with watertight construction joints.

If the Contractor elects to locate the slab and wall construction joints at locations other than shown or add additional joints, he shall submit to the Engineer for approval a set of marked up design drawings indicating his proposed locations a minimum of three weeks prior to scheduled concrete placement date. The Contractor shall be solely responsible to ensure the watertightness of all structures required to be watertight.

7. SUPERVISION

All concrete work indicated on the Drawings and specified herein shall be performed under the personal and constant supervision of a competent construction superintendent or foreman experienced in this class of work.

CONCRETE

SECTION 3B

CONCRETE FORMWORK

1. GENERAL

1.1 Formwork shall be designed, constructed, and erected in accordance with ACI 318 and ACI 347.

1.2 Vertical concrete surfaces shall be formed. The underside of slabs and beams shall be formed except where the concrete is placed against the ground. Sloping surfaces shall be formed unless otherwise authorized by Engineer.

1.3 Construct and erect forms so that the concrete will have the shape, form, line, and grade indicated. Make forms mortar tight and sufficiently rigid to prevent deformation under load. Use an adequate number of walers, stiffeners, and braces to ensure straight walls.

1.4 Except as noted, tolerances for formed surfaces shall meet the requirements of ACI 301. Edges of form panels in contact with concrete exposed to view in the finished work shall be flush within 1/32-inch. Forms for plane surfaces shall be such that the concrete will be plane within 1/8-inch in 4 feet. Leading edges of concrete shall lie within 1/4-inch as measured from a 10-foot template.

1.5 Forms for permanently exposed concrete shall produce a smooth, even, level, finish without fins or board marks, equal to surfaces produced by new, tight, clean, surface oil-treated plywood. The surface shall be equal in smoothness to sand finish plaster. Exposed concrete includes surfaces of beams, columns, and slabs; interior and exterior walls; and tank, chamber, and tunnel walls, except those in contact with earth.

1.6 The Contractor is responsible for the design, engineering and construction of the formwork. It shall be designed for all loads and lateral pressures and, where necessary, be cambered to compensate for deflections due to fresh concrete and construction loads. Shores shall have means of adjustment for settling during concrete placement.

2. MATERIALS

2.1 Forms for concealed concrete shall be clean, smooth surfaced Southern Yellow Pine, B-B Pine PLYFORM plywood, either fiberglass and/or metal, or a combination of these; straight, free from warp and of sufficient strength and bracing to resist movement during the depositing of concrete.

2.2 Forms for exposed concrete shall be B-B pine PLYFORM plywood or approved equal.

2.3 Form liners shall be B-B Pine PLYFORM or approved equal.

2.4 Form oil shall be nonstaining mineral oil or other approved releasing agent.

2.5 Form ties shall be fabricated such as to hold concrete from high pressures, yet not allow any grout leakage. Use metal snap ties with water seal washer in the center of wall and plastic snap cones on both exterior faces of the wall. Snap cones shall be 1-1/2 inches minimum depth, and 1 inch in diameter at surface. Ties to be Richmond, Burke, or equal.

2.6 Expansion joint filler shall be a premolded material similar to Celotex and composed of fiberboard impregnated with asphalt. Joint material shall be full thickness of slab or joint, unless otherwise indicated, 1/2-inch thick.

2.7 Vapor barrier shall be 6 mil. polyethylene sheets as manufactured by Visking Company or approved equal.

2.8 Porous fill base under slabs on grade shall be of crushed stone #67 size per ASTM D-448.

2.9 Chamber strips shall be of pine or molded plastic. Size to 3/4" x 3/4" unless otherwise indicated.

2.10 Dovetail anchor slots shall be standard galvanized as manufactured by Dur-O-Wal or equal.

3. EXECUTION

3.1 Forms shall conform to the shape, lines, and dimensions of the members indicated on the Drawings and shall be substantial and tight to prevent leakage of mortar. They shall be properly braced or tied together so as to maintain positions and shape when concrete is placed, tamped, and/or vibrated. Forms shall be free from surface defects. Provide shoring and bracing as required to ensure support of forms, fresh concrete and all construction loads in a sure, safe manner. All shoring and jacks shall have firm bearing. Shoring shall be adjustable type to set forms to required grade and/or elevation and adjust for camber or any settlement.

3.2 Install form liners in steel forms for exposed concrete surfaces.

3.3 Chamfer exposed corners of concrete members 3/4-inch, unless otherwise noted.

3.4 Furnish and install continuous dovetail anchors at intersections of concrete and masonry walls.

3.5 Coat the inside of forms with a nonstaining mineral oil or other approved releasing agent applied in conformance with the manufacturer's recommendations before setting reinforcing steel.

3.6 Forms once used shall have nails withdrawn, and the surfaces to be exposed to concrete shall be carefully cleaned before reuse.

3.7 Footing forms may be omitted where foundation material and workmanship permit accurate excavation to size and when the omission is approved by the Engineer.

3.8 Provide for installation of inserts, ties, anchors, plates, bolts, and other fastening devices required for attachment of other work. Properly locate in cooperation with other trades and secure in position before concrete is placed.

3.9 Concrete base slabs on grade: Over subgrade place crushed stone porous fill, thickness as shown on the plans or minimum 6 inches thick, unless noted otherwise. Tamp fill until thoroughly compacted. Over porous fill lay moisture retention sheets (vapor barrier); two layers where indicated. Sheets shall be lapped 12 inches at joints and joints offset. When placing slab reinforcing, take precautions to prevent punctures or tears.

3.10 Expansion joint filler shall be installed as indicated.

3.11 Remove forms carefully in such manner and at such time as to ensure complete safety of structure. Do not remove forms or shoring until members have acquired sufficient strength to support their weight and the load thereon safely.

3.12 All beam and slab soffit forms for poured-in place concrete or concrete block lintels shall be left in place not less than 7 days and until concrete has attained minimum 75% of its 28-day specified strength. All beams, joists, and slabs are to be completely reshored as forms are removed. All non-supporting forms such as column and beam sides shall be kept in place not less than 24 hours.

3.13 Forms are removed at the Contractor's risk at any time; and should any of the concrete give way by such removal or become permanently injured, the Contractor shall remove and replace same at his own expense.

3.14 Remove forms carefully to avoid spalling or marring the concrete.

3.15 Remove the removable portion of form ties immediately after stripping the forms. Avoid spalling exposed concrete.

CONCRETE

SECTION 3C

JOINTS IN CONCRETE

1. GENERAL

1.1 All concrete structures (tanks, basins, wells, sumps, etc.) which are part of the work shall be so constructed as to be watertight. The Contractor shall place concrete in maximum size sections and areas as indicated and as required with watertight construction joints.

1.2 If the Contractor elects to locate the slab and wall construction joints at locations other than shown or add additional joints, he shall submit to the Engineer for approval a set of marked up design drawings indicating his proposed locations a minimum of three weeks prior to scheduled concrete placement date. The Contractor shall be solely responsible to ensure the watertightness of all structures required to be watertight.

1.3 Submit manufacturer's descriptive details of waterstops for approval.

2. MATERIALS

2.1 Continuous PVC Waterstops

2.1.1 Serrated 3/8" X 9" with 1½" outside diameter center bulb; Green Streak Style 696, Expansion Joint type.

2.1.2 3/8" x 6" PVC serrated waterstop, Style 783, as manufactured by Green Streak, St. Louis, MO. or approved equal.

2.1.3 Labyrinth waterstop as manufactured by Green Streak, St. Louis, MO. Style 790, B-3 or approved equal.

2.1.4 Provide factory-made spliced corners, crosses and special pieces by PVC Waterstop Mfgr. where required.

2.2 Steel Plate Waterstops: A36 steel plate, size as indicated on Drawings, min. 1/4-inch thick X 6" ht., unless otherwise noted.

2.3 Expanding Waterstop: Waterstop Rx as manufactured by American Colloid Co., Swellseal #8 by deNeef, or approved equal.

2.4 Tubular Injection Waterstops: Injecto-System as manufactured by deNeef or approved equal.

2.5 Wood Formed or Metal Keyways

2.5.1 No. 2 southern yellow pine; B-B pine PLYFORM plywood.

2.5.2 Premolded Keyed Metal Form Joint.

2.6 Expansion Joint filler: A premolded material similar to Celotex and composed of fiberboard impregnated with asphalt. Joint material shall be full thickness of slab or joint unless otherwise indicated, 1/2-inch thick.

3. EXECUTION

3.1 Place construction joints at the locations indicated.

3.1.1 Obtain approval of Engineer before placing construction joints at locations not shown. Joints shall be made and located to least impair the strength of the structure. Locate construction joints near the middle of slab, beam, and girder spans.

3.1.2 Allow at least 2 hours to elapse after placing concrete in columns or walls before depositing concrete in beams, girders, or slabs supported thereon. Beams, girders, brackets column capitals, and haunches shall be considered as part of the floor system and shall be placed integrally therewith.

3.1.3 Construction joints without waterstops shall have continuous keyways conforming to the details shown and be bonded in conformance with Section 3D, Cast-in-Place Concrete.

3.1.4 If joints are added or changed from the locations indicated, adjustments to the reinforcing steel details shall be made by the Contractor as directed by the Engineer.

3.2 Place continuous waterstops at construction joint locations indicated and in the following locations:

3.2.1 Construction joints in walls with one surface in contact with soil and the opposite surface dry and exposed.

3.2.2 Construction joints in walls with one surface in contact with liquid and the opposite surface dry and exposed.

3.2.3 Construction joints in walls with one surface in contact with liquid and the opposite surface in contact with soil.

3.2.4 Construction joints in base slabs on grade and building roof slabs with top surface exposed to the weather.

3.3 Anchor waterstops to the formwork to prevent dislocation while placing concrete. Wire tie waterstops at each edge to reinforcing steel at maximum 12 inches o.c. as required to hold in proper position when concrete is placed. Waterstops shall be continuous around corners and intersections. Corners and intersections shall be prefabricated. PVC waterstops shall be spliced with an electric iron splicing tool as recommended by the manufacturer. Butt weld steel plate waterstops at joints. Support steel plate waterstops with steel reinforced bars tack welded to reinforced steel.

Install expanding and injection type waterstops per manufacturer's written instructions. Injection type waterstops shall be installed by contractor licensed by the manufacturer.

3.4 Waterstops at base of walls shall be continuous steel plate of size indicated unless noted otherwise.

Vertical waterstops shall be steel plate type unless noted otherwise.

Vertical waterstops at wall expansion joints shall be PVC expansion type.

Horizontal waterstops in base shall be steel plate type unless noted otherwise.

3.5 Place expansion joint filler at intersection of floor slabs on grade with vertical walls and columns and as indicated on the Drawings.

CONCRETE

SECTION 3D

CONCRETE REINFORCEMENT

1. GENERAL

1.1 Detail, fabricate, handle, and place reinforcing steel per the "Building Code Requirements for Reinforced Concrete" ACI-318 and Concrete Reinforcing Steel Institute (CRSI) Standards, and ACI-315, Manual of Standard Practice for Detailing Reinforced Concrete.

1.2 Submit shop drawings to Engineer for approval.

Include placing plans, elevations, sections, details, bar lists, and bending details for all reinforcing.

Provide all dimensions and details necessary for forming and placement.

Show all bar supports, chairs, and other accessories necessary for proper placement of reinforcement.

1.3 Submit a certified copy of mill test showing physical and chemical analysis on each heat of reinforcing steel delivered, if requested by Engineer.

1.4 Reinforcing steel shall be clean and free of rust, scale and oil or other coatings which may reduce bond. Deliver reinforcement to site tagged for easy identification. Store off ground on wood blocking.

2. MATERIALS

2.1 Reinforcing steel shall be per ASTM A-615-60, sizes as indicated.

2.2 Welded wire fabric shall be per ASTM A-185.

2.3 Bar Supports

2.3.1 Plastic protected type at formed cast-in-place concrete slabs and beams.

2.3.2 Individual chair supports with plate bottom as manufactured by Southern Sales, Birmingham, AL for support of base slabs on grade reinforcing steel and wire fabrics.

3. EXECUTION

3.1 Unless otherwise shown on the Drawings or specified, the spacing, amount of concrete coverage, splicing and bending of reinforcing steel shall conform to the requirements of the "Building Code Requirements for Reinforced Concrete" ACI 318.

3.2 Coat wood forms to prevent bond with concrete prior to placement of reinforcing steel. Maintain reinforcing steel free of oil and dirt.

3.3 No bars partially embedded in concrete shall be field-bent except as shown or specifically permitted by the Engineer.

3.4 No splices of reinforcement shall be made, except as shown, as specified, or as authorized by the Engineer.

3.5 Place reinforcing steel in position as shown on approved shop drawings, accurately spaced, securely fastened, and supported to prevent displacement before or during concrete placement.

3.6 Wire fabric used for reinforcing slabs on the ground shall have a minimum side and end lap of 6 inches. Wire fabric, where noted, shall be in sheet form. Sheets shall be supported with chair supports having a metal base to the levels in the slab indicated on the Drawings, or to mid-height of slab unless noted.

3.7 Concrete Cover shall be as follows, unless noted otherwise:

Formed Walls and Columns	2" against backfill 2" #6 size bar or larger, and 1-1/2" #5 size bar & smaller, u.n.o.
Footings:	3"
Slabs On Grade:	3" at bottom, 2" at top
Formed Slab:	1" #5 size bar & smaller, u.n.o. 1-1/2" #6 size bar & larger, u.n.o.

CONCRETE

SECTION 3E

CAST-IN-PLACE CONCRETE

1. GENERAL

1.1 All work of this Section shall conform to the latest edition of the American Concrete Institute, "Building Code Requirements for Reinforced Concrete," ACI 318 and "Specifications for Structural Concrete for Buildings," ACI 301.

1.2 Submit concrete mix design for each type concrete required, aggregate analysis, type cement, and data for all admixtures to be used. Obtain Engineer's approval of the design mix prior to furnishing any concrete for this project. Trial batch mix design of each class of concrete required shall be made by a reputable independent testing laboratory. The independent testing laboratory, approved by the Engineer, shall be employed by the Contractor to design the concrete mixes and to prepare, cure, and break test cylinders of laboratory trial batches. Proportions will be established by these tests in accordance with ACI 318.

Submit copies of results of concrete mix designs laboratory tests to the Engineer for approval.

1.3 Furnish certified copies of mill test reports for cement.

1.4 Ready-Mixed Concrete shall be mixed and delivered in accordance with the requirements of Standard Specifications for Ready-Mixed Concrete (ASTM C-94, Method 2), subject to following limitations:

Concrete shall be delivered to the project and completely discharged within 60 minutes after beginning of the mixing period.

Additional mixing water shall be introduced to transit-mixed concrete only under supervision of the testing laboratory representative and the inspector after the mixer arrives at the project.

1.5 Cold Weather Conditions

1.5.1 Cold weather concreting shall be in accordance with the provisions of ACI-306 "Recommended Practice for Cold Weather Concreting."

1.5.2 Whenever the temperature of the surrounding air is below 40°F, all concrete placed in the forms shall have a temperature of between 50°F and 70°F for at least five days and shall be protected from freezing for as much time as is necessary to ensure proper curing of the concrete.

1.5.3 Chemicals and other foreign materials shall not be used for prevention of freezing.

1.6 Hot Weather Conditions

1.6.1 Protection against drying and excessive concrete temperature shall be provided for the first seven days. Approved practice for hot weather concreting are those outlined in ACI 305, "Recommended Practice for Hot Weather Concreting."

1.7 The Contractor shall take all precautions necessary to protect concrete from damage due to unfavorable weather conditions.

1.8 Watertightness

1.8.1 All concrete structures (tanks, basins, wells, sumps, etc.) which are part of the work shall be so constructed as to be watertight. The Contractor shall place concrete in maximum size sections and areas as indicated and as required with watertight construction joints.

1.8.2 If the Contractor elects to locate the slab and wall construction joints, he shall submit to the Engineer for approval a set of marked up design drawings indicating his proposed locations a minimum of three weeks prior to scheduled concrete placement date. The Contractor shall be solely responsible to ensure the watertightness of all structures required to be watertight.

1.9 All concrete work indicated on the Drawings and specified herein shall be performed under the personal and constant supervision of a competent construction superintendent or foreman experienced in this class of work.

2. MATERIALS

2.1 Provide Portland Cement per ASTM C-150, Type 1. Use one brand only.

2.2 Provide sand as fine aggregate per ASTM C-33.

2.3 Provide gravel or crushed stone as coarse aggregate per ASTM C-33, Size 57.

2.4 Provide clean, potable water free of deleterious substances per ACI 318.

2.5 Provide air entraining agent per ASTM C-260. Air content shall be given percent plus or minus one percent.

2.6 Provide water reducing agent per ASTM C-494, normal range, mid-range and/or high range.

2.7 Curing and Sealing: Provide liquid, spray-applied compound per ASTM C-309.

2.8 Bonding Agent: Equal parts cement and sand slurry grout mix with water to attain consistency of heavy paint.

2.9 Non-Shrink Grout: Non-Metallic, cementitious high-strength, non-shrink grout as manufactured by Master Builders or approved equal, suitable for the intended use.

3. EXECUTION

3.1 All concrete shall be Ready-Mix furnished from an approved supplier in accordance with ASTM C-94. Concrete shall be in accordance with the following classes.

3.1.1 Class A - 4,000 psi minimum compressive strength at 28 days - minimum of 5.5 bags of cement per cubic yard, air entrained, with maximum water:cement ratio of 0.42. Class A concrete to be used in all structures, including base slabs, walls and structural slabs, and walks. Class A concrete may be used throughout the work at the Contractor's option.

3.1.2 Class B - 4,000 psi minimum compressive strength at 28 days - minimum 5.5 bags of cement per cubic yard with maximum water:cement ratio of 0.42. Class B concrete to be used in all structures, including base slabs, wall and structural slabs not exposed to the elements.

3.1.3 Class C - 2,500 psi minimum compressive strength at 28 days - minimum of 4.5 bags of cement per cubic yard. Class C concrete to be used below grade for pipe kickers, encasement, braces, fillets, cradles and used to fill voids or for backfilling operations. Class C concrete may be used for concrete block core fill and bond beams fill.

3.1.4 Class D - 5,000 psi minimum compressive strength at 28 days grout mix - minimum 9.0 bags of cement per cubic yard and only fine aggregate. Class D grout mix to be used at first lift, approximately 6 inches at bottom of walls with waterstops.

3.2 Air-entrained concrete shall be used for all work exposed to the elements, 4% to 6%.

3.3 Workability of concrete shall be such that concrete can be handled, placed and worked into angles and corners of forms, around reinforcing steel and inserts without segregations and without water and fine material rising to the surface.

