CONTRACT DOCUMENTS, TECHNICAL SPECIFICATIONS

AND

CONSTRUCTION DRAWINGS

FOR

BID
ASCENSION PARISH
WATER SECTOR PROGRAM (ROUND 1)
PARISH PROJECT # PM-21-09-002
ASCENSION PARISH

PARISH PRESIDENT
Clint Cointment

COUNCILMEMBERS
Alvin "Coach" Thomas, District 1
Joel Robert, District 2
Travis Turner, District 3
Corey Orgeron, District 4
Dempsey Lambert, District 5
Chase Melancon, District 6
Aaron Lawler, District 7
Teri Casso, District 8
Dal Waguespack, District 9
John Cagnolatti, District 10
Michael Mason, District 11

Date: February, 2023

PREPARED BY:
MCKIM & CREED, INC.
For
Ascension Parish
Gonzales, LA 70737

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BIDDING AND CONTRACT REQUIREMENTS

Division 0 – Article 1

INVITATION

Sealed bids will be received by ***Ascension Parish Purchasing Department, 615 E. Worthey, Gonzales, Louisiana (mailing address P.O. Box 2392, Gonzales, Louisiana 70707-2392) on February 29, 2024, at 10am. Local time and then at said office publicly*** opened and read aloud for the following project:

ASCENSION PARISH WATER SECTOR PROGRAM (ROUND 1)
PROJECT NO. PM-21-09-002

STATEMENT OF WORK:

This project will consist of the consolidation of the Parish Utilities of Ascension (PUA) and ACUD No. 1 water systems within the City of Donaldsonville at three different tie-in points to include: 1) LA 1 North, 2) La 1 South, and 3) LA 308. It will also consist of the addition of a pressure booster station near the McCall Elevated Storage Tank and rehabilitation/replacement of various water lines within the historic area of the City of Donaldsonville with mostly 8" DR 11 HDPE.

Any contractor wanting to bid on this project shall hold a State License in the MUNICIPAL & PUBLIC WORKS CONSTRUCTION category. Any bid received after the closure time above stated will be returned unopened.

All Bids must be in accordance with the Contract Documents on file at the ***Ascension Parish Legal Department, 615 E. Worthey Road, Gonzales, Louisiana 70737***.

Copies of Specifications, Bid Documents, Contract Documents and Construction Drawings for use in preparing Bids may be obtained from **McKim & Creed, Inc., 1022 S. Purpera Ave., Gonzales, LA 70737** upon payment of ***One Hundred Fifty Dollars ($150.00) per set made payable to McKim & Creed, Inc. or free if electronic copy requested and media provided.*** Documents can be mailed to bidders with a provided shipping account number. No refunds will be made for returned drawings.

Where bids are to be received on forms furnished by the awarding authority, no contract documents shall be issued to anyone except a Licensed Contractor or his authorized Representatives. **In no event shall any documents for bidding be issued later than seventy-two (72) hours prior to the hour and date set for receiving bids.**

Each bid must be submitted in a sealed envelope bearing on the outside the name of the bidder, his/her address, contractor's state license number and the name of the project for which the bid is submitted. If forwarded by mail, the sealed envelope containing the bid must be enclosed in another envelope addressed to the ***Ascension Parish Purchasing Department, 615 E. Worthey,***

Gonzales, Louisiana (P.O. Box 2392, Gonzales, Louisiana 70707), mailed certified mail and must be received no later than the bid opening.

Contractors desiring to bid shall submit to the Project Manager, with their request for Contract Documents, contract documents deposit and evidence that they hold State License of proper classification and in full force and effect.

Bid security in the amount of five percent (5%) of the Total Bid must accompany each Bid and shall be made payable to the Owner.

The Owner reserves the right to waive any informalities or to reject any or all bids.

No bidder may withdraw his bid within forty-five (45) days after the actual date of opening thereof.

A Non-Mandatory Pre-Bid Conference will be held on February 12, 2024 at the Ascension Parish Governmental Complex Conference Room #109, 615 East Worthey St., Gonzales, LA 70737 @ 10:00 A.M.

All questions regarding this project and the bid package shall be submitted to the Purchasing Department via purchasing@apgov.us by 3pm on February 14, 2024. Responses will be coordinated with the Project Manager and posted on the www.centralauctionhouse.com by 3pm on February 20, 2024.

In addition to paper bids, electronic bids and electronic bid bonds for the followings project will be downloaded by the Ascension Parish Purchasing Department. Electronic bids and electronic bid bonds must be submitted through www.centralauctionhouse.com prior to the electronic bidding deadline. Beginning at ***10am Local time*** (Local time) on **February 29, 2024** all bids will be downloaded. No bids are accepted after ***10am Local time.***

RS 38:2218. Evidence of good faith; countersigning

A. The public entity advertising for bids for work shall require the bidders to attach a certified check, cashier's check, or bid bond for not more than five percent of the contract price of work to be done, as an evidence of good faith of the bidder. The public entity advertising for bids for work may require the bidders to attach a certified check, cashier's check, or bid bond for not more than five percent of the estimated price of supplies or materials, as evidence of good faith of the bidder.

To address the above requirement for electronic bids Ascension Parish Government will allow electronic bids submitted via the parish approved on-line bid site to be submitted as follows:

A. A copy of the bid bond **must** be attached to bid document submitted electronically
B. The original bid bond document must be received in our office no later than 48 hours after bid opening date and time ***(Ascension Parish Purchasing Department, 615 E. Worthey, Gonzales, Louisiana (P.O. Box 2392, Gonzales, Louisiana 70707)***

C. The bid-bond envelope must be clearly labeled as a "Bid Bond" with the project name, vendor's name as it appears on the bid documents and address.

All addenda, Amendments, Letters of Clarification, and Withdrawal Notices will be posted online in addition to electronic copies being distributed. Construction proposal information may be accessed via the internet at www.centralauctionhouse.com. Users must click on Login and create a New User Registration to view and download drawings. Once logged in, users must click on Ascension Parish Government to view current advertisement listings. This listing is titled ***"ASCENSION PARISH WATER SECTOR PROGRAM (ROUND 1)".*** Registered users will have access to view Project Information, submit a question concerning the project, and view the drawings. All project specific notices are found here. It will be the responsibility of the bidder to check for updates. All submitted questions will be forwarded by email to the Project Manager for a response.

The Ascension Parish shall not be responsible if the bidder cannot complete and submit a bid due to failure or incomplete delivery of the files submitted via the internet.

Ascension Parish Government reserves the right to reject any and all bids for just cause.

OWNER
PARISH OF ASCENSION

BY: /s/ MR. CLINT COINTMENT

TO APPEAR IN THE:

CHIEF: 2/1/2024, 2/8/2024, 2/15/2024
WEEKLY: 2/1/2024, 2/8/2024, 2/15/2024

Division 0 – Article 2
INSTRUCTIONS TO BIDDERS

2.1 CROSS REFERENCE TO PRIMARY STATEMENTS. Definitions, requirements, and limitations affecting the bidding are contained in the various contract documents and are not necessarily repeated in these instructions.

2.2 QUALIFICATION OF BIDDERS. Bidders may be required to submit evidence that they have a practical knowledge of the particular task bid upon, and that they have the financial resources to complete the proposed scope in entirety.

In determining the Bidder's qualifications, the following factors will be considered: contracts previously completed by the Bidder and whether the Bidder (a) maintains a permanent place of business, (b) has adequate plant and equipment to do the task properly and expeditiously, (c) has the financial resources to meet all obligations incidental to the task, and (d) has appropriate technical experience.

Each Bidder may be required to show that he has completed similar work and that there are no just claims pending against such work. No Bid will be accepted from a Bidder who is engaged on any contract which would impair his ability to perform or finance his work.

2.3 LOUISIANA LICENSE REQUIREMENTS. Only Bids of Contractors licensed under LSA R.S. – 37:2150 et seq., will be considered. Licensing is supervised by the Louisiana Licensing Board for Contractors, 7434 Perkins Road, Baton Rouge, Louisiana. Contractors desiring to bid shall submit with their Bids evidence that they hold a valid license in the proper classification.

2.4 FAMILIARIZATION WITH THE WORK. Before submitting his Bid, each prospective Bidder shall familiarize himself with the scope of the task, the sites where the proposed improvements is to be performed, local labor conditions and all laws, regulations and other factors affecting performance of the work. He shall carefully correlate his observations with requirements of the Contract Documents and otherwise satisfy himself of the expense and difficulties attending performance of the Work. The submission of a Bid will constitute a representation of compliance by the Bidder. There will be no financial adjustment justification for lack of such familiarization. Additionally, evidence of having the lack of familiarization could result in contract termination or substantial financial impacts to the contractor due to liquidated damages or other variables.

2.4.1 Site Conditions. Each Bidder shall visit the sites of the Work and completely inform himself relative to construction hazards and procedure, the availability of lands, the character and quantity of surface and subsurface materials, and utilities to be encountered, the arrangement and condition of existing structures and facilities, the procedure necessary for maintenance of uninterrupted operation of existing facilities, the character of construction equipment and facilities needed for performance of the Work, and facilities

for transportation, handling, and storage of materials and equipment. All such factors shall be properly investigated and considered in the preparation of the Bid.

2.4.2 Access to the Sites. The project is to be constructed within the Parish of Ascension. Contractors and Suppliers wishing to inspect the various sites may do so at their convenience.

2.5 INTERPRETATIONS. The Drawings have been prepared by **McKim & Creed, Inc.** who is hereinafter called ENGINEER. All questions about the meaning or intent of the Specifications and Contract Documents shall be submitted to the Project Manager in writing. Replies will be issued by Addenda mailed or delivered to all parties recorded by Project Manager as having received the bidding documents and posted on the Central Auction House website. Addenda will be issued at least 72 hours, (3 working days, excluding weekends and holidays) prior to the time stated for opening bids. Questions received less than five (5) working days prior to the date for opening Bids will not be answered. Only answers furnished by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

2.6 TAXES AND PERMITS. Attention is directed to the requirements of the General Conditions and Supplementary Conditions regarding payment of taxes and obtaining permits. All taxes that are lawfully assessed against Owner or Contractor in connection with the Work shall be paid by Contractor. The bid prices shall include all such taxes and the costs of all required permits.

2.7 BID SECURITY. The amount of bid security is stated in the Invitation. The required security must be in the form of a certified or bank cashier's check or a bid bond. The bid bond must be executed by a surety meeting the requirements set forth in the General Conditions and Supplementary Conditions. Bid bond must have attached appropriate and satisfactory Power of Attorney. The bond shall also be countersigned by a person who is under contract with the Surety Company or Bond Issuer as a Licensed Agent in this State and who is residing in the State. Refer to R.S. 38:2218
The bid security shall be made payable without condition to the Owner. The bid security may be retained by and shall be forfeited to the Owner as liquidated damages if the Bid is accepted and a contract based thereon is awarded and the Bidder should fail to enter into a contract in the form prescribed, with legally responsible sureties, within fifteen (15) days after such award is made by Owner.

2.8 RETURN OF BID SECURITY. The bid security of the successful Bidder will be retained until the bidder has executed the Agreement and furnished the required Contract Security, whereupon checks furnished as bid security will be returned; if the bidder fails to execute and deliver the Agreement and furnish the required Contract Security within fifteen (15) days of the Notice of Award, Owner may annul the Notice of Award and the bid security of that Bidder will be forfeited. The bid security of any Bidder whom Owner believes 'to have a reasonable chance of receiving the award' may be retained by Owner until the seventh day after the executed Agreement is delivered by Owner to Contractor and the required Contract Security is furnished but not to exceed thirty (30) days after the Bid

opening. Checks furnished as bid security by other Bidders will be returned within five (5) days of the Bid opening.

2.9 CONTRACT TIME. The Contract Time is an essential part of the contract and it may be necessary for each Bidder to satisfy Owner of his ability to complete the Work within the time set forth in the Bid Form. Provisions for delays, liquidated damages, and extensions of time are set forth in the General and Supplementary Conditions.