3.4 Order concrete as per design mix with slump as required for placement method and final location of concrete. Provide concrete with minimum slump of 2-1/2 inches and a maximum slump of 4-1/2 inches. Slump for concrete in footings on grade shall not be more than 3 inches. Increase slump on job site by addition of mid-range or high range (super plasticizer) admixture only. Do not add water to concrete on the job site.

3.5 Delivery of concrete shall be scheduled to conform to the rate of placement. Do not exceed 1-hour time limit for the concrete from batch time to the time of deposit. Concrete shall not be retempered.

3.6 Place no concrete until foundations, forms, reinforcing steel, pipes, conduits, sleeves, hanger, anchors, inserts, and other work required to be built into concrete has been inspected and approved by the Engineer. Omitted and misplaced reinforcement and embedded items are the Contractor's responsibility and the Contractor is not relieved by the Engineer's inspection. Any aluminum embedded in concrete shall be coated with a bitumastic paint (as approved by Engineer) prior to embedding. Remove debris from the space in which concrete is to be placed.

3.7 Provide edge forms for concrete slabs on grade. Place concrete of required thickness over porous fill and vapor barrier and strike off at proper levels to receive finish.

3.8 Deliver concrete from the mixer to the place of final deposit using methods which will prevent separation or loss of materials.

3.9 The placing or depositing of all concrete shall be done in accordance with the requirements of ACI 318.

3.10 Concrete shall be deposited as near as practical to its final position. Convey concrete to point of deposit by methods which will prevent separation or segregation of aggregates. No delivery equipment that would allow contact between aluminum and the concrete shall be used. The free fall of concrete shall not exceed three (3) feet.

3.11 Place concrete in continuous operation until section being placed is completed. Always place concrete into section of previously placed wet concrete.

3.12 Consolidate concrete per ACI 301. Vibration shall be applied at the point of deposit and in the area of freshly placed concrete. It shall be of sufficient duration to accomplish thorough compaction and complete embedment of reinforcement but shall not be long enough to cause segregation of the mix. To secure even and dense surfaces free from aggregate pockets or honeycomb, vibration shall be supplemented by hand spading in the corners and angles of forms and along form surfaces. Vibrators shall not be used to transport or flow concrete.

3.13 Do no flowing of concrete with vibrators. Handle concrete to prevent aggregate separation or segregation.

3.14 Before placing new concrete against concrete previously placed, the existing surface shall be picked, brushed clean and given a coat of cement grout for a proper bond.

3.15 Before pouring footings, see that bottoms of excavations are undisturbed earth or rock as required, free from frost and properly leveled off.

3.16 Install concrete sidewalks as indicated on the Drawings. Install 1/2-inch expansion joints (not to exceed 25 feet o.c.) and form control joints as shown (5'-0" o.c.), with finishers edging tool 1/8-inch to 1/4-inch wide and at least 1 inch deep. Pitch walks to cross drain minimum 3/4-inch unless otherwise indicated.

3.17 Curing

3.17.1 Maintain concrete in a moist condition for minimum 7 days after placement.

3.17.2 Water holding structures, including base slabs, walls and channel slabs: Curing with burlap, cotton, or mats kept continuously wet, or by keeping forms continuously wet and, in addition, covering up with plastic sheets.

3.17.3 All other concrete: Curing same as above or by membrane curing.

3.17.4 Install membrane curing compound as soon as the surface has hardened sufficiently. Apply compound according to manufacturer's recommendations. Permit no traffic over compound during period.

3.18 Install grout as indicated in accordance with the manufacturer's specifications. Clean surfaces free from bond-reducing material. Pack grout solidly between bearing surfaces and bases or plates to ensure that no voids remain. Fill all grouted places solid. Finish exposed surfaces, protect installed materials, and allow to cure in strict compliance with the manufacturer's instructions.

3.19 Dispose of excess materials and debris away from site.

3.20 The Contractor shall leave everything broom clean.

3.21 The Engineer may require the complete replacement of excessively defective concrete and repairs as required to correct defective concrete.

4. TESTING

4.1 A reputable, independent testing laboratory approved by the Engineer shall be employed by the general contractor to perform concrete testing.

4.2 During construction, a laboratory representative for pours 10 cubic yards or greater or a laboratory representative or trained employee of the contractor for pours less than 10 cubic yards shall be at the site of pouring and shall prepare concrete test cylinders and perform slump tests. Testing Laboratory shall submit reports to the Engineer as hereinafter specified, and Contractor shall provide the following information to the lab: temperature (air and concrete), slump, quantity and location of pour.

4.3 Set of six test cylinders shall be made for each 100 cubic yards or fraction thereof of each type concrete in each day's pour. Cylinders shall be prepared in accordance with ASTM C-31. Slump tests shall be performed on concrete from each truck. If water is added on the job, slump test shall be repeated. Tests for entrained air content shall be made on each 200 cubic yard increment of concrete placed. Air entrainment shall range from 4% to 6%.

4.4 Curing shall take place under the supervision of the laboratory representative. Cylinders shall be tested in accordance with ASTM C-39. The laboratory representative and/or the inspector in attendance at the job site shall check the time interval between batching and placement and shall perform slump tests on the concrete on each truck. If the time interval exceeds 1 hour or the slump is greater than 4-1/2 inches, the truck load of concrete shall be rejected by the laboratory representative.

4.5 Testing of six cylinders made - test two at 7 days and two at 28 days. If required 28-day strength is not met by four cylinders tested, test one of two remaining test cylinders at 45 days. If required 28-day test strength is not met by 45 day test, test last cylinder at 60 days. The average strength of any three consecutive tests shall be equal to or greater than the specified strength. Should these conditions not be met or if deficient construction is suspected by the Engineer, core tests may be required and the cost of cores and tests shall be paid for by the Contractor. If core tests fall below the design specified strength, concrete represented by the weaker strength samples shall be removed and replaced.

CONCRETE

SECTION 3F

CONCRETE FINISHES

1. GENERAL

1.1 All concrete surfaces shall have honeycombed areas patched and form tie holes grouted solid with cement grout mix.

1.2 All exposed concrete shall receive a finish that will obliterate all patching, streaks, and discoloration from the finished concrete surface. Prior to finishing, all fins and projections shall be removed.

2. MATERIALS

2.1 Cement Grout Patch Mix: Equal parts of cement and sand and sufficient water to attain workability to patch honeycombed areas and fill form tie holes solid and permanently bond to concrete.

2.2 Cement Grout Slurry Mix: Equal parts of cement and sand and sufficient water to attain consistency of heavy paint. Alternate slurry mixes may be used by the Contractor subject to Engineer's approval.

2.3 Liquid floor hardener: Lapidolath by Sonneborn or approved equal.

3. EXECUTION

3.1 Patch all honeycombed areas and fill form tie holes on all concrete surfaces solid with cement grout patch mix and attain permanent bond to concrete.

3.2 All permanently exposed wall surfaces, including interior one foot below normal operating level and exterior one foot below grade walls of open tanks, shall be rubbed with a Carborundum stone with cement grout slurry mix applied to produce a level, even textured surface to a point one foot below water surface and 6 inches below finished grade.

3.3 Interior floors to have dense, smooth steel trowel finish, except in areas to receive grout or ceramic tile floor finishes, which shall have a level float finish. Interior exposed concrete floors shall have floor hardener applied per manufacturer's specifications.

3.4 Exterior steps, walks, landings, and slabs shall be leveled with floats, troweled and given a final finish by brushing lightly and evenly with a fiber broom.

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FOR

DIVISION 5

METALS

METALS

SECTION 5A

STRUCTURAL STEEL

1. GENERAL

1.1 Furnish and erect the structural steel work required for this project in accordance with the "AISC Specifications for Structural Steel for Buildings," latest edition, unless noted otherwise.

1.2 Furnish the instructions and templates required to install anchor bolts and other structural steel items built into concrete or masonry.

1.3 Employ only welders certified in accordance with the standard qualification procedure of the AWS. Use only welders qualified in the connections and materials to be welded. Re-qualify welders when certificates are more than 2 years old.

1.4 Submittals

1.4.1 Shop and erection drawings. Identify members on drawings by means of marks matching marks on members shipped to project site.

1.4.2 Certificates of compliance with the governing specifications for each type of steel furnished.

1.4.3 Manufacturer's certifications that fasteners to be used conform to governing specifications.

1.4.4 Certification papers for each welder for review and filing.

1.5 Load, transport, unload, pile, and store structural material to keep metal and shop paint clean and free from injury.

2. MATERIALS

2.1 Structural steel, ASTM A-36.

2.2 Welded and seamless steel pipe, ASTM A-53, Grade B.

2.3 Hot-formed welded and seamless carbon steel structural tubing, ASTM A-501.

2.4 High-strength bolts, nuts, and hardened washers, ASTM A-325.

2.5 Anchor bolts, ASTM A-36.

2.6 Welding electrodes, E70XX type.

2.7 Stud Anchor: Nelson Stud anchors or approved equal.

2.8 Shop primer, Section 9A.

3. FABRICATION AND INSTALLATION

3.1 Use connections shown or, if not shown, use standard connections conforming to AISC maximum uniform load for the indicated beam size and span. Provide only bolted standard field connections with high-strength bolts.

3.2 High-strength bolting, when required, shall comply with AISC "Specification for Structural Joints Using ASTM A-325 or A-490 Bolts."

3.3 Welding shall be in accordance with "Standard Code for Arc and Gas Welding in Building Construction," AWS.

3.4 Punch and drill steel for attachment of other materials. Field drill holes not shown but required for attachment of other materials.

3.5 Column base plates and setting plates shall have true squared edges.

3.6 Prepare surfaces and prime in compliance with Division 9A - Painting.

3.7 Contact surfaces of connections which are field bolted with high-strength bolts shall not be painted.

3.8 Set base plates or setting plates to grade on steel shims or by other approved means. Provide full bearing under plates with non-shrink grout specified in Division 3.

3.9 Provide standard angle wall anchors as specified in AISC "Steel Construction Manual" for beams bearing on masonry.

3.10 Erect structural steel in true alignment and position in accordance with dimensions shown.

3.11 Provide 4" height weldments consisting of 5/8" top and bottom plates and ½" vertical cross plates with holes top and bottom for connection to anchor bolts cast in concrete roof beams and to high strength bolts thru top flange of hoist monorail beam. Provide full size shim plates with matching holes to level and adjust hoist monorail beam.

METALS

SECTION 5B

MISCELLANEOUS METALS

1. GENERAL

1.1 Furnish and install the miscellaneous metal work required for this project.

1.2 Verify field conditions and measurements so that the fabricated metals will fit together properly and be suitable for the field conditions.

1.3 Prepare surfaces and prime in compliance with Division 9A - Painting. Paint anchors to be embedded in masonry or concrete with asphaltum.

1.4 Where dissimilar metals contact each other, apply alkali-resistant paint to the more active metal. Where steel work contacts aluminum, apply two coats of aluminum paint over shop coat.

1.5 Submit shop drawings showing location, sizes of metal, method of assembly, hardware, fasteners, anchorage, and connection with other work. List metals used and governing ASTM specifications.

1.6 All items shall be complete with minor sundry and accessory parts, anchors, fittings, sleeves, equipment, etc., customarily furnished for the general type and kind of miscellaneous items shown or specified.

1.7 Exposed surfaces shall be smooth and free from blemishes. Welds to be continuous and ground smooth. Ease exposed edges. All work shall be true to line and level.

2. FABRICATION

2.1 Miscellaneous metals shall have holes, connections, and other provisions for accommodating other work.

2.2 Miscellaneous metal work shall be formed to shape and size, with sharp lines and angles. Items shall be sheared and punched to obtain clean, true lines, and surfaces. Permanent connections shall be welded. Screws or bolts shall not be used where avoidable but, if used, heads shall be countersunk, screwed tight, and threads nicked to prevent loosening. Curved work shall be sprung evenly.

2.3 Exposed surfaces shall have smooth finish and sharp, well-defined lines and arises. Joints shall be mill machined to a close fit. Necessary rabbets, lugs, and brackets shall be provided so that work can be assembled in a neat and substantial manner.

2.4 Fastenings shall be concealed where practical. Metal thickness and details of assembly and supports shall be designed to provide strength and stiffness. Joints exposed to weather shall be formed to exclude water.

2.5 Castings shall be true to pattern, smooth, straight, sound, and free from warp, holes, and other defects that impair strength or appearance.

3. MATERIALS

3.1 Structural steel shapes, ASTM A-36.

3.2 Bent or cold-formed steel plates, ASTM A36 or ASTM A-283, Grade C.

3.3 Galvanized carbon steel sheets, ASTM A-526, with 2.0 ounces commercial zinc coating, ASTM A-525.

3.4 Gray iron castings, ASTM A-48.

3.5 Bolts and nuts, Type 304 stainless steel, ASTM A-320, unless otherwise specified.

3.6 Stainless steel, Type 304.

3.7 Anchor Bolts and Regular Structural Bolts and Nuts: ASTM A-307 or A-36.

3.8 Steel Pipe: ASTM A-53, Grade B, Type E or S.

3.9 Steel Structural Tubing: ASTM A-500, Grade B, Fy = 46ksi.

3.10 Aluminum:

1. Structural shapes and plates: 6061-T6.
2. Pipe and tubing: 6061-T6 or 6063-T6.
3. Extruded shapes: 6063.
4. Cast shapes: as required.

3.11 High Strength Bolts, Washers, and Nuts: ASTM A-325.

3.12 Welding Materials: Per AWS D1.1, Structural Welding Code, type required for materials being welded.

3.13 Expansion Anchors: Hilti or approved equal. Provide galvanized anchor unless noted otherwise. Provide stainless steel where indicated. Provide epoxy type where indicated.

3.14 Miscellaneous Anchors: Set bolts, nail type pin, drive type pin, etc., as manufactured by Heckman Building Products, Hilti, or approved equal.

4. COATINGS

4.1 Galvanizing shall be performed by the hot-dip process after fabrication in compliance with the following standards:

4.1.1 Iron and steel hardware, ASTM A-153.

4.1.2 Rolled, pressed, and forged steel shapes, plates, bars, and strips 1/8-inch thick and heavier, ASTM A-123.

4.1.3 Assembled steel products, ASTM A-386.

4.1.4 Hot-dip galvanizing of steel items as indicated on the drawings, minimum 2 oz./sq. ft. zinc coating.

4.2 Bituminous paint, cold-applied asphalt mastic (extra thick film), Steel Structures Painting Council Standard SSPC-PS9.01.

4.3 Clear anodized finish on aluminum metals.

5. PIPE RAILINGS

5.1 Pipe railings shall consist of top rail, bottom rail, and full-height support posts. All rails, including wall rails, and posts shall be fabricated from 1-1/2-inch Schedule 40 and Schedule 80, Alloy 6063-T6, aluminum pipe. Support posts shall be spaced not more than 6 feet apart for aluminum rails. Toeplates shall be provided at the bottom of handrails where there are no curbs. Handrails shall resist a 200-lb. force applied to any direction at any point in accordance with OSHA requirements and be designed to meet the requirements of SBC, latest edition. No pop riveted or glued construction shall be allowed.

5.2 Concealed sleeve expansion joints shall be provided at 20-foot centers. Secure aluminum railings with stainless steel expansion anchors, minimum size 1/2" diameter x 5-1/2" long.

5.3 Adjust railings before securing in place to ensure proper matching at butting joints and correct alignment throughout their length. Plumb posts in each direction.

5.4 Anchor posts and rail ends to steel with round or oval flanges, bolted to the steel supporting members.

5.5 Anchor posts to top of concrete unless otherwise shown. Fill the annular space between posts and pipe sleeves set into concrete with molten lead, sulfur, or a quick setting hydraulic cement.

5.6 Wrap posts with insulating tape 3 inches above and 3 inches below the top surface of the concrete. The wraps shall overlap one inch.

5.7 Secure handrails to walls with wall brackets and wall return fittings at handrail ends. Brackets shall project not less than 3 inches from finish wall surface to the center of the pipe handrail, and the wall plate portion of the bracket shall be drilled to receive one 3/8-inch bolt. Brackets shall be polished cast aluminum. Locate brackets at not more than 60-inch centers. Wall return fittings shall be of the same material as railings, flush-type, with the same projection as the wall brackets. Secure brackets and return fittings to walls as follows.

5.7.1 For concrete or solid masonry, stainless steel expansion anchor bolts.

5.8 Finish shall be Clear Anodize 215 R1. Provide clear protective plastic sleeve on all parts and rails for shipping.

5.9 Provide removable standard pipe railings where required as detailed on the Drawings.

5.10 Chain sections where shown in handrails or other openings shall be fabricated from 1/4-inch thick welded links of the same metal as the handrail. One end of each section shall be permanently attached to the handrail at the same height as the horizontal rails. The other end shall have a positive latching device for attachment to fixed eyes on the opposite railing.

5.11 Handrail shall be a component system as manufactured by Thompson Fabricating Co. (TFCO), Julius Blum & Co., or approved equal. Base flanges to be TFCO. TBF-3.4 with four (4) 1/2" diameter x 3-3/4" long stainless steel wedge expansion anchors or approved equal. Toeboard to be TFCO. extruded aluminum toeboard or approved equal.

6. FIXED LADDERS

6.1 Fixed ladders shall be aluminum as fabricated by Thompson Fabricating Co. (TFCO) and as shown and specified on the Drawings. Dimensions and details shall suit the location. Provide safety cages as shown on the Drawings.

7. CHECKERED PLATE

7.1 Checkered plate shall be aluminum minimum 1/4-inch thick.

8. ABRASIVE NOSINGS

8.1 Provide on the leading edge of poured-in-place concrete and concrete-filled metal pan stairs and landings an extruded aluminum nosing, Ally No. 6063-T5 with mill finish. Nosings shall have a 3-inch wide exposed top surface, be 1/4-inch thick, and have abrasive ribs.

8.2 Nosings shall be by American Abrasive Metals Co., Wooster Products Inc., or equal.

8.3 For concrete stairs, nosing lengths shall be 8 inches less than stair or landing width.

8.4 Install nosings with concealed 1/8-inch thick flat bar type anchoring devices on 8-inch centers so that top surface is flush with finished surface of stair or landing.

9. ALUMINUM FLOOR HATCHES

9.1 Floor hatches shall be of the size and quantity as indicated on the Contract Drawings.

9.2 Door leaf shall be 1/4-inch aluminum checkered plate reinforced with structural aluminum channels and shall be capable of withstanding a 150 lbs/sf uniform load.

9.3 Access doors shall be provided with aluminum hinges. The following hardware items shall be stainless steel: slam locks, hold open devices, brackets, bolts, nuts, and washers.

9.4 The frame shall be 1/4-inch thick extruded aluminum and shall incorporate a neoprene cushion. The door shall have a spring-assist device which shall balance the door leaf at some point in the first 60° of travel or shall cause the door to open completely. In no case shall the force required to completely open the door exceed 9 pounds applied to the edge of the plate. The door shall lock automatically in the open position.