The Contractor is responsible for equipment and material delivery. A time extension to the Contract duration will not be allowed for late material or equipment delivery.

2.10 SUBCONTRACTORS AND SUPPLIERS. Within three (3) days after Bids are opened, the apparent low Bidder, and any other Bidder so requested, shall submit a list of all Subcontractors and Suppliers he expects to use in the Work and to submit manufacturer's data on selected equipment, if requested by Owner.

2.10.1 Subcontractor Qualification. Particular consideration will be given to the qualifications of each Subcontractor proposed. An experience statement with pertinent information as to similar projects and other evidence of qualification shall be furnished for each named Subcontractor, as requested by the Owner or Engineer. If Owner or Engineer, after due investigation has reasonable objection to any proposed Subcontractor, he may, before giving Notice of Award, request the apparent low Bidder to submit an acceptable substitute without an increase in his Bid. If the apparent low Bidder declines to make substitution he will not thereby sacrifice his bid security. Any Subcontractor so listed and to whom Owner or Engineer does not make written objection prior to the giving of the Notice of Award will be deemed acceptable to the Owner and Engineer.

Contractor shall not be required to employ any Subcontractor against whom he has reasonable objection.

The use of Subcontractors listed by the Bidder and accepted by Owner prior to Notice of Award will be required in the performance of the Work.

2.10.2 Suppliers. The list of Subcontractors shall also include the suppliers of the principal items of materials and equipment the Bidder expects to use in the Work unless such suppliers or manufacturers are named in the Bid.

2.10.3 Manufacturer's Data. The list of Subcontractors submitted as provided herein shall be accompanied by two prints or copies of data on equipment and materials to be furnished by each supplier or manufacturer. Data so submitted shall illustrate the physical characteristics of the equipment and materials to be furnished. Although the drawings and specifications submitted prior to the Notice of Award need not be complete but must contain sufficient detail for Engineer to determine whether the materials and equipment will conform to the Contract Documents.

The Contract Documents will take precedence over any nonconforming data submitted.

Any Bid specifically conditioned upon furnishing equipment or materials which are not responsive to the Contract Documents will not be considered.

2.11 BIDS.

2.11.1 Bid Form. The Bid Form is bound within the Contract Documents. Bid forms must be completed in ink or typed.

Bids by corporations must be executed in the corporate name by a president or vice-president (or other corporate officer) accompanied by evidence of authority to sign. The state of incorporation shall be shown below the corporate name. Bids by partnerships must be executed in the partnership name and signed by a partner; title and the official address of the partnership must be shown below the signature. Bids by joint ventures shall be signed by each participant in the joint venture or by an authorized agent of each participant.

The names of all persons signing must also be legibly printed below the signature. A Bid by a person who affixes to his signature the word "president", "secretary", "agent", or other designation without disclosing his principal may be held to be liable for the Bid.

All blank spaces in the Bid Form shall be filled. Bids received without all such items completed will be considered as a nonresponsive Bid.

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

No alterations in the Bids, or in the printed forms therein, by erasures, interpolations, or otherwise will be acceptable unless each such alteration is signed or initialed by the Bidder. If initialed, Owner may require the Bidder to clarify any alteration so initialed.

All questions regarding this project and the bid package shall be submitted to the Purchasing Department via purchasing@apgov.us by 3pm on February 14, 2024. Responses will be coordinated with the Project Manager and posted on the www.centralauctionhouse.com by 3pm on February 20, 2024. In addition to paper bids, electronic bids and electronic bid bonds for the project will be downloaded by the Ascension Parish Purchasing Department. Electronic bids and electronic bid bonds must be submitted through www.centralauctionhouse.com prior to the electronic bidding deadline. Beginning at **10am on February 29, 2024 all bids will be downloaded. No bids are accepted after 10am (Local time).**

2.11.2 Affidavit. Bidders shall include with their Bid the attached Non-Collusion Affidavit.

2.11.3 Submission of Bids. The bid shall consist of the Bid Form and the other documents that are required to be submitted along with the Bid Form.

Each Bid and accompanying data shall be enclosed in a sealed opaque envelope or wrapping, addressed to:

Ascension Parish Purchasing Department
615 E. Worthey Street, Gonzales, Louisiana 70737
(P.O. Box 2392, Gonzales, Louisiana 70707-2392)

and identified on the outside with the Bidder's name, Louisiana Contractor License Number and the words "***"ASCENSION PARISH WATER SECTOR PROGRAM (ROUND 1)"*** If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "BID ENCLOSED" on the face thereof.

Bids shall be deposited at the designated location prior to the time and date for receipt of Bids indicated in the Invitation for Bids, or the modified time and date indicated by Addendum. Bids received after the time and date for receipt of Bids will be returned unopened.

Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

Oral, telephone, or telegraph Bids are invalid and will not receive consideration.

No Bidder may submit more than one Bid. Multiple Bids under different names will not be accepted from one firm or association.

2.11.4 Modification and Withdrawal of Bids. Bids may be modified or withdrawn by an appropriate document duly executed (in the manner that a Bid must be executed) and delivered to the place where Bids are to be submitted at any time prior to the opening of Bids.

2.11.5 Bids to Remain Open. All Bids shall remain open for 45 days after the day of the Bid opening. Owner shall release Bids and return bid securities as specified in Section 1.8 under "Return of Bid Security".

2.12 AWARD OF CONTRACT. Owner shall award a contract to the Bidder who, in Owner's judgment, is the lowest responsive, responsible Bidder. Owner reserves the right to reject any or all Bids, to award the contract by sections, to waive informalities, and to reject nonconforming, nonresponsive, or conditional Bids.

In evaluating Bids, Owner shall consider the qualifications of the Bidders, whether or not the Bids comply with the prescribed requirements, and alternatives and unit prices if requested in the Bid Form. Owner may consider the qualifications and experience of Subcontractors and other persons and organizations (including those who are to furnish the principal items of material or equipment) and may reject the Bid of any Bidder who does not pass any such evaluation to Owner's satisfaction.