9.5 Aluminum floor hatches shall be as manufactured by Thompson Fabricating Co., Birmingham, AL or approved equal.

10. IRON CASTINGS

10.1 Iron castings shall conform to "Standard Specifications for Gray Iron Castings", ASTM A-48, and shall be free from scale, lumps, blisters, sand holes, and defects of any nature which would impair their use.

10.2 Castings shall be well cleaned with a smooth, tough asphalt coating which does not become tacky or brittle within normal temperature range.

10.3 Bearing surfaces shall be machined to provide solid bearing and to prevent rocking.

11. MANHOLE STEPS

11.1 Steps shall be Alcoa Aluminum No. 15295, MA Industries No. PSI-45, or equal; corrosion resistant, non-slip surface, 12 inches wide.

12. ANCHOR BOLTS

12.1 Provide anchor bolts as indicated on the drawings.

12.2 Unless otherwise noted, anchor bolts to be 1/2-inch diameter with total minimum embedment including hook of 9 inches and thread and projection length as required.

12.3 Provide nuts and washers as required.

13. INSERTS, SCREWS, MISCELLANEOUS ANCHORS

13.1 Provide all inserts, screws, and miscellaneous anchors as required to secure the work in place.

14. ALUMINUM I-BAR GRATING

14.1 Aluminum I-Bar grating shall be IKG Type 1-AA with 1-3/16-inch bar spacing and cross bars at 4-inch o.c., depths as indicated on the Drawings, or approved equal. Finish shall be Standard Mill as fabricated.

14.2 Provide galvanized saddle clips type fasteners, or approved equal, minimum two per piece at each support for connection to steel supports and provide welded connections to aluminum support members were indicated.

15. INSTALLATION

15.1 Inspection: Examine the areas and conditions under which miscellaneous metal items are to be installed, and correct conditions detrimental to the proper and timely completion of the Work. Do not proceed until unsatisfactory conditions have been corrected. Field verify all dimensions prior to fabrication.

15.2 Preparation: Furnish setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, anchor bolts, and miscellaneous items having integral anchors, which are to be embedded in concrete construction. Coordinate delivery of such items to project site.

15.3 Installation

1. Provide and install items listed and shown on drawings and as required for the completion of the work with anchorage and attachments necessary for installation.

2. All items of miscellaneous metal shall be erected and installed true to lines and planes shown on the drawings with vertical lines plumb and horizontal lines level and in correct relation to adjoining work. Install all miscellaneous metal in accordance with shop drawings.

3. All items and parts thereof shall be secured in a rigid and substantial manner, and methods of attachment shall be concealed wherever practicable.

4. All anchors, inserts, lugs, etc., to be built into adjoining work shall be properly located before masonry, concrete, or other work is completed.

5. Provide all miscellaneous steel angles and plates and anchors embedded in cast-in-place concrete. Provide all sleeves required for items passing through concrete. Sleeves shall be of size to permit packing and caulking as shown. Provide sleeves as required and as shown on the plans for railings.

6. Perform field welding in accordance with AWS D1.1.

15.4 Touch-up all coatings damaged during erection or installation. Touch-up abraded places and paint all welded areas with Galv-o-weld paint. Perform surface preparation of areas to suit paint.

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DIVISION 9

FINISHES

FINISHES

SECTION 9A

PAINTING

1. GENERAL

1.1 Furnish and apply the paint required for this project.

1.2 See the Contract Drawings, other Sections of these Specifications, and the painting schedule for extent of painting work.

1.3 Submittals

1.3.1 Manufacturer's application instructions for each type of paint used, and maintain recommendations.

1.3.2 Manufacturer's color samples for selection and scheduling by the Engineer.

1.3.3 Certification from each supplier of shop primed items stating compliance with these specifications and paint manufacturer's application instructions, and name and manufacturer of primer used.

1.4 Store materials in an area protected in accordance with NFPA Bulletin No. 101, current edition.

1.5 Deliver paint to the site in unbroken containers with labels affixed by the manufacturer showing the name of the paint, the manufacturer, the color, and mixing and application instructions.

1.6 Mask or protect finished surfaces in areas being painted.

2. PAINTING CONDITIONS

2.1 Coatings shall be applied during good painting weather. Air and surface temperatures shall be within limits prescribed by the manufacturer for the coating being applied, and work areas shall be reasonably free of airborne dust at the time of application and while coating is drying.

2.2 Provide temporary heat as required to maintain the manufacturer's prescribed temperature day and night until painting is complete and paint is dry.

2.3 In high humidity areas (such as tunnels, galleries, basements, and filter rooms) provide de-humidification equipment to maintain suitable conditions for application and drying of paint.

2.4 Maintain adequate ventilation to promote proper drying.

3. MATERIALS

3.1 Products for the paint system shall be Tnemec Co., Inc., Sherwin Williams Co., or approved equal.

3.2 Products of manufacturers other than that named may be accepted by the Engineer if proof is submitted that products are of the same generic type and equal to those specified in composition, durability, utility, and appearance for intended use.

3.2.1 Submittals shall include the following performance data as certified by a qualified testing laboratory:

1. Abrasion - Fed. Teat Method Std. No. 141. Method 6192, CS-17 Wheel, 1,000 grams load.
2. Adhesion - Elcometer Adhesion Tester.
3. Exterior Exposure - Exposed at 45 degrees facing ocean (South Florida marine exposure).
4. Hardness - ASTM D-3363-74
5. Humidity - ASTM D-2247-68
6. Salt Spray - (FOG) - ASTM B-117-73

3.3 Colors shall be selected by the Engineer after systems have been approved.

3.4 Paint system shall be supplied by one manufacturer.

4. SURFACE PREPARATION

4.1 General

4.1.1 Remove foreign material, clean and dry surfaces, and roughen as recommended by paint manufacturer for proper adhesion of paint.

4.1.2 Obtain Engineer's approval of surfaces for field painting before application of each coat.

4.1.3 Clean previously primed surfaces so as not to damage the coating. Clean damaged areas of coatings with the same cleaning methods specified for bare surfaces.

4.1.4 Paint blast-cleaned surfaces the same working day. Re-clean surfaces on which rust has formed.

5. APPLICATION

5.1 Use brushes, rollers, or spray equipment only. Do not spray plastered walls, interior woodwork, doors, or trim.

5.2 Final coats of decorative paint shall be applied by brush or roller only.

5.3 Materials shall be mixed, thinned, and applied according to the manufacturer's printed instructions and in accordance with AWWA D102-78. All materials in contact with Potable Water must be approved by the US EPA or NSF (when effective) and the State Health Department, Division of Water.

5.4 Include the painting of engaged and free standing columns when painting walls. Include sides and soffits of beams and transitions between ceiling levels when painting ceilings.

5.5 Allow each coat to dry per manufacturer's recommendation.

5.6 Do not paint code required labels (such as UL or FM) or any equipment identification, performance ratings, name, or nomenclature plates.

5.7 Provide a finished surface evenly coated with the thickness specified and free of runs, drips, sags, crawling, brush marks, holidays, or other defects.

5.8 Dry and wet film thickness and continuity of painted surfaces will be subject to field check.

5.9 Furnish inspection devices in good working condition for the detection of holidays and measurement of paint film thickness. Keep the devices available at the construction site for use by the Engineer at all times until final acceptance of coatings. Acceptable devices include the Nordson Wet Film Gauge, a magnetic gauge for ferrous metals, and a Tooke Gauge for non-ferrous metals, or approved equals. At least one wet film gauge and one dry film gauge shall be available to the Engineer.

6. PAINTING SCHEDULE

6.1 General

6.1.1 The following schedule indicates the paint systems, the types of paint and the general types of surfaces, by exposure, to be painted under each system.

6.1.2 In general, paint all new or modified structures and items except the following surfaces:

Stainless Steel - all surfaces.

Aluminum - all surfaces, except where indicated. (Aluminum in contact with concrete to be coated with approved bitumastic paint).

Fiberglass - all surfaces.

Concrete structures and concrete floors (except as designated on Drawings).

Tile - ceramic, acoustical.

Factory finished furniture - unless damaged.

Factory furnished equipment - If a durable high quality permanent finish is provided, such finish is undamaged, and colors conform to color scheme selected.

Countertops or other plastic laminates.

Glass.

Galvanized Steel - unless otherwise noted.

6.2 Shop Painting

6.2.1 Prepare surfaces as specified under surface preparation.

6.2.2 Prime surfaces in accordance with the applicable systems listed in this schedule.

6.2.3 Provide certification as previously specified.

6.2.4 Coatings on factory finished items shall conform to the requirements of these Specifications for their anticipated exposures.

6.3 Field Painting

6.3.1 Prepare surfaces as specified under surface preparation.

6.3.2 Paint bare and shop primed surfaces in accordance with the applicable system listed in the following schedule.

6.3.3 Coordinate field painting with shop priming to insure complete compatibility and adhesion of paint materials.

6.4 Paint Systems Schedule

		Dry Mils
6.4.1	Ferrous Metals (Exterior - Normal Exposure)	
	Surface Prep: SSPC-SP6 Commercial Blast Cleaning	
	1st Coat : 66-1255 H.B. Epoxoline (T)	4.0-6.0
	2nd Coat: 1075-Color Endura-Shield (T)	3.0-5.0
6.4.2	Ferrous Metals (Subject to Immersion)	
	Surface Prep: SSPC-SP10 Near-White Blast Cleaning	
	1st Coat: 20-1255 Pota-Pox (T)	4.0-6.0
	2nd Coat: 20-Color Pota-Pox (T)	4.0-6.0
6.4.3	Ferrous Metals (Interior - Normal Exposure)	
	Surface Prep: SSPC-SP6 Commercial Blast Cleaning	
	1st Coat: 66-1255 H.B. Epoxoline (T)	4.0-6.0
	2nd Coat: 66-Color Hi-Build Epoxoline (T)	4.0-6.0
6.4.4	Factory Primed Surfaces	
	Surface Prep: Surface shall be clean and dry	
	Int. Coat: 530 Omnithane (T)	2.0-3.0
	Finish Coat: See top coat for exposure	

6.5 Clean Up

6.5.1 Remove and dispose of all rubbish or all unsightly material, leaving the premises in a clean condition.

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DIVISION 16

ELECTRICAL

ELECTRICAL

SECTION 16A

GENERAL ELECTRICAL APPURTENANCES

1. GENERAL

1.1 Furnish and install the electrical work specified or indicated on the Contract Drawings. The specifications and drawings do not include every equipment and conduit detail but all devices and appurtenances necessary to fully complete the work, whether the details are particularly specified or not, shall be included.

1.2 Certain items of equipment and control, such as electric motors, solenoid valves, and similar items, are provided under other divisions of the specifications and shall be connected as a part of the work under this Division, unless otherwise indicated.

1.3 Horsepower ratings listed on the Contract Drawings for motors are approximate.

1.4 See Division 1 for other requirements relating to furnishing and installing the work required under this Division.

2. INCLUDED WORK

2.1 Concrete for equipment bases, conduit encasement, and as otherwise required shall be in accordance with Division 3.

2.2 Excavation, backfill, and related work shall be in accordance with Division 2.

3. CODE COMPLIANCE

Electrical work shall be in compliance with the ordinances and bylaws of the City, State, Federal, or other political subdivision having jurisdiction. In the absence of other more stringent authority, the work shall conform to the requirements of the National Electrical Code, 2002 edition.

4. STANDARDS

Where materials and methods are indicated to be in conformance with a standard specification, it shall refer to the latest edition of the specification including revisions. Listing of a standard specification without further explanation means that the material or method shall conform to the specification.

5. VERIFICATION OF CONTRACT DRAWINGS

5.1 The Contract Drawings indicate generally the locations of outlets, fixtures, equipment, conduit, and wiring, and the details necessary for a complete installation. To avoid interferences, changes may be required from the installation shown on the Contract Drawings. Obtain approval of the Engineer before making changes.

5.2 Do not install electrical work for any item of equipment specified under this or other divisions until shop drawings of the equipment, approved by the Engineer, are available.

6. SUBMITTALS

Submit shop drawings of equipment assembled off the site and project data on equipment or appliances included in the project, as specified in Section 1C.

7. CATALOG NUMBERS

Where manufacturer's catalog or figure numbers are given, supply the equipment represented by these numbers. If the manufacturer has revised the numbers since publication of this specification but still produces the item specified, furnish equipment or appurtenances identical to that originally represented by the catalog or figure numbers given. If a manufacturer has redesigned any of the products specified, furnish the improved model regardless of whether or not the item retains its original numbers.

8. MATERIALS AND EQUIPMENT

8.1 The sizes and capacities of electrical materials and equipment shall conform to the latest requirements of the NEC, NEMA, the prevailing State and Local electrical codes, and to the applicable rules and regulations of the electrical utility serving the project.

8.2 Material and equipment shall be the products of established and reputable manufacturers. They shall be new and of first class construction and shall be guaranteed to perform the service required. Materials and equipment shall bear the label of approval of the UL when approval is available for the type of material or equipment.

8.3 Equipment used as service equipment shall be UL marked "Suitable For Use As Service Equipment."

8.4 Similar or identical material or equipment shall be the product of the same manufacturer or supplier to reduce maintenance expense.

9. INSTALLATION

Electrical work shall be installed in a neat and workman-like manner in accordance with the best practices of the trade. Unless otherwise indicated, materials and equipment shall be installed in accordance with the manufacturer's recommendations.

10. PROTECTION OF WORK

Protect electrical work fixtures, equipment, and appurtenances from damage during construction and until final acceptance of the completed project. Close conduit openings with plugs or caps during installation. Cover fixtures and equipment and protect against dirt, water, chemicals, or mechanical injury. Before final acceptance, clean fixtures and equipment and deliver to the Owner in perfect condition.

11. EQUIPMENT FOUNDATIONS

Equipment supported from the floor, except when it contains roll-out type equipment, shall be anchored to a 4-inch high concrete pad. After equipment is in place and aligned, grout the bases as specified in Division 3.

12. NAMEPLATES

12.1 Provide nameplates on electrical equipment and appurtenances located remote from, motor control centers, panel boards, control panels, and consoles.

12.2 Nameplates shall be engraved brass. Nameplates shall be not less than 1/16-inch thick. Nameplates shall be 2 x 3/4-inch size or more, with 3/8-inch lettering. Inscriptions shall designate the item of equipment controlled.

12.3 Attach nameplates with brass or stainless steel screws or other approved devices, but pressure type adhesives shall not be used. Where space is not available on the item for mounting the nameplate, install nearby where directed by the Engineer.

13. ELECTRIC SERVICE AND METERING

13.1 Provide all equipment, wiring, and connections required for a complete and ready-to-operate electric power service and metering installation in compliance with the requirements of the electric utility serving the project.

13.2 Obtain from the electric utility approval of the electric service and metering before installation.

13.3 Kentucky Utilities Company will provide electrical services at the locations and voltages as shown on the Contract Drawings.

13.4 Pay any charges made by Kentucky Utilities for installation of new services and include the cost in the bid price.

14. ELECTRIC SERVICE

14.1 Provide new electric services as indicated on Contract Drawings.

15. FINISH GRADE

References to finish grade in Division 16 or on the electrical drawings means the final grade outside the structure.

17. TESTING

17.1 Before final acceptance, test the electrical work, material, and equipment provided under this Division.

17.2 Tests may be made progressively as parts of the work are completed or may be made when the work is complete, at the option of the Engineer. Before testing, check the work for proper connections and adjustments and place in satisfactory operating condition.

7.3 Adjust, repair, or replace improper or faulty connections materials, and equipment discovered during the tests.

17.4 Work Under Other Divisions

17.4.1 Before final acceptance, test the electrical material and equipment provided under other divisions and connected under this Division. This material and

equipment shall be tested the same as that specified for the work under this Division.

17.4.2 If failure occurs because of the connecting or adjusting methods used, change, repair, or replace, as determined by the Engineer, the material or equipment which failed.

17.5 Work By Other Contractors

17.5.1 Before final acceptance, test the electrical material and equipment provided under other contracts and connected under this Contract. This material and equipment shall be tested the same as that specified for the work under this Contract.

17.5.2 The Contractor will not be responsible for the failure of material and equipment provided under other contracts unless failure is due to the connecting or adjusting methods used. If such is the case, change, repair, or replace, as determined by the Engineer, any material or equipment that has failed.

17.6 Tests Shall Include The Following:

17.6.1 Examine the rating of motor starter overload protective devices, motor circuit protectors, and motor nameplate full load running current, and determine whether the overloads are suitable for motor protection. Replace inadequate protective devices and set trips of motor circuit protectors before energizing motors.

17.6.2 Measure the line-to-line and line-to-neutral voltages at the load terminals of the main circuit breaker or switch or main incoming lugs of each piece of power generation and distribution equipment.

17.6.5 Measure the line currents of each phase of each motor under load.

17.6.7 Set and adjust isolating switches, disconnecting devices, contactors, motor starters, control switches, relays, pushbutton stations, adjustable trip circuit breakers, motor starting switches, electrodes and other switching and control devices for proper contacts and operation.

17.6.8 Check proper rotation, phase sequence and connections of busses, wires, cables, transformers, and motors.

17.6.9 Check control, alarm and signal connections associated with all equipment.

17.6.11 Where motors are furnished with multiple winding temperature detectors, one of the detectors shall be connected into the circuit for starting and testing purposes. After the motor has been under load conditions for two hours, the detector with highest temperature shall be included in the motor control circuits. The other winding temperature detectors shall be spare and shall be terminated in accordance with the motor manufacturer's recommendation.

17.7 Tests shall be made in the presence of the Engineer. Furnish the equipment required to perform the tests.

17.8 Notify the Engineer in writing when the work has been completed and tested, ready for operation. The Engineer may require additional tests before the facility is placed in operation. Perform the additional tests and make repairs and improvements of material, equipment, or work found by the Engineer to be defective or of not meeting the requirements of the specifications.

18. RECORD DRAWINGS

18.1 Alterations and additions to the electrical installation made during execution of the work shall be neatly and plainly marked with red pencil on a set of record drawings kept at the Contractor's field office.

18.2 When the work is complete, and before final payment, submit to the Engineer a complete set of record drawings.

18.3 Submit two sets of prints of the record drawings for approval. After approval, stamp each with "Record Drawing" and affix the signature of the supervising Engineer or electrician to each drawing.

19. DATA TO BE FILED WITH OWNER

19.1 Furnish the following data when testing is complete and before final acceptance of the work. The data shall be compiled in 8-1/2 x 11-inch hard cover booklets, arranged by buildings or areas where more than one building or area is involved, and filed with the Engineer in triplicate.