The evaluation of manufacturer's data, when required to be submitted with the Bid or submitted upon request prior to the Notice of Award, shall include the following information at a minimum for consideration:

- Full name and address of manufacturer.
- Manufacturer's engineering or technical representative contact, including telephone number and email addresses.
- Manufacturer's service facilities and availability of qualified field service personnel.
- Manufacturer's contact information for the local sales information.
- The name (model, series number, etc.) of the product(s) that are to be listed.
- Manufacturer's inventory on-hand and demand capacity.
- Manufacturer's installation requirements and procedures, related engineering specifications, training, required certifications.
- Manufacturer's operating cost, maintenance upkeep schedule, life expectancy, and any warranty or other service included for the product listed.
- Experience and performance record of the manufacturer and specific products listed.
- Manufacturer's Cut sheet(s) / engineering details of products listed.
- A cost / benefit analysis compared to similar and common product from different manufacturer.

If the contract is awarded, Owner shall give the apparent successful Bidder a Notice of Award within thirty (30) days after the date of the Bid opening.

2.13 EXECUTION OF THE AGREEMENT. The Contractor shall be furnished four (4) copies of the Agreement, including insurance certificates, and other Contract Documents bound therewith. Within fifteen (15) days of Notice of Award, Contractor shall execute the Agreement, insert executed copies of the required bonds and power of attorney and submit all copies to Owner. The date of contract on the Agreement and Bond forms shall be left blank for filling in by Owner. The certification date on the power of attorney also shall be left blank for filling in by Owner.

Owner shall execute all copies, insert the date of contract on the Agreement, Bonds, and power of attorney, and return all copies to Owner for review and distribution.

Once all contract documents have been executed, the Contractor shall be furnished one (1) set of original documents. The Owner shall have one (1) set of these documents recorded in the office of the Recorder of Mortgages in the jurisdiction where the work is to be performed.

2.14 COPIES OF CONTRACT DOCUMENTS. Copies of the drawings and specifications for use in preparing Bids may be obtained from:

McKim & Creed, Inc.
One Hundred Fifty Dollars ($150.00)

The Contractor to whom a contract is awarded will be furnished two (2) working copies of the specifications and the drawings, together with all Addenda thereto.

2.15 LOCAL MATERIAL AND FIRMS. By statutory authority, preference is hereby given to materials, supplies, and provisions produced, manufactured, or grown in Louisiana, quality being equal to articles offered by competitors outside of the State (LSA R.S. – 38:2252), and preference is hereby given to firms doing business in the State of Louisiana (LSA R.S. – 38:2253).

Division 0 – Article 3

BID NOTICE
"ASCENSION PARISH WATER SECTOR PROGRAM (ROUND 1)"

Sealed bids will be received by Ascension Parish Government at the Ascension Parish Government Purchasing Office, 615 E. Worthey Street, Gonzales, Louisiana 70737 until **February 29, 2024, at 10:00 a.m.** local time. The bids will be publicly opened and read aloud for the following:

Ascension Parish Water Sector Program (Round 1)
PROJECT NO. PM-21-09-002

Statement of Work:
This project will consist of the consolidation of the Parish Utilities of Ascension (PUA) and ACUD No.1 water systems within the City of Donaldsonville at three different tie-in points to include: 1) LA 1 North, 2) La 1 South, and 3) LA 308. It will also consist of the addition of a pressure booster station near the McCall Elevated Storage Tank and rehabilitation/replacement of various water lines within the historic area of the City of Donaldsonville with mostly 8" DR 11 HDPE.

Any contractor wanting to bid on this project shall hold a State License in Municipal & Public Works Construction category. Any bid received after the closure time above stated will be returned unopened.

All Bids must be in accordance with the Contract Documents on file at the **Ascension Parish Purchasing Department, 615. E. Worthey Road, Gonzales, LA 70737.**

Copies of Specifications, Bid Documents, Contract Documents and Construction Drawings for use in preparing Bids may be obtained from **McKim & Creed Inc., 1022 S. Purpera Ave., Gonzales, La 70737** upon payment of ***One Hundred Fifty ($150.00) per set made payable to McKim & Creed, Inc. or free if electronic copy requested and media provided***. Documents can be mailed to bidders with a provided shipping account number. No refunds will be made for returned drawings.

Where bids are to be received on forms furnished by the awarding authority, no contract documents shall be issued to anyone except a Licensed Contractor or his/ her authorized Representatives. **In no event shall any document for bidding be issued later than seventy- two (72) hours prior to the hour and date set for receiving bids.**

Each bid must be submitted in a sealed envelope bearing on the outside the name of the bidder, his/her address, contractor's state license number and the name of the project for which the bid is submitted. If forward by mail, the sealed envelope containing the bid must be enclosed in another envelope addressed to the **Ascension Parish Purchasing Department, 615 E. Worthey, Gonzales, Louisiana 70737, mailed certified mail and must be received no later than the bid opening.**

Contractors desiring to bid shall submit to the Project Manager, with their request for Contract Documents, contract documents deposit and evidence that they hold State License of proper classification and in full force and effect.

Bid security in the amount of five percent (5%) of the Total Bid must accompany each bid and shall be made payable to the Owner.

The Owner reserves the right to waive any informalities or to reject any or all bids.

No bidder may withdraw his/her bid within forty-five (45) days after the actual date of opening thereof.

A Non-Mandatory Pre-Bid Conference will be held on **February 12, 2024, at the Ascension Parish Governmental Complex Conference Room # 109, 615 East Worthey St., Gonzales, LA 70737 at 10:00 am.**

All questions regarding this project and the bid package shall be submitted to the Purchasing Department via purchasing@apgov.us **by 3:00 PM on February 14, 2024**. Responses will be coordinated with the Project Manager and posted on the www.centralauctionhouse.com **by 3:00 pm on February 20, 2024**.