19.1.1 Nameplate data of each motor and equipment identification, a record of measured line currents under load for each motor, and location of the motor within the plant.

19.1.2 A list of the manufacturer's name and type, code number, or ampere rating of overload heaters for each motor starter and the trip settings of each motor circuit protector.

19.1.3 A list of the line-to-line and line-to-neutral voltages at the load terminals of the main circuit breaker, switch or main incoming lugs of each piece of power generation and distribution equipment.

19.1.5 Interconnection wiring, diagrams for the process, instrumentation, heating, and ventilating equipment connected under this Division. The diagrams shall show connections between motor starters, control panels, motors, devices, and other equipment and shall include identification of terminals, color coding, and numbering of interconnection wires.

ELECTRICAL

SECTION 16B

ELECTRICAL APPURTENANCES

1. GENERAL

1.1 Furnish and install the electrical appurtenances specified in this Section or shown on the Drawings required for the electrical work on this Contract.

1.2 Electrical work shall be as specified herein unless specifically indicated otherwise.

2. LIGHTING AND AUXILIARY SYSTEM

2.1 Fixtures

Lighting fixtures shall be in accordance with the schedules on the Drawings and shall include energy saving lamps. Fixtures shall be by manufacturers scheduled on Drawings or equal. All fluorescent ballasts shall be energy-saving type meeting Federal Standards as manufactured by MagneTek or Advance. Lamps shall meet Federal Standards and be as manufactured by Osram/Sylvania or Phillips.

2.2 Toggle switches

Toggle switches shall conform to FS W-S-896, Specification Sheet W-S-896/2, and to NEMA WD-1-1965. They shall be brown, AC only, rated 20-amp, 120-277-volt, Hubbell #1221 (single pole), Hubbell #1223 (3-way), Hubbell #1224 (4-way).

2.3 Receptacles

Duplex convenience outlets shall conform to FS W-C-596, Style X2 and to NEMA WD-1-1965 and shall be 2-pole, 3-wire, brown, and rated 20-amp, 125-volt, Hubbell #5262. Other receptacles shall be as indicated in the schedules on the Drawings.

2.4 Plates

Wall plates for flush steel boxes shall be Type 302 stainless steel with satin finish, 0.035 inch thick, conforming to FS W-P-455.

2.5 Covers

Cast covers for toggle switches shall be Appleton No. FSK-IV, Crouse Hinds No. DS181, or equal. Cast covers for duplex convenience outlets shall be Appleton No. FSK-IVDR, Crouse Hinds No. WLRD-1, or equal. Cast covers for other receptacles shall have threaded caps attached to the covers with lengths of chain.

2.6 Transient Voltage Surge Suppressors

Provide transient voltage surge suppressors (TVSS's) where indicated on Drawings. Suppressors shall be Advanced Protection Technologies HP Series or equal, at main distribution panel and Series 100 or equal at other panels and shall be U.L. 1449 listed.

Transient voltage surge suppressors shall have a minimum rating of 100,000 amps surge current per phase (8/20 microseconds current waveform).

3. ELECTRICAL RACEWAY SYSTEM

3.1 Unless otherwise specified or indicated, all conductors shall be installed in raceways.

3.2 Raceways

Rigid steel conduit shall be heavy-wall full mild steel conforming to FS WW-C-581. Outside surfaces, including threads and couplings, shall be hot dipped or electro galvanized or sherardized. Connections shall be threaded.

3.3 Flexible Metallic Conduit

Flexible metal conduit shall be American Brass Co. Sealtite Type UA, International Metal Co. Liquidtite Type UA, or equal. Fittings shall be as recommended by the manufacturer. Connectors shall have nylon-insulated throats.

3.4 Non-metallic Conduit

Non-metallic conduit shall be PVC Schedule 40 conforming to FS W-C-1094. Fittings shall be as recommended by the conduit manufacturer. The minimum wall thickness of 2-inch conduit shall be 0.060 inch, 3-inch conduit 0.092 inch, 4-inch conduit 0.121 inch, and 5-inch conduit 0.152 inch.

3.5 Conduit Fittings

3.5.1 Conduit couplings, elbows, and nipples shall conform to the Specifications for the conduit.

3.5.2 Locknuts, bushings, reducers, and similar conduit fittings shall be galvanized or cadmium plated and shall conform to FS W-F-408.

3.5.3 Cast metal or malleable iron conduit fittings and outlet boxes shall be galvanized or cadmium plated and shall conform to FS W-C-586. Aluminum used for cast metal fittings shall be copper free. Cast metal or malleable iron outlet boxes shall be at least 2-1/2 inches deep. Covers for fittings and outlet boxes shall be of the same material, designed to fit the box or fitting, and complete with gaskets.

3.5.4 Sheet metal outlet boxes shall be galvanized or cadmium plated and shall conform to FS W-J-800. Sheet metal outlet boxes for lighting fixtures shall be not less than 4-inch octagon. Other sheet metal outlet boxes shall be not less than 4-inches square. Multiple-gang boxes shall be one-piece construction. Covers for exposed boxes shall be of the same material and shall fit the box.

3.6 Conduit Hubs

Conduit hubs not integral with a box or fitting shall be malleable iron or stainless steel with nylon-insulated throats. Hubs shall have positive grounding and shall be equipped with O-rings of neoprene for a watertight installation.

3.7 Junction And Pull Boxes

3.7.1 Junction boxes and pull boxes shall be cast metal. Covers shall be of the same material and shall fit the boxes.

3.7.2 Cast metal boxes

3.7.2.1 Cast metal boxes shall be close grain grey iron or copper-free aluminum alloy, free from blowholes, shrinkage cracks, cold-shuts, blisters, or other defects. Warped or defective boxes will not be accepted.

3.7.2.2 Boxes and covers shall have machined joints. Drilling and tapping shall be accurate. Boxes shall be provided with clean cut, neoprene gaskets.

3.7.2.3 Cover screws shall be copper-silicon alloy for cast iron boxes and stainless steel for cast aluminum boxes.

3.7.2.4 Cast iron boxes shall be hot-dipped galvanized inside and outside. Surfaces shall be smooth before galvanizing.

3.8 Raceway System Installation

3.8.1 The electrical installation shall consist of insulated conductors installed in metallic raceways. No raceway smaller than 3/4-inch shall be installed except where indicated.

3.8.2 Raceways installed exposed shall be rigid galvanized steel conduit.

3.8.5 Install exposed raceways in straight lines at right angles to or parallel with walls, beams, or columns, and group together as much as possible. Make changes in direction of exposed runs with symmetrical bends or cast metal conduit boxes.

3.8.6 Conduit runs shall have no more than the equivalent of three 1/4 bends (270 degrees total) between pull points. Raceway bends shall have a radius as long as possible. Short radius bends shall not be used unless approved by Engineer. Make field bends with approved hickeys or conduit bending machines.

3.8.7 If possible, raceways shall drain to the nearest box or fitting. If not possible, provide other means for draining entrapped water.

3.8.8 Provide wall seals for raceways passing through exterior walls of structures below grade, except at electrical manholes.

3.8.9 Provide rigid metallic sleeves where exposed raceways pass through floors, walls (except exterior walls below grade), and ceilings. Sleeves shall extend 3 inches above floors or ceilings and shall be flush with each side of walls. Pack the space between the outside of conduits and the inside of sleeves with oakum and grout or plaster of paris.

3.8.10 Raceways in the ground shall be protected on all sides by concrete not less than 3 inches thick.

3.8.11 Make up threaded raceway joints with a conductive compound applied to male threads only to insure low- resistance ground continuity.

3.8.12 Concrete-tight split couplings may be used in raceways embedded in concrete instead of union type couplings. After installation and before concrete is poured, demonstrate to Engineer that the installation has low resistance.

3.8.13 Provide expansion fittings in raceways crossing expansion joints. Expansion locations are shown on the structural or architectural Drawings.

3.8.14 Running threads shall not be used.

3.8.15 Provide reducers as required to connect conduit to equipment.

3.8.16 Provide liquidtight flexible metal conduit not more than 3 feet long to connect motors, limit switches, solenoid valves, and other devices where vibration is possible or flexibility is desired. Fittings shall be approved for the purpose and, where required, shall include a method of terminating the bonding and grounding conductor, and a grounding conductor shall be installed in the raceway.

3.8.17 Provide conduit hubs to terminate conduits at cast metal or malleable iron boxes which do not have integral hubs and at steel enclosures or boxes located below grade floor elevation in structures.

3.8.18 Provide junction and pull boxes with covers where indicated. The size of junction and pull boxes shall be in accordance with the NEC, but larger boxes shall be provided where shown. Larger sizes or additional boxes than those shown or required may be installed to utilize standard sizes or to facilitate the installation.

3.8.19 Junction and pull boxes which receive conduit drainage shall have drainage openings in the bottom and vent openings in the bottom or sides. Install surface junction and pull boxes with a 1/2-inch clearance between the box and the surface. Spacers shall be 1 x 1/2 x 1/8-inch bar channels. Wood spacers shall not be installed.

3.8.20 The size of outlet boxes shall be in conformance with the NEC as a minimum.

3.8.22 Provide plates and covers on outlet boxes which do not have attached lighting fixtures.

3.8.23 Unless otherwise indicated, outlet, junction, and pull boxes less than 1,800 cubic inches shall be cast metal or malleable iron. These boxes shall be NEMA 4.

3.8.24 Install only one device in a single-gang position.

3.8.26 Until conductors are pulled, the ends of raceways shall be plugged with tapered plugs or capped bushings. Clean raceways with a dry swab before pulling conductors. Clogged raceways shall be freed of obstructions or be replaced.

3.9 Raceway Supports

3.9.1 Support surface-mounted raceways using one-hole, cadmium plated, malleable iron clamps with clamp backs which provide clearance between the raceways and the mounting surface.

3.9.2 Support other raceways by trapeze, rings, or clevis hangers. Supports for raceways 2-inch and smaller shall be cadmium plated adjustable swivel ring hangers, and for larger raceways supports shall be galvanized adjustable clevis type hangers.

3.9.3 Trapeze hangers shall be structural channels, angle irons, or preformed channel shapes with raceways held in place by U-bolts, clips, or clamps. Hangers shall have edges ground and dressed and shall be hot-dipped galvanized after fabrication. Preformed channels shall be not less than 1-5/8 x 1-5/8 inches by 14-gauge, and field-cut edges shall have end caps.

3.9.4 Do not use chain, wire, or perforated strap hangers.

3.9.5 Do not support raceways from pipelines or other raceways.

3.9.6 Fastenings shall be expansion bolts to concrete or solid masonry walls and machine screws, welded threaded studs, or spring tension clamps to steel. Threaded studs driven by a powder charge and provided with lock washers and nuts may be used in lieu of expansion bolts, machine screws, or wood screws.

3.9.7 Expansion anchors shall be steel wedge type not less than 1/4-inch size. They shall extend at least 3 inches into concrete or masonry.

3.9.8 Power set fasteners shall be not less than 1/4-inch size and shall extend at least 1-1/4 inches into concrete.

3.9.9 Inserts in concrete and slabs to support raceways shall be provided under this Division. Inserts for individual hangers shall be galvanized malleable iron and shall include removable nuts held in place by V-type teeth on the inserts. Continuous slotted channel inserts shall be on the galvanized steel with integral anchors at 6-inch centers. Factory finished steel snap-on cover plates shall be provided on channel inserts between support attachments.

3.10 Underground Raceway Installation

3.10.1 Raceways installed underground and under ground floor slabs may be non-metallic turning up with rigid galvanized elbows except conduit for 4-20mA signal conductors shall be rigid galvanized only.

3.10.2 Non-metallic raceways shall include ground conductors to maintain grounding continuity. The ground conductors shall be sized in accordance with the NEC. Ground conductors shall be bonded to the grounded portion of the raceway system at each end of non-metallic raceways.

3.10.3 Where duct bank abut walls of building and/or structures, provide steel reinforcing as required to tie duct bank and wall together to prevent duct bank settling which could result in shearing of conduits.

3.10.4 Seal underground raceways entering structures with duct seal or equivalent material at both ends.

4. ELECTRICAL WIRE AND CABLE

4.1 General

4.1.1 In this Specification and on the Drawings, the words wire, cable, and conductor are used interchangeably and shall mean insulated conductor as defined in the NEC.

4.1.2 Provide the wire and cable required to connect power, branch, control, and signal circuits as indicated and as specified.

4.1.3 Wire and cables shall be delivered in full reels and shall be protected against injury. UL approved tags showing the manufacturer's name and the type of insulation, size, and length of wire in each coil or reel shall be attached.

4.1.4 Conductors shall be soft drawn annealed copper wire. Conductors No. 8 and larger shall be stranded; smaller sizes shall be solid, except control wiring shall be stranded.

4.1.5 Insulation and outer covering, whether metallic or non-metallic, shall be designed for the conditions under which the wire or cable is used. Wires and cables for power, branch, and control circuits operating at 480 volts or less shall have 600-volt insulation, except for fixture wire and signal cable.

4.1.6 Wire smaller than No. 12 shall not be used unless shown.

4.1.7 Fixture wire shall be in compliance with the NEC.

4.1.8 600-volt cables shall be UL listed.

4.2 600-Volt Wire and Cable

4.2.1 All 600-volt wire and cable No. 8 size and larger shall be single-conductor copper with heat and moisture resistant thermoplastic insulation type THWN.

4.2.2 All 600-volt wire and cable smaller than No. 8 shall be single-conductor copper with heat and moisture resistant thermoplastic insulation, THWN.

4.3 Installation

4.3.1 Use lubricating compounds when pulling wires and cables into conduits. The compounds shall not be injurious to the conductors and shall not harden or become adhesive. Provide slack in each wire run for contraction and expansion of the wires. Where a number of single conductor wires are trained through a box, manhole, or handhole, they shall be cabled together and supported. Do not bend wires so that insulation is injured.

4.3.2 Use cable grips or other devices to distribute the strain to the conductor, insulation, and jacket. Fish tapes, cable grips, and other devices used to pull wires shall have no sharp projections that will scratch or otherwise injure the interior of the raceway.

4.3.3 Control or instrumentation wiring shall not be run in the same conduit as power distribution conductors.

4.4 Splices

4.4.1 Materials used for splices shall be compatible with conductors, insulations, and protective jackets. Splices shall insulate and protect the conductors as much as the insulation and protective jackets of the individual wires and cables. In manholes, handholes, and other locations where moisture may be present, the splices shall be waterproof and suitable for submersion.

4.4.2 Splices in signal cables shall be nylon, self-insulated, crimp type for individual conductors, with an overall covering of plastic tape, heat shrinkable plastic sleeve, or poured epoxy, installed in accordance with the manufacturer's directions.

4.4.3 Splices for 600-volt wires No. 8 and smaller shall be indenture compression or screw-on compression type connectors rated 600-volt, 75C. Sizes shall be as recommended by the manufacturer of the connectors for the number and size of wires connected. Insulators shall be heavy duty, non-rigid plastic which will not break or crack when installed with pliers or compression tools and shall have skirts long enough to prevent flashovers and to protect excessively stripped wires.

4.4.4 Screw-on compression connectors shall be non-restricted, expandable, zinc-coated, steel springs capable of holding conductors under constant compression along at least half of the spring length after mechanical and thermal stresses have been applied and released. Springs shall be contained so that the wires will not cut through the ends of the connectors and insulation. Install connectors with tools designed for the purpose. Waterproof spring compression connectors with epoxy connector sealing packs of with an alternate method approved by Engineer.

4.4.5 Splices for 600-volt wires No. 6 and larger shall be made with compression type copper sleeves with conductivity equal to that of the conductors and insulated with plastic tape, heat-shrinkable plastic sleeve, or other material approved by Engineer, equivalent to the wire insulation.

4.4.6 Insulating tape for 600-volt wires and for signal cables shall be vinyl plastic conforming to FS HH-I-595.

4.5 Terminations

4.5.1 Provide terminal lugs on the ends of 600-V wires unless lugs are provided on the connected device, such as circuit breakers. Terminal lugs for wires No. 6 and smaller shall be solderless, compression type copper. Lugs for wires No. 4 and larger shall be color keyed, compression type copper, with insulating sealing collars. Sizes shall be as recommended by the manufacturer for the wire sizes terminated. Lugs used to connect wires to copper bus bars shall be 2-hole type for wires No. 4 and larger.

4.5.2 Terminal lugs which are fastened together, as on motors, transformers, and other apparatus, or when the space between studs is so small that the lugs can turn and touch each other, shall be insulated for a dielectric strength of 2-1/2 times the normal potential of the circuit.

4.6 Identification of Conductors

4.6.2 Provide permanent self-sticking wire markers on each 600-volt wire and each conductor in signal or communications cable installed under this Division. Install markers at each termination and in enclosures, such as junction, outlet, and pull boxes, and on each spliced wire.

5. GROUNDING

5.1 Grounding and bonding shall be in accordance with Article 250 of the NEC and as indicated on Drawings. Insulated green grounding conductor shall be provided in all power distribution conduits.

5.2 Grounding conductors shall be copper and shall have 600-volt insulation unless otherwise specified or indicated. Grounding conductor sizes shall be not less than required by the NEC and shall be larger where indicated.

5.3 Ground rod type made electrodes shall be copper weld type rods, not less than 5/8-inch diameter and 10 feet long.

5.4 Grounding connections shall be made to driven ground rods and shall be supplemented by bonding to the metal underground water pipe system, to an effectively grounded metal building frame and to the interior metal cold water piping system. A water piping system shall not be used as the sole grounding electrode because it may be isolated or insulated.

5.5 Provide made electrodes outside of structures. Electrodes installed in multiple to form a grounding field shall be at least 20 feet apart. Install grounding conductors outside of structures 3 feet below grade. Connections to made electrodes or to building structure steel shall be thermite welded. Wrap thermite welded connections with 4 layers of electrical tape and overlap the conductor insulation at least 4 inches. Grounding conductor connections to piping systems, ductwork, or other equipment shall be made with grounding connectors and shall be accessible for inspection and maintenance. Metal conduits carrying grounding conductors shall be bonded to the conductors.

5.6 Provide a minimum of 20-feet of bare copper #250 MCM wire encased within concrete footing and connected as part of grounding electrode system per NEC 250-81(C).

5.8 Before grounding systems are placed in regular service, measure the resistance to ground of each made electrode. Make the measurements in the presence of Engineer and submit copies of the results. If the resistance to ground of any made or building grounding electrode exceeds 25 ohms, install additional made electrodes as required to reduce the resistance to less than 25 ohms.

6. ELECTRICAL CONTROL EQUIPMENT

6.1 Safety Switches

6.1.1 Safety switches shall conform to FS WS-865C and shall be heavy duty type, 600-volt, 3-phase, unless otherwise indicated. Class RK-5, dual element, time delay, fuses (Bussman Fusetrons) shall be provided in fused switches. Provide rejection kits in each safety switch which reject all type fuses except Class R.

6.1.2 Safety switches shall be installed in enclosures with external operating handles equipped for locking in the "off" position and with cover interlocks so that the door cannot be opened when the switch is on.

6.1.3 Enclosures for safety switches exposed to the weather shall be NEMA 4, cast or stainless steel.

6.1.4 Safety switches shall be Square D, Siemens, Cutler-Hammer/ Westinghouse, General Electric, or equal and shall be UL listed.

6.1.5 Provide equipment ground lug in each safety switch.

6.1.6 Provide engraved nameplate on each safety switch.

6.2 Circuit Protective Devices

6.2.1 Circuit protective devices shall have number of poles and voltage rating as required and as shown on the Drawings.

6.2.2 Circuit protective devices for feeder and branch circuit conductors shall be manually-operated, molded case, thermal-magnetic, circuit breakers with trip ratings as shown. Circuit breakers shall be common trip and have single operating handles of molded insulating material with indicators showing "On," "Tripped." and "Off" positions. Circuit breakers shall not be smaller than 100-amp frame and shall have interchangeable trip units when larger than 225-amp frame.

6.2.2.1 Circuit breakers shall have a UL listed interrupting rating at voltage shown on Drawings.

6.2.3 Individually mounted circuit protective devices shall be installed in enclosures with external operating handles with provisions for locking in the "off" position and cover interlocks so that the door cannot be opened when the circuit protective device is on. Enclosures exposed to the weather shall be NEMA 4, cast or stainless steel. Flush mounted enclosures shall be NEMA 1B. Other enclosures shall be NEMA 12.

6.2.4 Circuit protective devices shall be Square D, Siemens, General Electric, Cutler-Hammer/Westinghouse or equal.

6.3 Control Stations

6.3.1 Control station pushbuttons, selector switches, indicating lights, and other devices shall be heavy duty, oil-tight type. Enclosures for control stations exposed to the weather, including those installed flush with the outside surface of exterior walls, shall be NEMA 4 stainless steel. Other enclosures shall be NEMA 12.

6.3.2 Indicating lights shall have built-in transformers and 6-volt, miniature, bayonet base incandescent lamps, and shall be push-to-test type. Lenses for motor running lights shall be green and for other functions as indicated or selected by Engineer. Pushbutton colors shall be red for stop, black for start, and as selected by Engineer for other functions. Legend plates shall be provided on oil-tight units. Contact blocks shall contain not less than one SPDT contact.

7. <u>ELECTRICAL DISTRIBUTION EQUIPMENT</u>

7.1 Panelboards

7.1.1 Panelboards shall conform to FS W-P-115C, Type 1, Class 1 and shall be factory-assembled, dead front type with copper bus, lugs, finish trim and bolt-on, thermal- magnetic molded case circuit breakers of frame and trip ratings shown on Drawings. Panelboards shall utilize bolt-on breakers with a minimum cabinet width of 20 inches. Provide NEMA 3R enclosures.

7.1.2 Circuit breakers shall conform to FS W-C-375B/GEN and UL 489.

7.1.3 Provide multi-terminal ground bus in each panel.

7.1.4 For each panelboard, provide typewritten directory card listing location and circuit controlled. Insert with plastic cover into directory frame on door.

7.1.5 Panelboards shall be as indicated on the Drawings as manufactured by Square D, Siemens, General Electric, or Cutler-Hammer/ Westinghouse.

7.1.6 Provide single door with spring loaded lock. Key panel locks alike.

ELECTRICAL

SECTION 16C

SOLID STATE SOFT STARTERS

1. GENERAL

1.1 These specification requirements are for solid-state reduced voltage motor controllers herein referred to as soft starters.

1.2 The soft starter shall be listed by an independent testing laboratory in accordance with UL508 - Industrial Control Equipment.

1.3 The soft starter shall carry the CE mark for indication of compliance to low voltage and EMC directives.

1.4 The manufacturer shall be a certified ISO 9002 facility.

2. PRODUCTS

2.1 Manufacturers

Allen-Bradley

General Electric

Siemens

Square D

3. GENERAL DESCRIPTION

3.1 The soft starter shall be provided by the manufacturer in a motor control center as indicated on the drawings.

3.2 Enclosure shall include a door mounted digital keypad for adjusting the starting parameters. The soft starter shall be provided complete with a magnetic only circuit breaker.

3.3 The motor must be automatically protected from solid state component failure by one of the following means:

1. Shunt trip coil to trip disconnect in the event of a controller fault condition including a shorted thyristor.
2. Isolation contactor that opens when the motor is stopped or when the controller detects a fault condition including a shorted thyristor.

3.4 The soft starter shall utilize a thyristor (SCR) bridge consisting of at least two SCRs per phase to control the starting and stopping of industry standard motors.

3.5 The soft starter shall provide torque control for linear acceleration without external feedback independent of motor load or type of application. The gating of the thyristors will be controlled in such a manner to ensure smooth and stable acceleration ramp.

3.6 The soft starter shall be controlled by a microprocessor that continuously monitors the current and controls the phasing of the SCRs. Analog control algorithms shall not be allowed.

3.7 A shorting contactor shall be supplied with soft starters. Protective features and deceleration control options integral to the soft start shall be available even when the shorting contactor is employed.

4. RATINGS

4.1 The soft starter shall be designed to operate in an ambient temperature 0°C to 40°C.

4.2 Storage temperature range shall be -25°C to 70°C.

4.3 Maximum relative humidity shall be 93% at 40°C, non-condensing.

4.4 The soft starter shall be capable of operation within +/-10% of nominal voltage rating

4.5 The soft starter shall automatically adapt for operation at 50 or 60 Hz. Frequency tolerance shall be +/- 5% when starting and +5% or -15% during steady state operation.

4.6 The soft starter shall be capable of supplying 300% of rated full load current for 30 seconds at maximum ambient temperature.

4.7 The SCRs shall have a minimum P.I.V. rating of 1400 volts. Lower rated SCRs with protection by MOVs are not acceptable.

5. ADJUSTMENTS AND CONFIGURATIONS

5.1 All dialogue functions, display units, remote functions, terminal blocks, configuration switches and adjustment potentiometers shall be accessible on the front of the control module. Exposure to control circuit boards or electrical power devices during routine adjustments shall be prohibited.

5.2 Digital indication shall provide the following information:

1. Soft start status - ready, starting/stopping, run
2. Motor status - current, torque, thermal state, power factor
3. Fault status - Motor thermal overload, starter thermal fault, phase fault, frequency fault, supply fault, locked rotor fault, motor underload, max start time exceeded, external fault, serial link fault, phase inversion, internal failure, overcurrent

5.3 The starter shall be preset to the following for operation without adjustment in most applications:

1. Torque acceleration ramp of 10 seconds
2. Current limitation to 300% of the motor full load current rating
3. Class 10 overload protection
4. Motor current preset per NEC and UL tables for standard HP motors

5.4 A digital keypad shall allow adjustment of the following operating parameters as required:

1. Motor full load amps adjustable from 50% to 130% of the controller's rating

2. Current limitation on starting adjustable from 1.5 to 7.0 times rated motor current, not to exceed 5.0 times the controller rating
3. Torque ramp adjustable from 1 to 60 seconds
4. Initial torque adjustable from 10% to 100% of nominal motor torque
5. Torque limit adjustable from 10% to 200% of nominal motor torque
6. Maximum start time adjustable from 10 to 999 seconds
7. Voltage boost adjustable from 50% to 100% of the nominal supply voltage
8. Selection of freewheel, soft stop or braking
9. Adjustable soft stop torque ramp time from 1 to 60 seconds
10. Threshold to change to freewheel following a soft stop from 0 to 100% of the nominal motor torque
11. Braking torque level adjustable from 0 to 100% effectiveness
12. Selection of Class 2, 10, 10A, 15, 20, 25 or 30 motor thermal overload protection

5.5 A digital keypad shall allow adjustment of the following controller parameters as required:

1. Selectable automatic reset operation
2. Cancellation of the torque control loop for multi motor installations
3. Adjustment of the stator loss estimation for specialty motors
4. Assignment of controller inputs and outputs
5. Activation of phase reversal protection
6. Reset of motor thermal state
7. Return to factory settings
8. Activation of test mode for use with low power motors
9. Indication of elapsed time in hours of starting, running and stopping

5.6 Output relays shall provide the following status indications:

1. One form A (N.O.) and one form B (N.C.) minimum for indication of fault or control of an isolation contactor
2. One form A (N.O.) for indication that torque ramp is complete and current is below 130% motor FLA (End of start)

5.7 Additional inputs and outputs shall be available to provide the following status indications:

1. One logic input for force to freewheel, indication of external fault, force to local control, control of cascading motors, or external motor overload reset
2. One logic output for indication of motor thermal overload pre-alarm or presence of motor current and one logic output to indicate overcurrent alarm
3. One analog output shall be available for 4 - 20 or 0 - 20 milliamp indication of motor current, torque, thermal state or power factor

5.8 Relay and I/O functions listed above must be isolated with respect to common.

6. PROTECTION

6.1 A microprocessor controlled thermal protection system shall be included which continuously calculates the temperature-rise of the motor and soft start and provides:

1. An overload pre-alarm, which indicates by relay contact that the motor has exceeded its rated temperature rise by 110%. This function shall be annunciation only.
2. A thermal fault condition which stops the motor if the temperature rise exceeds 120% of the motor thermal capability.
3. An analog electronic circuit with a time constant adjustable to the motor's thermal cooling time constant ensuring the memorization of the thermal state even after power supply disconnection or shorting out of the power semiconductors.

6.2 The soft starter shall provide phase loss, phase reversal, underload, stall, and jam protection

6.3 The integral protective features shall be active even if an external shorting contactor is used to bypass the SCR's during steady state operation.

7. CONTROL OPTIONS

7.1 The soft starter's control circuit shall be fed from the line supply and be completely independent of the power circuit and separate from the control logic.

7.2 The peripheral soft starter control circuitry shall be operated at 120 VAC 60 Hz from a control power transformer included within the enclosure.

7.3 Operator devices shall be door mounted and shall be:

1. Three position H-O-A switch, which provides for manual (HAND) start or remote signal (AUTO) start from user supplied relay contacts.
2. Red or green RUN pilot light illuminated whenever the soft start is provided a run command and no fault condition is present.
3. Red or green OFF pilot light illuminated whenever the soft start is supplied with control power and no run command is present
4. All operator devices shall be remote mounted using supplied 120 VAC control logic. Clearly labeled terminals shall be provided for field installation.

8. SHORTING CONTACTOR

8.1 A microprocessor shall control the operation of the shorting contactor via an output relay.

8.2 The shorting contactor shall close, shorting the thyristors after the motor current is below 130% of motor FLA and voltage is below nominal voltage and open on a stop command to allow a deceleration ramp.

9. EXECUTION

9.1 A standard wiring diagram shall be included for making the appropriate electrical connections.

10. START-UP

10.1 The services of a qualified manufacturer's technical representative shall be available to install, test, and start up all soft starters furnished under this specification.

ELECTRICAL

SECTION 16D

DRY TYPE TRANSFORMERS

1. GENERAL

1.1 Furnish and install the dry type transformers at location at locations as shown on the Contract Drawings and as specified herein.

2. QUALITY ASSURANCE

2.1 Comply with applicable portions of NEMA Standard Publication No. ST 20-1972(R 1978) pertaining to dry-type transformers.

3. SUBMITTALS

3.1 Submit manufacturer's data including rated KVA, frequency, primary and secondary voltages, percent taps, impedance, efficiency, average temperature rise above 40 degrees C ambient, and sound level in decibels.

4. PRODUCTS

4.1 Provide products of one of the following:

1. Cutler Hammer
2. General Electric
3. Hevi-Duty Electric
4. Sorgel Electric

5. GENERAL DESCRIPTION

5.1 Provide factory-assembled, general-purpose, air-cooled, dry-type distribution transformers of rated capacities indicated, 60 hertz, 10 kV BIL. Primary winding shall have two 2-1/2 % taps above and below rated voltage.

5.2 Unless indicated otherwise on drawings, voltage ratio shall be 480 volts delta to 208/120 volts wye.

5.3 Transformer surface temperature rise shall be limited to a maximum of 65 degrees C. Terminal compartment temperature shall be limited to 75 degrees C when transformer is operating continuously at rated load with ambient temperature of 40 degrees C. Sound level ratings shall not exceed 45 dB.

5.4 Transformers shall be provided with fully enclosed sheet steel enclosures that are electrically grounded to transformer enclosure by means of flexible grounding strap. Transformer enclosure shall be NEMA 3R.

5.5 Provide transformers with 150 degrees C rise insulation system and suitable for mounting on floor or suspending from structure.

6. INSTALLATION

6.1 Install units on external vibration isolation supports complying with manufacturer's installation instructions.

6.2 Where indicated on drawings, transformers shall be installed in motor control centers.

7. GROUNDING

7.1 Provide equipment-grounding connections for power distribution transformers.

7.2 Ground neutral on secondary side of each delta-wye connected transformer to building steel and metal cold water pipe.

8. TESTING

8.1 Upon completion of installation of transformers, energize primary circuitry at rated voltage and frequency from normal power source and test transformers. Test shall include output voltage and audible sound levels. Correct or replace malfunctioning units and retest.

ELECTRICAL

SECTION 16E

MOTOR CONTROL CENTERS

1. GENERAL

1.1 Furnish and install the dry type transformers at location at locations as shown on the Contract Drawings and as specified herein.

2. QUALITY ASSURANCE

2.1 Comply with applicable portions of NEMA Standards Publications No. ICS 2-322 "AC General Purpose Motor Control Centers" and UL Standard 845 "Motor Control Centers".

3. SUBMITTALS

3.1 Submit manufacturer's data on motor control centers including voltage, current rating, short-circuit current rating all switch and circuit breaker ratings, and all motor starter ratings.

3.2 Submit shop drawings of motor control centers showing dimensioned sections, auxiliary compartments, and identifying all components. Also submit wiring diagrams showing connections to feeders and to distribution branches. Clearly identify portions of wiring that are to be field-installed.

3.3 Submit control diagrams for all starters in motor control center.

3.4 Submit a dimensioned layout of space containing motor control center showing all electrical equipment and all required electrical working clearances.

4. PRODUCTS

4.1 Provide products of one of the following:

1. Cutler Hammer
2. General Electric
3. Siemens
4. Square D

5. GENERAL DESCRIPTION

5.1 Provide factory-assembled, dead-front, metal-enclosed, self-supporting motor control center, NEMA 3R enclosure with electrical ratings indicated and containing circuit breakers and motor starters of quantities, ratings and types indicated in "Motor Control Center Schedule" on Drawings.

5.2 Provide copper bus with copper connections to switching devices of sufficient capacity to limit rated continuous current operating temperature rise of no greater than 65 degrees C above average ambient temperature of 30 degrees C. Main bus and tap connections shall be silver-surfaced. Bus shall be braced for short circuit stresses up to maximum interrupting capacity.

5.3 Provide NEMA Class II, Type B control centers wiring with all necessary electrical

interlocking and interwiring between units.

5.4 Provide for accessibility of line and load terminations from front of enclosure. Equip vertical sections with provisions for bolting together at project site.

5.5 Motor control center shall bear UL label "suitable for service entrance equipment".

5.6 Provide strip heaters as required to maintain motor control equipment within required ambient temperature.

7. METERING

7.1 Provide metering at each motor control center equal to Square D PowerLogic system.

8. INSTALLATION

8.1 Tighten connectors and terminals in accordance with equipment manufacturers' recommendations.

8.2 Install motor control centers on 4" high concrete pads. Pads shall extend a minimum of 6" past base of motor control center.

8.3 Adjust operating mechanisms for free mechanical movement.

8.4 Clean motor control center and touch-up scratched or marred surfaces to match original finish.

8.5 Provide equipment-grounding connections for motor control centers.

8.6 Provide nameplates on all motor control center compartments identifying load served or equipment in compartment.

8.7 Provide "Service Disconnect" label on main disconnect switch when used as service disconnect.

8.8 Prior to energization of motor control center verify that phase-to-phase and phase-to-ground insulation resistance levels are within manufacturers' recommended minimum values.

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FOR

DIVISION 17

PIPE AND PIPING APPURTENANCES

PIPE AND PIPING APPURTENANCES

SECTION 17A

GENERAL PIPING REQUIREMENTS

1. GENERAL

1.1 For the sludge treatment additions and related facilities furnish, install, and test the pipe, valves, gates, and appurtenances required on this project.

1.2 Piping includes sludge, process water, and gas, instrumentation piping, tubing and accessories, and all other miscellaneous small piping required for the operation of any equipment or system.

1.3 Piping shall form complete connected systems, including connections to valves and equipment supplied under other Sections of the Specifications. Piping work shall be performed by skilled workmen.

1.4 Information on pipe sizes, pressure classes, operating pressures, types of joints, types of valves and other pertinent data is contained in schedules, shown on the Contract Drawings or specified herein.

1.5 The Contract Drawings indicate the required pipe sizes and general arrangement and location for piping, gates, valves, manholes, hydrants, and equipment. Locations shall be verified in the field. If it is necessary to change the location of the work due to building construction, consult with the Engineer before making changes. Do not change sizes indicated without prior written approval of the Engineer.

2. TEMPORARY PIPING

Pipe, fittings and valves for temporary use during construction, as shown or as required, may be of any type suitable for the use intended and which will perform satisfactory for the period required. Maintain the lines while in service and repair leaks and any other defects promptly and without interfering with the normal operation of the facility. Remove temporary piping when no longer required.

3. SHOP DRAWINGS

Submit shop drawings and project data for piping work showing pipe sizes, valves, gates, joint details; catalog cuts of valves, gates and operators; hydrants; dimensions; support and hanger details; details of reaction blocking and harnessing; and a complete piping layout. Shop drawings shall also show dimensions, configurations, and other pertinent data of equipment to which the piping connects or relates. See Division 1 - General Requirements - for other provisions relating to the submittal of shop drawings.

4. BURIED PIPE

Excavation, backfill, trenching, and related work for buried piping shall be in accordance with Division 2 - Site Work - of these Specifications.

5. INSERTS

Determine and be responsible for the proper location and character of inserts for hangers, chases, sleeves, and other openings required for piping work. The location of such items shall be coordinated with facilities required for other installations to prevent interference.

6. STANDARD SPECIFICATIONS

Where materials and methods are specified to meet the requirements of a standard specification, it shall refer in all cases to the latest edition of the specification and shall include all revisions. Listing of a standard specification without further reference indicates that the listed specification or method shall meet the requirements of the listed specification.