In addition to paper bids, electronic bids and electronic bid bonds for the following project will be downloaded by the Ascension Parish Purchasing Department. Electronic bids and electronic bid bonds must be submitted through www.centralauctionhouse.com prior to the electronic bidding deadline. Beginning at **10:00 am local time on, February 29, 2024,** all bids will be downloaded. **No bids are accepted after 10:00 am local time.**

RS 38:2218. Evidence of good faith; countersigning

A. The public entity advertising for bids for work shall require the bidders to attach a certified check, cashier's check, or bid bond for not more than five percent of the contract price of work to be done, as evidence of good faith of the bidder. The public entity advertising for bids for work may require the bidders to attach a certified check, cashier's check, or bid bond for not more than five percent of the estimated price of supplies or materials, as evidence of good faith of the bidder.

To address the above requirement for electronic bids Ascension Parish Government will allow electronic bids submitted via the parish approved on-line bid site to be submitted as follows:

A. A copy of the bid bond **must** be attached to the bid document submitted electronically.

B. The original bid bond document must be received in our office no later than 48 hours after bid opening date and time ***(Ascension Parish Purchasing Department, 615 E. Worthey, Gonzales, Louisiana (P.O. Box 2392, Gonzales, Louisiana 70707)***.

C. The bid-bond envelope must be clearly labeled as a "Bid Bond" with the project name, vendor's name as it appears on the bid documents and address.

All addenda, Amendments, Letters of Clarification, and Withdrawal Notices will be posted online in addition to electronic copies being distributed. Construction proposal information may be accessed via the internet at www.centralauctionhouse.com. Users must click on Login and create a New User Registration to view and download drawings. Once logged in, users must click on Ascension Parish Government to view current advertisement listings. This listing is titled ***"Ascension Parish Water Sector Program (Round 1)."*** Registered users will have access to view Project Information, submit a question concerning the project, and view the drawings. All project specific notices are found here. It will be the responsibility of the bidder to check for updates. All submitted questions will be forwarded by email to the Project Manager and the Project Landscape Architect for a response.

Ascension Parish Government shall not be responsible if the bidder cannot complete and submit a bid due to failure or incomplete delivery of the files submitted via the internet.

Ascension Parish Government reserves the right to reject any and all bids for just cause.

ASCENSION PARISH
GOVERNMENT CLINT
COINTMENT, PARISH
PRESIDENT

WEEKLY- 2/1/24, 2/8/24, 2/15/24
CHIEF- 2/1/24, 2/8/24, 2/15/24

DIVISION 0
Article 4

Draft Contract

**DRAFT Contract – Final contract subject to final negotiations and special conditions that may arise for this project, until such agreement approved by Parish Legal

00500- SAMPLE CONTRACT

THIS AGREEMENT, made and executed in FOUR (4) original copies on this _____day of _____ in the year 20_____ by and between:

_____Ascension Parish Government____
(hereinafter called OWNER) and

_____
(hereinafter called CONTRACTOR)

OWNER and CONTRACTOR, in consideration of the mutual covenants hereinafter set forth, agree as follows:

Article 1 WORK.

CONTRACTOR shall complete all Work as specified or indicated in the Contract Documents in conjunction with:

WATER SECTOR PROGRAM (ROUND 1)
PARISH PROJECT NO: PM-21-09-002
MCKIM & CREED, INC. PROJECT NO: 08391-0010

Article 2 ENGINEER.

The Drawings have been prepared by McKim & Creed, Inc., who is hereinafter called ENGINEER and who is to act as OWNER's representative, assume all duties and responsibilities and have the rights and authority assigned to ENGINEER in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents.

Article 3 CONTRACT TIME.

3.1 The Work will be substantially completed within ***(365)*** calendar days from the date when the Contract Time commences to run as provided in paragraph 2.03 General Conditions.

3.2 **Project Schedule.** CONTRACTOR shall submit and strictly adhere to a project construction schedule throughout the allocated contract and associated time frame. See Sections 2.05, 2.06, and 2.07 on pages 00700-07. CONTRACTOR is aware that OWNER may have a representative at each site where Work is performed and that CONTRACTOR needs to coordinate with the OWNER'S REPRESENTATIVE where Work on the CONTRACT will be performed. CONTRACTOR will coordinate with the OWNER'S REPRESENTATIVE by strictly following the project construction schedule or Progress Schedule. OWNER recognizes and understands that changes in project construction schedule or Progress Schedule may become necessary during the course of the project. However, in the event of any such change, the CONTRACTOR shall notify the OWNER'S REPRESENTATIVE **in writing** of a proposed change. Said written notice shall

be provided at least 12 hours prior to the revised construction activity. Said notice shall be provided by emailing notice of change to ***deinsel@mckimcreed.com.***

Should the CONTRACTOR fail to timely notify the OWNER'S REPRESENTATIVE of such change, the OWNER'S REPRESENTATIVE will document the CONTRACTOR'S failure to notify of the change in work and SHALL assess stipulated damages as follows. For EACH failure to notify the OWNER'S REPRESENTATIVE of any change in the project construction schedule or Progress Schedule, the CONTRACTOR AGREES TO PAY **$150.00 per failure to notify the OWNER'S REPRESENTATIVE.** CONTRACTOR agrees that these stipulated damages reflect the lost time, manpower, and mileage incurred by OWNER attempting to locate the CONTRACTOR where a change in schedule occurs and the required notice was not provided. CONTRACTOR further agrees that **said amount shall be paid** by directly reducing the amount of monthly invoices/pay applications by the amount of penalties issued. The Penalty fees shall be itemized on monthly invoices.

3.3 Liquidated Damages. OWNER and CONTRACTOR recognize that time is of the essence of this Agreement and the OWNER will suffer financial loss if the Work is not completed within the times specified in paragraph 3.1 above, plus any extensions thereof allowed in accordance with Article 12 of General Conditions. There are delays, expenses and difficulties involved in proving in a legal arbitration proceeding the actual loss suffered by OWNER if the Work is not completed on time. Accordingly, instead of requiring proof, OWNER and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) CONTRACTOR shall pay OWNER the amount of ***($750.00) Seven Hundred Fifty Dollars)*** for each day that expires after the time specified in paragraph 3.1 for Substantial Completion until the Work is substantially complete.

Article 4 CONTRACT PRICE.

4.1 OWNER shall pay CONTRACTOR for completion of the Work in accordance with the Contract Documents in current funds the sum of **(CONTRACT PRICE ($0.00) Dollars)**.

Article 5 PAYMENT PROCEDURES.

CONTRACTOR shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by ENGINEER/ARCHITECT ***(choose one)*** as provided in the General Conditions. All requests for payment must be notarized.

5.1 Progress Payments. OWNER shall make progress payments on account of the Contract Price on the basis of CONTRACTOR'S Applications for Payment as recommended by ENGINEER, once each month during construction. All progress payments will be on the basis of progress of the Work measured by the schedule of values established in paragraph 2.07.A of the General Conditions (and in each case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements.

5.2 Pursuant to LA R.S. – 38.2248 (Public Contract Law), Owner shall withhold retainage from each progress payment until payment is due under terms and conditions governing substantial completion or final payment. Retainage shall be ten percent of the amount of work completed to date if the contract amount is up to $500,000 and five percent of the work complete to date if the contract amount is over $500,000.

5.3 Fuel or Asphalt/Concrete Adjustments. There shall be NO adjustments for prices or costs of any fuel or asphalt/concrete on this project, arising out of the work on this project/contract, or arising out of this contract. Further, the CONTRACTOR hereby waives any price adjustment for fuel or asphalt/concrete or the ability or right to request any price adjustment for fuel or asphalt/concrete. Particularly, the Louisiana DOTD provisions (or any such or similar provisions by any other third party) pertaining to or related to fuel or asphalt/concrete adjustments are not part of this contract, are not incorporated by reference or otherwise in this Contract, and shall not apply in any form or fashion to the contract. Any language in this Contract which implies that the CONTRACTOR may obtain an adjustment in price for fuel or asphalt/concrete is hereby to be interpreted that CONTRACTOR shall **not** receive any such adjustment. CONTRACTOR shall not assert that any language in the CONTRACT creates any vagueness or ambiguity in the CONTRACT entitling CONTRACTOR to price adjustments for fuel or asphalt/concrete. CONTRACTOR hereby waives any right or ability to request any price adjustment for fuel or asphalt/concrete and CONTRACTOR shall **not** submit any request for any change in price for fuel or asphalt/concrete adjustments to the OWNER in any form.

5.4 Final Payment. Upon final completion and acceptance of the Work in accordance with paragraph 14.07 of the General Conditions and Supplementary Conditions SC-9.03(B)(13). OWNER shall pay the remainder of the Contract Price as recommended by ENGINEER.

Article 6 CONTRACTOR'S REPRESENTATIONS.

In order to induce OWNER to enter into this Agreement, CONTRACTOR makes the following representations:

6.1 CONTRACTOR is familiar with the nature and extent of the Contract Documents, Work site, locality and all local conditions and Laws and Regulations that in any manner may affect cost, progress, performance or furnishing of the Work.

6.2 CONTRACTOR has reviewed and checked all information and data shown or indicated on the Contract Documents with respect to existing Underground Facilities. No additional examinations, investigations, explorations, tests, reports, studies, or similar information or data in respect of said Underground Facilities are or will be required by CONTRACTOR in order to perform and furnish the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of paragraph 4.3 of the General Conditions.

6.3 CONTRACTOR has correlated the results of all such observations, examinations, investigations, explorations, tests, reports, and studies with the terms and conditions of the Contract Documents.

6.4 CONTRACTOR has given ENGINEER/ARCHITECT ***(choose one)*** written notice of all conflicts, errors, or discrepancies that he has discovered in the Contract Documents and the written resolution thereof by ENGINEER is acceptable to CONTRACTOR.

Article 7 CONTRACT DOCUMENTS.

The Contract Documents which comprise the contract between OWNER and CONTRACTOR, attached hereto and made a part hereof, consist of the documents listed in Table of Contents, and the documents identified below.

a. Bid
b. Bid Bond
c. Agreement
d. Payment Bond
e. Performance Bond
f. Notice of Award
g. Notice to Proceed
h. Drawings prepared by ***McKim & Creed, Inc.***
i. Specifications prepared by ***McKim & Creed, Inc.***

Article 8 MISCELLANEOUS

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

8.2 OWNER and CONTRACTOR each binds itself, its partners, successors, assigns and legal representative to the other party hereto, its partners, successors, assigns, and legal representatives in respect to all covenants, agreements and obligations contained in the Contract Documents.

IN WITNESS WHEREOF, OWNER and CONTRACTOR have signed this Contract the day and year first above written.

OWNER	CONTRACTOR
Ascension Parish, Louisiana	_____
72-6000096 _____ Federal Identification No.	_____ Federal Identification No.
By Clint Cointment	By_____
Title Parish President	Title_____
Attest_____	Attest_____
Address for giving notices	Address for giving notices
615 E. Worthey Street	_____
Gonzales, Louisiana 70737	_____
	License No._____

STANDARD CONDITIONS OF THE CONSTRUCTION CONTRACT

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

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly by

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A Practice Division of the
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Endorsed by

CONSTRUCTION SPECIFICATIONS INSTITUTE

These General Conditions have been prepared for use with the Suggested Forms of Agreement Between Owner and Contractor (EJCDC C-520 or C-525, 2007 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other. Comments concerning their usage are contained in the Narrative Guide to the EJCDC Construction Documents (EJCDC C-001, 2007 Edition). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (EJCDC C-800, 2007 Edition).

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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.1 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.

2. *Agreement*—The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.

3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

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

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

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

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

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

9. *Change Order*—A document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.

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

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

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

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

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

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

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

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

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

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

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

21. *General Requirements*—Sections of Division 1 of the Specifications.

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

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

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

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

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

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

28. *Notice to Proceed*—A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.

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

30. *PCBs*—Polychlorinated biphenyls.

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

32. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.

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

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

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

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

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

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

39. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

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

41. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.

42. *Specifications*—That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.

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

44. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

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

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

47. *Supplier*—A manufacturer, fabricator, supplier, distributor, material man, or vendor having a direct contract with Contractor or with any Subcontractor to furnish

materials or equipment to be incorporated in the Work by Contractor or Subcontractor.

48. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

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

50. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.

51. *Work Change Directive*—A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.2 *Terminology*

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

B. *Intent of Certain Terms or Adjectives:*

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

responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

C. *Day:*

1. The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective:*

1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

a. does not conform to the Contract Documents; or

b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or

c. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

E. *Furnish, Install, Perform, Provide:*

1. The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words "perform" or "provide," when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

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

F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

2.1 *Delivery of Bonds and Evidence of Insurance*

A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.

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

2.2 *Copies of Documents*

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

2.3 *Commencement of Contract Times; Notice to Proceed*

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

2.4 *Starting the Work*

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

2.5 *Before Starting Construction*

A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review:

1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;

2. a preliminary Schedule of Submittals; and

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

2.6 *Preconstruction Conference; Designation of Authorized Representatives*

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

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

2.7 *Initial Acceptance of Schedules*

A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.1 *Intent*

A. The Contract Documents are complementary; what is required by one is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that reasonably may be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the indicated result will be provided whether or not specifically called for, at no additional cost to Owner.

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

3.2 *Reference Standards*

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

1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard, specification, manual, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.3 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies:*

1. *Contractor's Review of Contract Documents Before Starting Work*: Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor discovers, or has actual

knowledge of, and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.

2. *Contractor's Review of Contract Documents During Performance of Work*: If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation , (b) any standard, specification, manual, or code, or (c) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies:*

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

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

b. The provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.4 *Amending and Supplementing Contract Documents*

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

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

1. A Field Order;

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

3. Engineer's written interpretation or clarification.

3.5 *Reuse of Documents*

A. Contractor and any Subcontractor or Supplier shall not:

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

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

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

3.6 *Electronic Data*

A. Unless otherwise stated in the Supplementary Conditions, the data furnished by Owner or Engineer to Contractor, or by Contractor to Owner or Engineer, that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.

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

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

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

4.1 *Availability of Lands*

A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing

facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.2 *Subsurface and Physical Conditions*

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

1. those reports known to Owner of explorations and tests of subsurface conditions at or contiguous to the Site and

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

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

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

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

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

4.3 *Differing Subsurface or Physical Conditions*

A. *Notice:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed either:

1. is of such a nature as to establish that any "technical data" on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or

2. is of such a nature as to require a change in the Contract Documents; or

3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

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

C. *Possible Price and Times Adjustments:*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

   a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and

   b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.

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

   a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or

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

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

3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, neither Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.4 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data provided by others; and

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

a. reviewing and checking all such information and data;

b. locating all Underground Facilities shown or indicated in the Contract Documents;

c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction; and

d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated:*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of

the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

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

4.5 *Reference Points*

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

4.6 *Hazardous Environmental Condition at Site*

A. *Reports and Drawings:* The Supplementary Conditions identify those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at the Site.

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

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

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

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

C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.

D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 4.06.E.

E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered written notice to Contractor: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.

F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.

G. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all

court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

H. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

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

ARTICLE 5 – BONDS AND INSURANCE

5.1 *Performance, Payment, and Other Bonds*

A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.

B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed each bond.

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

promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

5.2 *Licensed Sureties and Insurers*

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

5.3 *Certificates of Insurance*

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

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

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

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

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

5.4 *Contractor's Insurance*

A. Contractor shall purchase and maintain such insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:

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

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

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

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

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

b. by any other person for any other reason;

5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and

6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

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

1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, be written on an occurrence basis, include as additional insureds (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;

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

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

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

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

6. include completed operations coverage:

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

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

5.5 *Owner's Liability Insurance*

A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

5.6 *Property Insurance*

A. Unless otherwise provided in the Supplementary Conditions, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee;

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

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

4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such

materials and equipment have been included in an Application for Payment recommended by Engineer;

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

6. include testing and startup; and

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

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

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

D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

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

5.7 *Waiver of Rights*

A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered

thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insurers or loss payees thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.

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

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

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.

C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them.

5.8 *Receipt and Application of Insurance Proceeds*

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

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

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

A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

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

ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES

6.1 *Supervision and Superintendence*

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique,

sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

6.2 *Labor; Working Hours*

A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner's written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

6.3 *Services, Materials, and Equipment*

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.

B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

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

6.4 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.

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

6.5 *Substitutes and "Or-Equals"*

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.

1. *"Or-Equal" Items:* If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment Engineer determines that:

1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole; and

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

b. Contractor certifies that, if approved and incorporated into the Work:

1) there will be no increase in cost to the Owner or increase in Contract Times; and

2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

2. *Substitute Items:*

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

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

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

d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

1) shall certify that the proposed substitute item will:

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

b) be similar in substance to that specified, and

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

2) will state:

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

b) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and

c) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;

3) will identify:

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

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

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

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

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

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

E. *Engineer's Cost Reimbursement*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

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

6.6 *Concerning Subcontractors, Suppliers, and Others*

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

B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract

Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.

C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity; nor

2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

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

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

F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as a loss payee on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any

such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.7 *Patent Fees and Royalties*

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

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

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

6.8 *Permits*

A. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work. The Contractor shall apply for building permit and electrical permit, and other permits as necessary.

6.9 *Laws and Regulations*

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

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

6.10 *Taxes*

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

6.11 *Use of Site and Other Areas*

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

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

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

To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.

B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. *Loading Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 *Record Documents*

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

6.13 *Safety and Protection*

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

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

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

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.

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

E. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

F. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *Safety Representative*

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

6.15 *Hazard Communication Programs*

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

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

6.16 *Emergencies*

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

6.17 *Shop Drawings and Samples*

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

1. *Shop Drawings:*

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

b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.

2. *Samples:*

a. Submit number of Samples specified in the Specifications.

b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.

B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Submittal Procedures:*

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

a. reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;

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

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

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

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal.

3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawings or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

D. *Engineer's Review:*

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

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

3. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

E. *Resubmittal Procedures:*

Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

6.18 *Continuing the Work*

A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 *Contractor's General Warranty and Guarantee*

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on representation of Contractor's warranty and guarantee.