7. ELECTRICAL EQUIPMENT

Electrical equipment furnished under this Specification shall be protected from damage due to condensation while in storage and after installation by energizing space heaters, providing supplementary heat, or by other approved methods.

PIPE AND PIPING APPURTENANCES

SECTION 17B

PIPE AND PIPING ACCESSORIES

1. GENERAL

1.1 Install piping so that joints are tight and adequate for the service intended; that will meet the tests specified; that the internal diameter is in no manner diminished or blocked, and that presents a neat and workmanlike appearance.

1.2 Furnish pipe with ends as required for the type of connections shown or as required for proper installation.

2. TESTING PIPE

2.1 General

2.1.1 All piping systems, including small pipe, tubing, nipples, connectors, and other appurtenances which are a part of the system shall be tested as specified herein.

2.1.2 Instruments, controls, and appurtenances with pressure ratings less than the test pressure of the piping system shall be removed or blocked off before testing starts.

2.1.3 Bushings of any kind shall not be used except where specifically detailed on the Contract Drawings.

2.2 Buried Pipe

2.2.1 Buried gravity pipelines which will not normally flow full shall be tested before backfilling by plugging both ends, filling with clean water so that there is a 5-foot head of water above the highest point and inspecting for leaks. Repair leaks and retest the pipeline until no leakage is visible.

2.2.2 Buried pipelines which will be subjected to a maximum static pressure equal to the liquid level in an open tank shall be tested before backfilling by a pressure 5 feet above the designed liquid level. Inspect for leaks, repair if necessary, and retest until no leakage is visible.

2.2.3 Buried lines which will transmit liquids under pressure from a pump shall be tested to a pressure of 150 percent of the maximum possible discharge pressure of the pump.

2.2.4 Buried water lines under pressure from an outside supply system shall be tested to 125 percent of the working pressure of the pipe installed.

2.2.5 Leakage from buried pressure pipelines at test pressures shall not exceed 6 gallons per inch diameter per mile during the 2-hour test period.

2.3 Test Duration

Unless otherwise specified, tests shall be maintained for 2 hours. Leaks or defective pipe shall be repaired or replaced and the tests repeated until piping shows tight.

Furnish and dispose of material for tests. Piping shall not be insulated or concealed until it has been tested to the satisfaction of the Engineer. Tests shall be witnessed by the Engineer and the results certified by a registered professional engineer from a testing company or by the contractor's representative when approved by the Engineer.

3. CLEANING

3.1 Before placing piping in use, the interior shall be cleaned of foreign substances. Any stoppage, discoloration, or other damage to buildings and their finish or furnishings because of failure to properly clean piping systems shall be repaired without cost to the Owner.

4. CLEANING AND STERILIZATION

4.1 See Specification Section 1F – Cleaning and Disinfection for requirements of pipe disinfection.

5. PIPING PROTECTION

5.1 Protect piping, equipment, and materials from damage during construction until final acceptance. Close pipe openings with plugs or caps during installation. Cover and protect equipment against dirt, water, chemicals, or mechanical injury. Before final acceptance clean equipment and deliver to the Owner in perfect condition.

6. PAINTING

6.1 Painting and/or identifying of pipelines will be performed as per the requirements of Division 9A - Painting - of these Specifications.

7. WELDINGS

7.1 Welding shall be performed in accordance with the procedures of the National Certified Pipe Welding Bureau, or other approved procedures, which conform with the requirements of the ASME boiler and pressure vessel code or of ANSI B31.1. No welder or welding operator shall be employed who has not been fully qualified under these procedures and certified by a member of a local chapter of the NCPWB or similar locally recognized authority. Submit certification papers for each welder to the Engineer for review and filing.

7.2 The Engineer may at any time call for and witness the mailing of test specimens by any welder or welding operator and observe the physical test of the specimens.

8. PIPE, JOINTS, AND FITTINGS

8.1 Brass Pipe

8.1.1 Brass pipe, ASTM B-43.

8.1.2 Brass threaded fittings, ANSI B16.15.

8.1.3 Brass fittings for flared copper tubes, ANSI B16.26.

8.2 Cast Iron Soil Pipe

8.2.1 Cast iron soil pipe and fittings, ANSI A40.5.

8.2.2 Soil pipe joint packing shall be best quality tarred jute. Caulking lead, AWWA C600. Sheet lead, FS QQ-L-201, Grade A.

8.3 Cast Iron Threaded Pipe

8.3.1 Cast iron threaded pipe, ANSI B16.4 Fittings, ANSI B16.12.

8.4 Clay Pipe

8.4.1 Clay drain tile, ASTM C-4.

8.4.2 Vitrified clay pipe, ASTM C-700.

8.4.3 Clay pipe bell and spigot compression joints, ASTM C-425.

8.5 Concrete Pipe

8.5.1 Concrete sewer pipe, non-reinforced, ASTM C-14.

8.5.2 Reinforced concrete sewer pipe, AWWA C302, with steel bell and spigot ends. Class of pipe shall be in accordance with the following ASTM C-76 requirements unless otherwise specified:

8.5.3 Distance From Top Of:

Pipe To Finished Grade	Pipe Class
7 feet or less	II
7 to 11 feet	III
11 to 25 feet	IV

8.6 Copper Pipe

8.6.1 Copper pipe shall be copper water tube, ASTM B-88, Type K soft temper for buried service and Type L hard temper for inside service.

8.6.2 Copper pipe solder joint fittings, ANSI B16.22.

8.6.3 Copper pipe flared fittings, ANSI B16.26.

8.7 Ductile Iron Pipe

8.7.1 Buried ductile iron pipe, ANSI A21.51. with Type 5 laying condition. Joints and fittings shall be push-on type unless otherwise shown. 4-inch to be Class 53; 6-inch to be Class 52; 8-inch and larger to be Class 51.

8.7.2 Flanged pipe shall be Class 53.

8.7.3 Joint restraints shall be American Cast Iron Co., Fast-Grip, Flex-Ring, Lok-Ring, or Mega-Lug joints, or equal.

8.7.4 Fittings for ductile iron pipelines shall be ductile iron, ANSI/AWWA-C110/A21.10 or ANSI/AWWA-C153/A21.53

8.7.5 Unburied ductile iron pipe, ANSI A21.51, with metal thickness as specified in ANSI A21.15.

8.7.6 Unless otherwise indicated, ductile iron pipe and fittings shall be bituminous coated and lined in accordance with the ANSI specifications, except that pipe exposed to view, and wall fittings and sleeves shall be lined only, and the exterior shall be prime coated in accordance with Division 9A - Painting.

8.8 Polyvinyl Chloride Pipe

8.8.1 Polyvinyl chloride pipe, ASTM D-1785 designation PVC 1120. Fittings for Schedule 40 pipe, ASTM D-2466, Class 12454B, socket type. Fittings for Schedule 80 pipe shall be threaded, ASTM D-2464, or socket type, ASTM D-2467, both class 12454B.

8.8.2 PVC pipe and fittings for drain, waste or vent lines, ASTM D-2665.

8.8.3 PVC sewer pipe shall be SDR 35, or heavier, manufactured in accordance with ASTM D-3034, latest revision, for type PSM sewer pipe and fittings, 4" through 15". Pipe shall be furnished in lengths not exceeding 13 feet. Pipe shall be furnished with integral bells; gaskets and lubricants shall be furnished by the pipe manufacturer.

8.9 Steel Pipe

8.9.1 Type SP-1 steel pipe, ASTM A-53 Type E or S, Grade A, black.

8.9.2 Type SP-2 steel pipe, ASTM A-53 Type E or S, Grade A, galvanized.

8.9.3 Type SP-3 steel pipe, ASTM A-120 black.

8.9.4 Type SP-4 steel pipe, ASTM A-120 galvanized.

8.9.5 Type SP-6 steel pipe, Type TP304L stainless steel, ASTM A-778.

8.9.6 Type SP-7 steel pipe, water pipe, AWWA C200-75.

8.9.7 Steel pipe threaded fittings, ANSI B16.3, galvanized malleable iron, 150 or 300 lb. as required for the pipeline in which installed.

8.9.8 Steel pipe welded fittings, ANSI B16.9, factory made wrought steel.

8.9.9 Steel pipe fittings, ASTM A-234 WPB, black.

8.9.10 Steel pipe fittings for AWWA pipe, AWWA C208. Shop hydrogen static test of completed fittings not required.

8.9.11 Nipples for threaded steel pipe shall be extra strong and of the same material as the pipe.

8.9.12 Black steel pipe one inch and larger may be installed with butt welding joints and fittings of the same schedule number as the piping.

8.10 Coatings and Linings

8.10.1 Asphaltic lining for cast or ductile iron pipe, AWWA C104 and ANSI A21.4.

8.10.2 Asphaltic coating for cast or ductile iron pipe, ANSI/AWWA C151/A21.51, latest revision.

8.10.3 Coal tar enamel coating and lining of steel pipe and fittings, AWWA C203.

8.10.4 Cement lined for ductile iron pipe to be in accordance with ANSI/AWWAC104/A21.4.

8.11 Pipe Joints

8.11.1 Flanges, gaskets, bolts, and nuts for ductile iron pipe, ANSI A21.15. Bolts and nuts shall be galvanized or cadmium plated. Gaskets shall be full face. Flanges shall be ductile iron, plain face.

8.11.2 Flanges, bolts, and gaskets for steel pipe, ANSI B16.5, of the class required for the pipeline in which installed.

8.11.3 Flanges, bolts, and gaskets for AWWA and ASTM A-139 steel pipe, AWWA C207. Class of flange shall be as required for the pipe in which installed. Gaskets as required for elevated temperatures shall be so rated by the manufacturer.

8.11.4 Grooved end joints, AWWA C606. Gaskets shall be suitable for the pressure, fluid, and temperature in the pipeline. Ductile iron pipe and fittings used with grooved couplings shall have a minimum thickness in accordance with AWWA C606. Shouldered joints shall be Type D. Grooved end cast iron fittings shall be used with grooved and ductile iron pipe. Grooving dimensions shall be designed for rigid joints except when flexible joints are required due to construction as recommended by the manufacturer and approved by the Engineer. Lubricants used to install joints shall be compatible with pipe coatings so that a leakproof joint results.

8.11.5 Mechanical joints, ANSI A21.11. Glands at wall fittings shall be furnished with set screws or equivalent locking devices.

8.11.6 Push-on joints, ANSI A21.11.

8.11.7 Concrete pipe joints, ASTM C-443. Gaskets shall be confined O-rings, suitable for the pressure, fluid, and temperature in the pipeline.

8.12 Unions

8.12.1 Unions for steel or iron pipe shall be 300-lb. malleable iron, brass-to-iron seat, ground joints.

8.12.2 Unions for copper tube shall be wrought copper, solder joints, copper-to-copper seats.

8.12.3 Dielectric insulated unions shall be used to connect dissimilar metal pipe. They shall separate the metals so that the passage of more than one percent of the galvanic current which would exist with metal-to-metal contact is prevented.

8.12.4 Unions shall be of the same material as the pipe to which attached, and pressure and temperature ratings shall be no lower than that of the piping system in which installed.

8..13 Threaded Couplings

8.13.1 Couplings for threaded pipe shall be extra heavy recessed of the same material as the pipe to which attached.

8.14 Sleeve Type Couplings

8.14.1 Belted compression type couplings shall be provided where shown. Gaskets shall be suitable for the pressure, fluid, and temperature in the pipeline. Couplings shall be as manufactured by Dresser Industries, Smith-Blair, or equal.

8.15 Flexible Connectors

8.15.1 Flexible connectors shall be designed for the working pressure shown and shall absorb vibration and eliminate sound. They shall consist of multiple plies of fabric impregnated with special compounds and helical wire reinforcing. End flanges shall be integral with the fabric reinforced rubber bodies and shall be backed up with galvanized steel retaining rings. Flanges and retaining rings shall be drilled to ANSI standards.

8.15.2 Flexible connectors shall be installed in accordance with the manufacturer's recommendations. Adjacent piping shall be supported so that the connectors carry no load. Restraining rods and gusset plates shall be provided if adequate anchoring is not practical. Rods and plates shall be steel and shall have rubber grommets to isolate the rods from the plates.

8.15.3 Flexible connectors shall be as manufactured by Mercer Rubber Co., General Rubber Corp., or equal.

8.16 Sleeves and Wall Fittings

8.16.1 Unless otherwise noted, all pipes passing through concrete walls and slabs shall be means of wall pipe and through masonry walls by means of wall sleeves.

8.16.2 Wall castings for exterior walls below grade or for walls with liquid on one or both sides shall be gray or ductile iron with intermediate waterstops. Castings shall have mechanical joint, flanged, flared, or other ends as indicated. Where type of end is not shown, mechanical joints shall be furnished.

8.16.3 Wall Sleeves and Seals

Wall sleeves shall be ductile iron or standard weight Type SP-4 steel pipe. Sleeves shall extend from face to face of wall and have intermediate waterstops where installed in "wet" or exterior walls.

8.16.4 Seals for pipe sleeves shall be bolt-up type consisting of interlocking synthetic rubber links shaped to continuously fill the annular space between the pipe and the sleeve. When bolts are tightened, the rubber sealing elements shall expand to result in a watertight seal. Bolts and pressure plate nuts shall be Type 316 stainless steel. Rubber links shall be suitable for use in water, moist environments, and normal atmospheric conditions.

8.16.5 Sleeves through interior partitions shall be 14-gauge galvanized steel.

8.17 Tapping Sleeve and Valve

Tapping sleeves shall consist of a mechanical joint ductile iron (ASTM A536 Grade 65-45-12) tapping sleeve Mueller H-615, M&H, or flanged outlet stainless steel tapping sleeve Mueller H304 or approved equal, and a valve with mechanical joint outlet Mueller H-667, M&H or approved equal. The valve shall conform to all applicable specifications for gate valves.

9. ACCESSORIES

9.1 Pressure Gauge

9.1.1 Pressure and vacuum gauges shall be Bourdon tube type with the pressure ranges indicated, or approximately double the normal operating pressure if not indicated. Gauges shall have dustproof cases, gauge piping, globe valves, and 4-1/2 inch dials. Gauges shall meet the requirements of ANSI B40.1, Grade A. Gauges for fluids at temperatures above 150°F shall be provided with siphons. Gauges subjected to pulsating pressures shall be provided with dampeners.

9.1.2 Pressure gauges for pipelines containing sludge or other suspended solids shall be Bourdon tube type with Type 304 stainless steel diaphragm seals. Gauges shall read in feet and shall be so designated on the dials. Pressure range shall be as indicated, or approximately double the normal operating pressure if not indicated. Gauges shall have dustproof cases, gauge piping, gauge cocks, and 4-1/2 inch dials. Gauges shall meet the requirements of ANSI B40.1, Grade A. Pulsation dampers shall be provided, factory installed.

9.2 Pressure Instrument Diaphragm Seals

9.2.1 Diaphragm seals for pressure instruments and gauges shall be continuous duty type and suitable for the fluid, pressure, and temperature in which installed. Diaphragm seals shall prevent escape of fluid when pressure devices leak or are removed. They shall have pressure devices, process and flushing connections, and pressure device bleed screws.

9.2.2 Diaphragm seals shall be for 2,500 psi pressure. Diaphragms shall be teflon coated Type 316 stainless steel. Top housings shall be steel with rust resistant finish and bottom housings and flushing plugs shall be Type 316 stainless steel.

9.2.3 Diaphragm seals shall be as manufactured by Mercoil, Ashcroft, or equal.

9.3 Expansion Joints

9.3.1 Expansion joints for metal pipelines shall be bellows type, controlled for traverse in compression and corrugation movement. Bellow and liners shall be stainless steel. Units shall have 150-lb. forged flanges, Schedule 40 steel end fittings, and cast steel contour control rings. Units shall be as recommended by the manufacturer for the temperature, pressure, and expansion of the pipeline in which installed.

9.3.2 Expansion joints for hot water lines 2 inches and smaller shall be telescopic expansion compensators with stainless steel bellows and copper or brass shrouds. They shall be equipped with set screws for installation positioning. The joints shall be as recommended by the manufacturer for the pressure, temperature, line position, space requirements, and expansion and contraction travel involved.

10. SYSTEM PIPING

Unless otherwise indicated, piping materials for the following services shall be as specified herein.

10.1 Air Piping

10.1.1 Air piping for high pressure service (above 15 psi) shall be standard weight Type SP-1 steel with 150 or 300-lb. malleable iron threaded fittings as required. Buried high pressure air lines shall be Type K copper with flared joints. Air lines at less than 100 psi may be Type L copper with solder or flared joints.

10.1.2 Low pressure air piping (under 15 psi) less than 4-inch size, exposed outside of buildings or immersed in liquid, shall be standard weight Type SP-4 steel with galvanized 150-lb. malleable iron threaded fittings.

10.1.3 Pipe and fitting for low pressure air 4 inches to 12 inches in diameter shall be ductile iron or SP-6 steel pipe.

10.1.4 Buried lines shall be coal tar coated.

10.2 Chemical Piping

10.2.1 Piping shall be Schedule 80 PVC, unless otherwise indicated.

10.3 Downspout Piping

10.3.1 Downspout piping from roof drains shall be ASTM C-2665 PVC.

10.4 Hot and Cold Water Piping

10.4.1 Hot and cold water lines inside structures shall be Type L hard tempered copper with soldered joints for pipe sizes 3-inch and smaller.

10.4.2 Hot and cold water lines 4-inch size and larger inside structures shall be Type L hard tempered copper with soldered joints, or Type SP-1 steel pipe with butt weld fittings.

10.5 Plumbing Waste, Drainage, and Vent Piping

10.5.1 Plumbing waste, drain and vent piping shall be PVC, ASTM D-2665.

10.5.2 Sanitary sewer shall be PVC SDR 35, ASTM D-3034.

10.6 Sample Piping

10.6.1 Pipe and fittings for sampling shall be Schedule 80 PVC, unless otherwise indicated.

10.7 Water Piping

All pipelines conveying treated or untreated water, except sample lines, shall be in accordance with the following:

10.7.1 Unburied pipe less than 4 inches in diameter shall be Schedule 40 Type SP-1 steel with threaded 150-lb. malleable iron fittings.

10.7.2 Unburied pipe larger than 4 inches in diameter shall be ductile iron with cast or ductile iron fittings or SP-6 steel pipe.

10.7.3 Buried pipe and fittings less than 4 inches in diameter shall be threaded standard weight Type SP-4 steel.

10.7.4 Buried pressure pipe, including treatment tank drains, larger than 4 inches in diameter shall be ductile iron with mechanical joint or push-on joints and cast or ductile iron fittings, unless otherwise shown.

10.7.5 Buried gravity pipe shall be ductile iron with mechanical or push-on joints and cast or ductile iron fittings, unless otherwise shown.

11. INSTALLATION

11.1 Exposed Piping

11.1.1 Install exposed inside piping parallel to walls, floors, and partitions in rectangular structures, and to column lines in curved structures unless otherwise shown.

11.2 Cutting, Repairing Structures

11.2.1 Cutting, fittings, repairing, and finishing of masonry, concrete, metal and carpentry work that may be required for installation of the piping shall be performed as part of the pipe installation work.

11.3 Sleeves and Wall Pipes

11.3.1 Install piping through concrete walls and floors with wall pipes, and connect to wall castings accurately located before concrete is poured.

11.3.2 Pipe passing through masonry walls shall be by means of wall sleeves.

11.3.3 Where 6-inch outside diameter or smaller pipes pass through floors, walls, or ceilings with finished surfaces, they shall be fitted with chromium plated steel plates

held in place on the pipe by springs. Floor plates shall completely cover the sleeve extension.

11.3.4 Sleeves installed in rooms containing chlorine piping, containers, or chlorination equipment shall be caulked with lead wool and hemp or by other Engineer approved methods to make the sleeves waterproof and gas tight.

11.4 Unions, Flanges, and Couplings

11.4.1 Unless otherwise shown, install unions or grooved end bolted couplings at piping connections to each piece of equipment at not more than 50-foot intervals in straight runs of pipe, at each threaded valve, and elsewhere as required to adequately service the piping system and equipment.

11.4.2 Use unions in piping 3-inch and smaller and grooved end bolted couplings in larger pipe. Flanged union connections for threaded steel pipe shall be ANSI Class 125 cast iron threaded flanges. Those for welded pipe lines shall use 150 lb. steel lab joint flanges with stub ends.

11.4.3 Make connections between ferrous and nonferrous metal pipe with dielectric unions.

11.5 Expansion and Contraction

11.5.1 Install piping so that it will be free to expand and contract without injury to itself, its supporting structure, or to connected equipment.

11.5.2 Provide for expansion with expansion loops or expansion joints as indicated and as required to prevent damage.

11.5.3 Obtain approval of the Engineer on the type and location of pipe anchors before installing them.

11.6 Pipe dope for threaded pipe shall be approved and recommended by the manufacturer for the service intended.

11.7 Lay buried pipe at a uniform grade in straight lines unless deflections or other deviations are approved by the Engineer. Deflections shall not exceed the recommendations of the pipe manufacturer.

11.8 Buried PVC pipe shall be installed in conformance with ASTM D-2774.

11.9 Lay buried pipe 4-inch size or larger on an even, firm bed of ASTM D-692 No. 67 crushed aggregate. Depth of bed shall be as specified. Shape and form the bedding material so that the bottom third of each pipe is uniformly supported along its entire length. Recess the bedding material at the bells, if any, so that they are relieved of any load. Backfill the space between the pipe and the slides of the trench to 8 inches above the top of the pipe with the same crushed aggregate.

11.10 Dewater the trench when joints are made and keep dewatered for joints which require time to harden.

11.11 Pipe installed below a ground or pier supported concrete slab shall be encased in concrete of the same type as used for the slab to a minimum thickness of 8 inches on

all sides. Support the pipe and encasement from the slab by means of hanger rods minimum #4 at 2 feet on center. Coat rods not encased in concrete with two coats of bitumastic or coal tar enamel. Hanger rods will not be required for piping with encasement integral with the slab. Pipe encased integral with the slab shall have a joint flush with each structural expansion joint it crosses and the expansion joint shall extend through the encasement. Provide pipe joint within two (2) feet outside of termination of concrete encasement.

11.12 Set castings for manholes, storm water inlets, catch basins, valve basins and similar structures in full mortar beds. Castings shall be as shown.

11.13 Payment for extra concrete encasement or cradle for buried pipe, when ordered in writing by the Engineer, will be made at the unit price stated in the agreement for the actual number of cubic yards furnished and placed until the total quantity placed since the start of construction under this contract becomes 115 percent of the quantity stated in the bid form. Compensation for encasement or cradle concrete in excess of 115 percent of the quantity stated in the bid form will be made through a contract supplement as provided for in the General Conditions. The price shall include the cost of removing and disposing of the added excavation required to accommodate the concrete. No payment will be made for concrete cradle or encasement shown on the Contract Drawings or specified in other Sections.

PIPE AND PIPING APPURTENANCES

SECTION 17C

VALVES AND GATES

1. VALVES AND REGULATORS

1.1 General

1.1.1 Marking and identification of valves shall conform to the standard specifications referred to or to the manufacturer's standard.

1.1.2 End connections of valves shall be as shown but, in general, valves 3-inch and smaller shall be threaded. Flanges shall be plain faced unless otherwise specified.

1.1.3 Manual operators for valves 4-inch or larger located with centerlines more than 6-1/2 feet above the operating floor shall have chain or extension operators. Chain wheels shall be malleable cast iron and have chain guides. Chains shall be cadmium plated or stainless steel and shall extend to within 5 feet of the operating floor. Valves mounted in a vertical position with operator wheel more than 6 feet above the floor shall be equipped with totally enclosed, permanently lubricated gear operators so that the chain wheel is in a vertical position and extended outward sufficiently so that the chain hangs free.

1.1.4 Valves for non-metallic pipelines shall be of the same material as the pipeline in which installed or lined with or fabricated from a material satisfactory for the service intended.

1.1.5 Valve boxes shall be provided for buried valves unless contained in valve basins.

1.1.6 Operator floor stands, extensions shafts, brackets, and other accessories required for complete installation of valves shall be furnished with the valves.

1.1.7 Yard valves shall be resilient seat gate, unless otherwise noted on the Drawings.

1.2 Ball Valves

1.2.1 Ball valves shall be PVC with teflon seats and vitonseals suitable for the temperature and pressure of the pipeline in which installed. Valves shall have manual operators.

1.3 Butterfly Valves

1.3.1 All butterfly valves shall be of the tight closing, rubber seat type with rubber seats that are securely fastened to the valve body or valve disc. Valves shall be bubble-tight at rated pressure with flow in either direction and valve discs shall rotate 90° from the full open to the tight shut positions. Valves shall meet requirements of AWWA Standard C504 for Class 150 B and shall be Henry Pratt Company, DeZurik, Clow or approved equal.

1.3.2 Valves to be installed above ground or in vaults shall be flanged (ANSI B16.1) connections, and buried valves shall have mechanical joint connections unless otherwise shown on the Drawings.

1.3.3 Valve bodies shall be constructed of cast iron ASTM A-126, Class B. Valves with rubber seat on disc shall be provided with stainless steel body seat.

1.3.4 Valve discs shall be constructed of either alloy cast iron ASTM A-436, Type 1 for valves 6" through 20" or cast iron with stainless steel seating edge for 24" valves. For larger sizes, 30" through 48", valve discs shall be ductile iron with stainless steel seating edge.

1.3.5 Shafts of all valves shall be turned, ground, and polished. Valve shafts shall be constructed of 18-8, Type 304 stainless steel.

1.3.6 Valve seats shall be a synthetic rubber compound. Valves 20-inch and smaller shall have bonded seats. Bonded seats must be simultaneously molded in, vulcanized, and bonded to the body. Valve seats on 24-inch valves and larger shall be field adjustable and replaceable without dismantling operator, disc, or shaft. Seats shall be retained in the valve body by mechanical means without use of metal retainers or other devices in the flow stream. Valves with the seat on the disc shall be fitted with a rubber seat fixed in place with a stainless steel retainer ring and cap screws which pass though rubber seat. The rubber disc seat shall be adjustable and replaceable in the field.

1.3.7 Bearings shall be corrosion resistant and self-lubricating sleeve type.

1.3.8 Manual operators for valves on waterlines shall be of the traveling nut, self-locking type and shall be designed to hold the valve in any intermediate position between fully open and fully closed without creeping or fluttering. Operators shall be equipped with mechanical stop-limiting devices to prevent overtravel of the disc in the open and closed positions. Valves shall close with a clockwise rotation. Operators shall be fully enclosed and designed to produce the specified torque with a maximum pull of 80 lbs. on the handwheel or chainwheel. Operator components shall withstand an input of 450 ft. lbs. at extreme operator position without damage.

1.3.9 Manually operated waterline valves above ground or in vaults shall be furnished with handwheels unless chainwheel operators are required. Manually operated valves that are buried shall be equipped with valve boxes as listed in these Specifications and with extension stems, if required, to bring the operating nut within 30 inches of the ground surface.

1.4 Check Valves, Swing Type

1.4.1 Check valves shall be swing gate type and shall be equipped with outside lever and adjustable weight, or spring operated. Check valves shall be capable of operation in vertical position with flow down or upward, as well as in horizontal position. They shall be iron body, bronze mounted built for a water working pressure of 150 lbs. per square inch, metal-to-metal seat, unless noted otherwise on the Drawings. They shall afford full opening by swinging entirely clear of water way.

1.4.2 Iron body check valves shall be as manufactured by American-Darling, Mueller, Clow, Golden Anderson,or approved equal.

1.4.3 Check valves 3-inch and smaller shall be standard all-brass swing gate with brass disc, 200 lbs. water working pressure for either in vertical (upward flow) or horizontal position, Crane 37, Powell 578 or equal.

1.5 Gate Valves

1.5.1 Gate valves shall be resilient seat wedge type unless otherwise indicated. All gate valves shall conform to latest revision AWWA Spec. C-509. All gate valves shall be of such design that valves may be installed in horizontal or vertical piping runs.

1.5.2 Valves shall be rated for a working pressure of 200 psi.

1.5.3 All underground valves shall be NRS housed in cast iron valve boxes, telescope type without screw, of size suitable for covering glands of valves and with lengths necessary for each location. O-ring seals will be required on all NRS valves.

1.5.4 Unless otherwise shown on Drawings, underground valves shall be nut operated (2-inch square). Valve supplier shall furnish two standard stem iron wrenches for turning nut operated valves. All underground gate valves which have nuts deeper than 30 inches below the tops of valve boxes shall have extended stems with nuts located within one foot of valve box cap.

1.5.5 Unless otherwise shown on Drawings or noted herein, all housed valves shall be NRS and shall be equipped with handwheels.

1.5.6 Resilient gate valves shall be American-Darling, Mueller, Clow, or approved equal.

1.5.7 Valves for water service with copper or threaded pipe 3-inch or smaller shall be standard brass gate valves, rising stem, double disc, parallel seat, 125 lbs. water working pressure; Crane No. 440, Nibco, or equal.

1.5.8 In copper solder joint piping, use Crane No. 1334, Powell No. 1821S or equal gate valves with solder joint connections.

1.6 Hydrants

1.6.1 Fire and yard hydrants shall be non-freeze type compression hydrants as manufactured by Murdock, Woodford, or equal with outlets threaded for hose couplings. Hydrants shall be installed at least 12 inches below the lowest frost line and not less than two feet below grade. Hydrants shall have bronze thread protection caps with attached bronze chains. Hydrants shall be of appropriate size to accommodate supply lines indicated on Drawings.

1.7 Air Vent Valve

1.7.1 The air vent valve shall operate (open) under pressure, and allow entrapped air to escape from a pipeline, pump, tank, or hot water system.

1.7.2 After air escapes out of the air vent valve orifice, the orifice shall close by means of a simple lever mechanism to prevent water from escaping. The orifice will then stay closed until more air accumulates inside and the opening cycle will repeat automatically.

1.7.3 The needle shall be Buna-N, accurately guided to the seat orifice by means of a stainless steel lever and needle arm for drop tight shut-off.

1.7.4 The seat shall be stainless steel with a 3/32-inch orifice to operate (open) up to 175 psi.

1.7.5 The air vent valve body shall have a stainless steel float designed to withstand a shock pressure of 1,000 psi or more.

1.7.6 The Air Vent Valve body shall have a 1-inch NPT female threaded inlet and outlet and be rated for 350 psi test pressure.

1.7.7 Materials of construction shall be certified to conform to ASTM Specifications as follows:

Body & Cover	Cast Iron	ASTM A-48, Class 30
Internal Levers	Stainless Steel	ASTM A-240
Float	Stainless Steel	ASTM A-240
Needle	Buna-N	
Exterior Paint	Phenolic Primer Red Oxide	FDA Approved for Potable Water Contact

1.7.8 Valve to be APCO Model 50-Air Vent Valve, Factory Mutual Approved & Underwriters Laboratories Listed, as manufactured by Valve & Primer Corp., Schaumburg, Illinois, or approved equal.

1.8 Solenoid Valves

1.8.1 Solenoid valves shall be pilot operated, slow operating type and the same size as the line in which installed. Valves shall be N.C. or N.D. as indicated; globe type, packless, full port with threaded connections. Valves shall have bronze bodies with stainless steel trim and Buna-N replacement seats. Body ratings shall be 125-lbs. for systems with working pressures less than 100 psi and 300 lbs. for higher pressure systems. Valves shall operate on 115-volt, single phase, 60-Hz current unless otherwise noted. Valves shall have continuous- duty, watertight, epoxy encapsulated molded coils for severe moisture or humidity conditions and be suitable for 10 percent above and 15 percent below rated voltage. Valves shall operate on 115-volt, single phase, 60-Hz current. They shall have manual operators and NEMA 4 enclosures.

1.9 Pump Control Valves (Electric Operated)

1.9.1 The Pump Control Valve shall consist of a main valve assembly and electric motor operator, completely assembled, tested and ready for field installation and wiring. Valve size shall be as shown on the Contract Drawings.

1.9.2 The valve body shall be of the in-line wye pattern of cast iron conforming to ASTM A126 with integral flanges The flanges shall be cast iron FF&D 250 lb. (WP=500 psi). The valve shall be inherently self-cleaning and have a net flow area through it of no less than the area of its nominal pipe size. The body shall have a replaceable 316 stainless steel seat. There shall be a clean out/inspection port near the valve seat.

1.9.3 The valve disc shall be ductile iron or steel with a renewable, resilient seat of rubber or other suitable material and retained by a stainless steel follower ring and stainless steel screws. The valve stem shall be 18-8, non-hardened stainless steel and guided in a long bronze bushing retained in the valve cover. The valve stem shall be sealed where it passes through the body by a pressure actuated seal. A wiper ring shall be used to prevent solids from entering the bearing area. The valve stem shall not be attached to the motor actuator stem so the valve may close upon flow reversal, independent of the motor actuator operation.

1.9.4 The valve shall be equipped with an electric motor actuator with multi-turn, rising stem type gearbox, suitable for open-close, non-throttling pump check service.

1. The motor actuator shall be sized by the valve manufacturer to positively close the valve against the maximum differential pressure generated at the pump shut-off head with a downstream static system pressure. The minimum time for one full stroke (full closed to full open, or full open to full closed) of the valve shall be 40 seconds.
2. The motor actuator shall be rigidly attached to the valve cover with an air gap between the motor actuator and the valve body containing line media.
3. The motor actuator shall be furnished with a stainless steel rising stem that engages with, but is not mechanically attached to the valve stem.
4. The motor actuator shall be furnished with electric motor and controls housed in a NEMA 4 housing, in accordance with AWWA C540. Controls shall include 4 train geared limit switches, 8 wire torque switches, reversing starter(s), control transformer, local-off-remote selector switch, local open-close pushbuttons, status lights, manual handwheel with hand-auto lever, and visual position indicator. Motor actuator controls shall be suitable for operation with 3 Phase, 60 Cycle, 230/460 VAC power source.
5. Motor actuator controls shall include a stepping time module that allows the valve stroking time to be increased for the entire or any portion of the valve travel. The start and stop point of the stepping mode shall be manually adjustable for any portion of the valve stroke. The on- and off- time intervals within the stepping mode shall be manually adjustable between 1 and 30 seconds.

1.9.5 The basic functions of the valve shall include:

1. The valve shall function to control surges associated with the normal starting and stopping of pumps.
2. The valve shall slowly open after the pumps has come upon receipt of open signal (momentary contact closure) after the pump has been started and has come up to speed.
3. The valve shall close slowly upon receipt of close signal (momentary contact closure) against the running pump. After the valve has fully closed, a valve-closed limit switch shall turn off the pump.

4. Anytime the valve is open and valve outlet pressure exceeds valve inlet pressure, the valve shall close quickly and independently of the motor actuator to prevent backflow through the pump.

1.9.6 The valve shall be GA Industries, Inc. Series 1600-M or approved equal.

1.10 Pump Control Valves (Hydraulic Operated)

1.10.1 Automatic water actuated pump control valve system shall be provided and installed where shown on the Contract Drawings. The system shall include the valve assembly, control cabinet. The equipment shall be secured from a single manufacturer that offers the pump control valve as a standard product line. The equipment shall be suitable for use with raw water. The valve shall include a manual override mechanism and a manual operation to permit the emergency manual opening and closing of the control valve.

1.10.2 All ball valves shall be of the tight-closing, shaft-mounted type that fully comply with AWWA *Standard C507. Design pressure ratings shall be the pump shut-off head* and provide tight shutoff against flow in two directions. Design of valve shall be such that with the valve in the open position the full and unobstructed circular inlet and outlet port diameter shall be as specified in Table 2 of AWWA Standard C507. With the valve in the closed position, the rubber-seated valve shall be bubble tight at rated pressure.

1.10.3 The valve body shall have integral support legs or pads and shall consist of two body end pieces and a center body piece through-bolted and O-ring sealed against leakage. All body pieces shall be of cast iron ASTM A126, Class B. Minimum body thickness shall be as specified in Table 3 of AWWA Standard C507. Flanges shall be flat-faced and flange cast iron FF&D 250lb. (WP=500).

1.10.4 *The valve ball shall be constructed of ductile iron* ASTM A536 65-45-12 or cast iron ASTM A48, Class 40, and shall be taper pinned to an upper and lower fitted shaft of 18-8 Type 304 or 17-4 Type 630 stainless steel. Valves employing chromium-plated iron or steel shafts or trunnions shall not be accepted.

1.10.5 The center section shall be fitted with sleeve-type bearings contained in the body *hubs. Bearings shall be corrosion resistant and self-lubricating. Material shall be* Teflon lined with fiberglass backing. Bearing surfaces shall be isolated from flow by O-ring type seals. The ball assembly shall be supported by a 2-way thrust bearing assembly consisting of a stainless steel stud and thrust collar in a grease-packed cavity.

1.10.6 *All seats shall be of a synthetic rubber compound. Seats shall be retained in the* valve body by mechanical means without retaining rings, segments, screws or hardware of any kind in the flow stream. Seats shall seal a full 360° without interruption and have a plurality of grooves mating with a spherical stainless steel seating surface on the ball. Valve seats shall be field adjustable around the full 360° circumference and replaceable without dismantling the operator, ball or shaft. Where line size permits, seats shall also be capable of being adjusted without removing the valve from the line. Manufacturer shall certify that the rubber seat is field adjustable and replaceable.

In single seated valves, there shall be one set of ball and body seats. In double seated valves, there shall be two sets of ball and body seats. Single seated valves

shall provide drop-tight closure in one direction. Double seated shall provide drop-tight closure in two directions.

1.10.7 Valve actuators shall conform to the operating requirements of AWWA Standard C507 and shall be designed to hold the valve in any intermediate position between full open and fully closed without creeping or fluttering.

1.10.8 Cylinder actuators shall move the valve to any position from full open to fully closed. All wetted parts of the cylinder shall be corrosion resistant and cylinder rods shall be chromium plated stainless steel. Cylinders furnished with enclosed operating mechanisms shall have all wetted parts constructed of nonmetallic materials except the cylinder rod which shall be chromium plated stainless steel. Rod seals shall be of the nonadjustable wear compensating type. A rod wiper for removing deposits inside the cylinder shall be provided in addition to the external dirt wiper. Cylinder actuators of this type shall be Pratt MDT with Dura-Cyl cylinder.

1.10.9 All ball valves shall be subjected to hydrostatic, shop leakage and performance tests as specified in Section 5.2 of AWWA Standard C507.

1.10.10 All internal cast or ductile iron surfaces, except finished or bearing surfaces, shall be shop painted with two coats of asphalt varnish conforming to Federal Specification TT-C-494. All exterior steel or cast or ductile iron surfaces of each valve, except finished or bearing surfaces, shall be shop painted with one or more coats of alkyd primer. For buried service valves, two coats of asphalt varnish per Federal Specification TT-C-494.

1.10.11 Provide factory-mounted hydraulic operated cylinders for open-close service. To be Pratt Model MDT air/oil opposed type. Tandem cylinders are not acceptable. Air and oil cylinders shall be the same size.

1.10.12 The cylinder shall be capable of operating valve under all conditions when the supply air pressure is 80 psi. Normal supply pressure varies from 80 to 125 psi.

1.10.13 Provide factory-mounted limit switches, solenoid valves and other accessories as required.

1.10.14 Provide indicators to show position of ball.

1.10.15 Provide manual override on four-way solenoid valve.

1.10.16 Cylinders shall be double acting and designed to prevent drifting throughout stroke. Provide Dura-Cyl nonmetallic cylinders and accessories as manufactured by Henry Pratt Company.

1.10.17 The water control system for the pump check valve shall provide the following functions:

a. Independent adjustable rates of valve opening and closing operations.

b. Independent adjustable emergency closure rate resulting from an electric power failure or other operational signal eliminating power to the system.

1.10.18 The system shall be provided with a single solenoid four-way valve for the normal open and close function. One solenoid operated two-way valve shall be provided for emergency closure. Separate adjustable speed control valves shall be furnished for open, close and emergency operation. The system shall be provided with a manual override for the normal open and close function.

1.10.19 The required speeds of operation shall be as follows:

Normal open -- 60 seconds minimum
300 seconds maximum

Normal close -- 60 seconds minimum
300 seconds maximum

Emergency close -- 10 seconds minimum
20 seconds maximum

1.10.20 *The control system shall be fully piped on the actuator. All fittings and tubing shall* be brass and copper.

1.10.21 The pump check valve should be furnished with three limit switches. One each for the full open or full close positions, and the third switch shall provide momentary interruption of the pump motor control to initiate pump shutdown prior to 100% valve *closure to minimize hydraulic surge.*

1.10.22 The pump check system shall be the water Check-Mate system as manufactured by the Henry Pratt Company or approved equal.

1.10.23 The basic functions of the pump control valve shall include:

1. When the pump is not in operation the valve is closed.
2. When the pump is started, and when adjustable set is developed at the pump discharge, the pump control valve shall commence opening (rate of opening is adjustable from 30 to 180 seconds, initial set point to be 60 seconds).
3. When the pump is in operation and is signaled to stop, the pump control valve shall commence closing (rate of closing is adjustable from 30 to 180 seconds, initial set point to be 60 seconds). Pump shall not stop operation until such time as the valve position switch, on the valve position indicator, confirms that the valve is fully closed. The valve position indicator must confirm that the valve is fully closed before the pump starting sequence can be commenced. The pump can not be started with the valve partially open.
4. The pump control valve shall have certain safety features included as part of its control functions. These functions shall be based upon time delays, adjustable from 0 to 90 seconds. If any operation's safety feature should activate (timer delay period expires before confirming relay activated), pumps shall be *immediately stopped, the unit locked out and a "Motor Stop" alarm light activated* on the control panel. This safety shutdown shall include a normally open contact with terminals for remote alarms. Pump can not be restarted until the safety condition is manually reset. Safety shutdowns shall be activated by any of the following faults: (1) failure of the pump to develop or maintain the minimum discharge pressure set point, (2) failure of the pump control valve to fully open, and (3) operation of the pump at or near its shut off head.

5. In the event of a loss of power, the pump control valve shall close immediately and at an accelerated rate (adjustable from 10 to 20 seconds, initial set point 20 seconds).

2. GATES

2.1 Sluice Gates

2.1.1 Sluice gates shall have rising stems and shall meet the requirements of AWWA C501 with the following materials:

Cast Iron	ASTM A126 Class B or C
Seating face	Bronze, ASTM B21, Alloy A
Fasteners	Bronze, ASTM B98
Stems	Stainless steel
Wedges	Bronze, ASTM B147
Lift nut	Bronze, ASTM B147

2.1.2 Type of closures, frame and wall thimble and operation heads and configuration shall be as shown on the Drawings. Sluice gate operators shall be manual unless otherwise indicated on the Drawings and shall meet the requirements of AWWA C501 as indicated on the Drawings.

2.2 Slide Gates

2.2.1 Slide gates shall consist of aluminum gates and guides and stainless steel rising stems.

2.2.2 Type of closure, frames operating head and configuration shall be as indicated on the Drawings. Slide gate operators shall be manual unless otherwise indicated and shall meet the requirements of AWWA C501 as indicated on the Drawings.

2.2.3 Resilient seals for flush bottom closure type gates shall be attached to the lower edge of the gates and seat against stop bars attached to the frame along the invert of the gates.

2.2.4 Gates shall be manufactured by Rodney Hunt of approved equal.

3. VALVES AND FLOOR BOXES

3.1 Valve boxes shall be cast iron sectional type. The lower section shall have a minimum diameter of 5 inches, enlarged to fit around the bonnet of the valve if a 2-section box is used or to fit a circular or oval base section if a 3-section box is used. The upper section shall slide down over the adjoining lower section and shall be full diameter throughout. Valve boxes shall have cast iron lids or covers. The boxes shall be long enough to permit the top to be set flush with the ground surface.

3.2 Floor boxes for operating nuts of extended stem valves or gates, where installed in concrete floors, shall be cast iron and shall be equipped with bronze bushing or other suitable device to permanently maintain the operating nut in the center of the box. Boxes shall be equal in length to the thickness of the floor in which they are installed

and large enough to receive a standard T-wrench. Boxes shall have cast iron lids with finger holes for removal.

3.3 Buried Valves shall be supplied with type 304 stainless steel extension shafts with 2-inch square nuts at ground level and with indicators to show valve position. Shafts shall be enclosed in the valve boxes.

PIPE AND PIPING APPURTENANCES

SECTION 17D

PIPE SUPPORTS

1. GENERAL

1.1 Piping inside structures shall be hung except when it can be supported from the floor or racked adjacent to walls.

1.2 Inserts cast in concrete walls or slabs for hanging and supporting pipe shall be provided under this Section. Materials not galvanized or cadmium plated shall be prime painted before installation.

1.3 Support components shall be designed, fabricated and installed in general conformance with Sections 120 and 121 of ANSI B31.1, Power Piping, except as modified in this Section.

1.4 Shop drawings of piping systems requiring expansion joints and fixed anchors shall be submitted to the Engineer for review. Submittals shall include:

1.4.1 A layout of the systems including location of fixed and movable joints.

1.4.2 Details of design and fabrication of joints.

1.4.3 Details of support brackets, cradles, pads, thrust resisting elements, and other supporting elements.

As a minimum, floor supports shall be Bergen-Patterson 6651 or equal; overhead supports shall be Bergen-Patterson Pant 6100 with weldless eye nut 5130 and threaded rod as provided hereinafter. Overhead support shall be braced to adjacent building structure.

1.4.4 Insulated pipe shall be hung using chained supports in order to avoid compression or other damage to insulation.

1.4.5 Other pertinent elements necessary for a complete installation.

1.4.6 Design calculations for all items.

2. INSTALLATION

2.1 Interior piping shall be supported, braced, and anchored to prevent movement in any direction because of pressure, temperature, flow, or water hammer, except at properly located expansion joints and fittings.

2.2 Two pipe guides shall be provided on each side of expansion joints at which pipe movement occurs. The first guide shall be not more than four pipe diameters from the joint and the second not more than 14 diameters. Additional guides shall be provided as required to maintain pipe alignment, spaced as required for the pipe size, fluid pressure and temperature inside the pipe, and as recommended by the expansion joint manufacturer or as shown.

2.3 Maximum support spacing and hanger rod sizes for metal pipe shall be in accordance with the following:

Nominal Pipe Size Inches	Support Spacing Feet	Rod Diameter Inches	
		One Rod	Two Rods
Liquid Service			
1 and Smaller	7	3/8	3/8
1-1/4 and 1-1/2	8	3/8	3/8
2	10	3/8	3/8
2-1/2	11	1/2	3/8
3	12	1/2	3/8
4 and 5	14	1/2	3/8
6 and 8	17	1/2	3/8
10	17	5/8	1/2
12	17	3/4	1/2
14	17	3/4	5/8
16	17	7/8	5/8
18 and 20	17	1	3/4
24	17	1-1/8	7/8

2.4 Valves 4-inch and larger and flow meters in horizontal lines shall have supports on both sides located within 18 inches of the valve or meter. Provide additional supports where required so that piping loads do not place damaged stresses on supports, valves, and equipment. Where necessary, block up pipe at supports to permit installation of insulation.

2.5 Piping not included in the foregoing tabulation shall be supported as indicated or in accordance with the pipe manufacturer's recommendations if not indicated.

2.6 Anchor buried pressure piping at each fitting causing a change in direction of 22-1/2 degrees or more. Concrete thrust blocks or other restraining devices in any satisfactory combination may be used. Submit the details of the method proposed for use, together with design calculations, to the Engineer for approval before installation.

PIPE AND PIPING APPURTENANCES

SECTION 17E

PIPE INSULATION

1. GENERAL

1.1 Where indicated on the Contract Drawings, pipe, valves and fittings shall be insulated to protect from freezing or condensation. Unless noted differently on the Contract Drawings, all pipe insulation shall be furnished and installed in accordance with this section of the Specifications.

1.2 Furnish submittals in accordance with Division 1.

2. PRODUCTS

2.1 Insulation Material

Insulation shall be rigid polyurethane equal to DOW "Trymer". Fabricate to fit piping, fittings, and valves. Use 2-inch thickness.

Voids to be filled with flexible fiberglass insulation.

2.2 Exterior Pipe Insulation Covering

Pipe insulation exposed to weather shall be covered with corrugated aluminum metal lagging of not less than 0.016-inch thickness. Lagging to be held in place with ½-inch aluminum bands spaced 6-inches ± apart. Aluminum bands to be held together with winged seals.

3. EXECUTION

3.1 Installation shall be in accordance with manufacturer's recommendations.

3.2 Finished work shall be of neat, workmanlike appearance. Workers shall be skilled in the application of material used.

TABLE OF CONTENTS

FOR

DIVISION 22

PUMPS AND DRIVES

PUMPS AND DRIVES

SECTION 22A

GENERAL PUMP REQUIREMENTS

1. GENERAL

1.1 Furnish and install the pumps, drives and related accessories required for this project, unless specified under other sections.

1.2 See Section 1E for other requirements relating to furnishing and installing equipment items.

1.3 To reduce maintenance expense, pumps of the same type shall be supplied by the same manufacturer insofar as possible.

2. TESTS

2.1 Furnish six copies of certified curves, based on pumping clear water, showing the capacity, efficiency and brake horsepower for each pump furnished, and for maximum and minimum speeds where applicable. Curves shall be derived from shop tests performed by the manufacturer in accordance with the standards of the hydraulic institute.

2.2 After installation, conduct field tests to demonstrate that capacities and operating characteristics specified are developed.

2.3 Each motor shall be given a routine test at the factory to assure conformance to design standards and limits, and freedom from mechanical and electrical defects.

3. SUBMITTALS

3.1 Shop drawings shall be submitted in accordance with Section 1C.

3.2 Shop drawings shall include details and assembly plans, including parts lists and complete material specifications for each type and size of pump furnished.

3.3 Shop drawings for motors submitted for approval shall include the following motor data:

- Manufacturer
- Nameplate rated horsepower
- Rated voltage
- Full load rpm
- Full load current
- Full load power factor (20 hp and larger)
- NEMA design letter
- NEC code letter or inrush current
- Insulation class
- Service factor

3.4 For motors of 100 hp and larger include the following additional information:

- Acceleration time-current curve of motor and starting load
- Allowable stall time (full voltage)
- Recommended starting restrictions

4. NAMEPLATES

4.1 Brass nameplates shall be attached to each pump stamped with the manufacturer's name, capacity, head in feet, rpm, and identification number.

5. GAUGE CONNECTIONS

5.1 Pump shall have a tapped opening with bronze plug for installation of a pressure gauge on the discharge opening on the pump. Furnish pressure gauge assembly consisting of 4-1/2-inch oil-filled pressure gauge, oil-filled seperation diaphragm, and isolation valve for installation on each pump. Pressure gauge shall be rated for shut-off head of pump.

6. STUFFING BOX DRAINS

6.1 Copper or flexible plastic tube drain lines, 1/2-inch minimum size, shall be provided between water sealed stuffing boxes and nearest floor drains.

7. MOTORS

7.1 Pump motors shall be non-overloading at any discharge rate between zero and 1.5 times the duty point capacity. Variable speed pumps shall be supplied with inverter duty motors meeting the requirements of NEMA MG1-1993, Rev 1, Part 31, "Definite Purpose Inverter-Fed Motors".

8. PUMP SCHEDULE

8.1 The pumps to be provided under this Division shall be as follows:

1. High Service Pump

Type	Vertical Turbine
Quantity	1
Design GPM	2,800 GPM
Design TDH	430 Ft
Max RPM	1,800 RPM
Minimum Shut-Off Head	677 Ft
Minimum Efficiency (Design Pt)	84 %
Secondary GPM	3,360 GPM
Secondary TDH	322 Ft
Min. Effiency @ Sec. Pt.	72%
Max. NPSHR @ Design	22.5 Ft
Column Size	10 Inches
Discharge Outlet	12" – 125 LB
Minimum Motor HP	400 HP
Separate Sole Plate	36" Sq x 1.375"
Stages	5
Representative Model No.	Fairbanks Morse

2. Backwash Pump

Type -Vertical Turbine
Quantity - 1
Operating Range – 3,600 gpm @ 45 ft. TDH
Maximum Speed – 1,200 RPM
Motor - 50 HP, 460 V, 3P
Representative Model No. – Fairbanks Morse 17H - Single Stage

PUMPS AND DRIVES

SECTION 22B

VERTICAL TURBINE PUMPS

1. GENERAL

1.1 Furnish and install product lubricated turbine pumps consisting of, but not limited to, pump/bowl assembly, column, open line shaft, discharge head, motor, and motor base assembly.

1.2 The pumps setting and configuration and characteristics shall be in conformance with that shown on the Contract Drawing.

1.3 Pumps shall be manufactured in accordance with the standards of the Hydraulic Institute and to ANSI/AWWA specification E101.

1.4 The pump shall be as manufactured by Flowserve, Fairbanks Morse, Peerless, Simflo or approved equal.

2. PUMP CONSTRUCTION

2.1 The pumps bowls shall be of ASTM A48 cast iron free from blow holes and other detrimental effects. They shall be accurately machined with register fits. All bowls must be flanged type. All interior water passage ways shall be enameled. The suction bowl shall include a suction bell with bronze permanently lubricated bearing. Each bowl shall be fitted with a bronze bowl wear ring.

2.2 The impellers shall be of the enclosed design and of bronze construction. Each impeller shall be locked to the pump shaft with the tapered lock collet. They shall be dynamically balanced. They shall be vertically adjustable by means in top of the motor. The impellers shall be supported by bronze bearings between each stage and also in the suction and discharge bowl.

2.3 The pump discharge column shall be of butt welded steel pipe with flanged ends which shall be machined parallel. Maximum length shall not 5'-0". Each section shall include a bearing retainer assembly with a rubber product lube bearing to support the pump line shaft. The column must be of A53 grade B with sufficient wall thickness.

2.4 The line shaft shall be of type 416 stainless steel in maximum of 5'-0" length. Sections shall be connected with threaded couplings of 400 series stainless steel. Minimum size shall be as indicated in the above table. The butting faces shall be machined square to the axis with the maximum permissible axial misalignment of the threaded axis with the shaft axis .002 inch in 6 inches. The couplings shall have a safety factor of .5 times the shaft factor, and shall have left hand threads to tighten during pump operation.

2.5 The discharge heads shall be of heavy fabricated steel construction with below floor outlet. They shall include an elbow of the segmental design with an outlet and flange drilling as called for in the above table. The head shall include a two-piece top shaft

arrangement with a threaded coupling to connect the head shaft with the motor shaft. The head shall include a packing box with asbestos free packing matched for the pressure required. A separate sole plate with size indicated in above table shall be furnished with each pump.

3. PUMP MOTOR

All motors shall be of the size and speed indicated in the above table. They shall be of the vertical hollow shaft design in Nema Type 1 weather protected enclosure. They shall be of the Squirrel cage induction design and meet all the latest AIEE standards. They shall be of high thrust design and shall be non-overloading beyond the name plate at any point on the pump performance curve. They shall have class F insulation with premium efficiency and shall be furnished with non-reverse ratchets. They shall have a bronze lower steady bushing installed in the lower part of the motors to give the shaft additional steadiness. Motors shall be furnished for 3 phase 60 Hz, 460 volt service, shall have a 1.15 service factor, and be provided with space heaters. Each motor shall be given a short commercial test to meet NEMA MG1-12.51 standards and shall include no load current, locked rotor current, winding resistance, high potential and bearing inspection. Copies of test reports shall be submitted to the engineer for approval. Motors shall be as manufactured by USEM or General Electric.

4. AIR RELIEF

Provide an air relief assembly for both the discharge piping and the upper pump column above the discharge head.

5. STARTUP

Provide the services of a manufacturer's representative to check out each pump after installation, make impeller adjustments and place pumps into service. He shall also instruct the Owner's personnel in operation and maintenance. The Engineer shall be provided with written certification that this service has been provided.