B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or

2. normal wear and tear under normal usage.

C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

1. observations by Engineer;

2. recommendation by Engineer or payment by Owner of any progress or final payment;

3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;

4. use or occupancy of the Work or any part thereof by Owner;

5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;

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

7. any correction of defective Work by Owner.

6.20 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable .

B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:

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

or

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

6.21 *Delegation of Professional Design Services*

A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.

B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature
seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.

D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.

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

ARTICLE 7 – OTHER WORK AT THE SITE

7.1 *Related Work at Site*

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

1. written notice thereof will be given to Contractor prior to starting any such other work; and

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

B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between
owner and such utility owners and other contractors.

C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

7.2 *Coordination*

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

1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;

2. the specific matters to be covered by such authority and responsibility will be itemized; and

3. the extent of such authority and responsibilities will be provided.

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

7.3 *Legal Relationships*

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

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

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

ARTICLE 8 – OWNER'S RESPONSIBILITIES

8.1 *Communications to Contractor*

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

8.2 *Replacement of Engineer*

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

8.3 *Furnish Data*

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

8.4 *Pay When Due*

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

8.5 *Lands and Easements; Reports and Tests*

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

8.6 *Insurance*

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

8.7 *Change Orders*

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

8.8 *Inspections, Tests, and Approvals*

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

8.9 *Limitations on Owner's Responsibilities*

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

8.10 *Undisclosed Hazardous Environmental Condition*

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

8.11 *Evidence of Financial Arrangements*

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

8.12 *Compliance with Safety Program*

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

ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION

9.1 *Owner's Representative*

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

9.2 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check

the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.3 *Project Representative*

If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.4 *Authorized Variations in Work*

A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

9.5 *Rejecting Defective Work*

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

9.6 *Shop Drawings, Change Orders and Payments*

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

B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.

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

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

9.7 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

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

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

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

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

D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.9 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with, the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to the Resident Project Representative, if any, and assistants, if any.

9.10 *Compliance with Safety Program*

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

ARTICLE 10 – CHANGES IN THE WORK; CLAIMS

10.1 *Authorized Changes in the Work*

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

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

10.2 *Unauthorized Changes in the Work*

A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.D.

10.3 *Execution of Change Orders*

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

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

2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and

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

10.4 *Notification to Surety*

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

10.5 *Claims*

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

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

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

1. deny the Claim in whole or in part;

2. approve the Claim; or

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

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

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

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

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

11.1 *Cost of the Work*

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

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.

4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.

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

f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, express and courier services, and similar petty cash items in connection with the Work.

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

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

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.

2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A.

C. *Contractor's Fee:* When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.

D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

11.2 *Allowances*

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

A. *Cash Allowances:*

1. Contractor agrees that:

a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

B. *Contingency Allowance:*

1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

C. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.3 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:

1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and

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

3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled

to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

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

12.1 *Change of Contract Price*

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

B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or

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

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

C. *Contractor's Fee:* The Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;

b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;

where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 12.01.C.2.a and 12.01.C.2.b is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier

Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;

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

d. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and

e. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.2 *Change of Contract Times*

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

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

12.3 *Delays*

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

B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

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

Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be
Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.

D. Owner, Engineer, and their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

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

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

13.1 *Notice of Defects*

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

13.2 *Access to Work*

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

13.3 *Tests and Inspections*

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

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

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

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

3. as otherwise specifically provided in the Contract Documents.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.

E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation.

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

13.4 *Uncovering Work*

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

B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.

C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.

D. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement,

and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.5 *Owner May Stop the Work*

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

13.6 *Correction or Removal of Defective Work*

A. Promptly after receipt of written notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).

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

13.7 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. repair such defective land or areas; or

2. correct such defective Work; or

3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and

4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.

If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.

B. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

C. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

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

13.8 *Acceptance of Defective Work*

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

13.9 *Owner May Correct Defective Work*

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other

provision of the Contract Documents, Owner may, after seven (7) days written notice to Contractor, correct, or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.

C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

13.10 *Schedule of Values*

A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

13.11 *Progress Payments*

A. *Applications for Payments:*

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is

requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

B. *Review of Applications:*

1. Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

a. the Work has progressed to the point indicated;

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

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

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

a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in

progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or

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

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

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

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

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

d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or

e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:

a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;

b. the Contract Price has been reduced by Change Orders;

c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or

d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. *Payment Becomes Due:*

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

D. *Reduction in Payment:*

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

a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;

b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;

c. there are other items entitling Owner to a set-off against the amount recommended; or

d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.

2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor remedies the reasons for such action.

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

13.12 *Contractor's Warranty of Title*

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

13.13 *Substantial Completion*

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.

B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will, within

D. 14 days after submission of the tentative certificate to Owner, notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will, within said 14 days, execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.

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

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

13.14 *Partial Utilization*

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its

intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 14.04.A through D for that part of the Work.

2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

13.15 *Final Inspection*

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

13.16 *Final Payment*

A. *Application for Payment:*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.

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

a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.6;

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

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

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

3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

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

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. *Payment Becomes Due:*

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

13.17 *Final Completion Delayed*

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

13.18 *Waiver of Claims*

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

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

2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 14 – SUSPENSION OF WORK AND TERMINATION

14.1 *Owner May Suspend Work*

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

14.2 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule

established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);

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

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

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

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

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

2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere; and

3. complete the Work as Owner may deem expedient.

C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

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

E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.

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

14.3 *Owner May Terminate For Convenience*

A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;

3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. reasonable expenses directly attributable to termination.

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

14.4 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or

Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

ARTICLE 15 – DISPUTE RESOLUTION

15.1 *Methods and Procedures*

A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.

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

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

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

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

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

ARTICLE 16 – MISCELLANEOUS

16.1 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended; or

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

16.2 *Computation of Times*

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

16.3 *Cumulative Remedies*

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

16.4 *Survival of Obligations*

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

16.5 *Controlling Law*

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

16.6 *Headings*

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

SUPPLEMENTARY CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract, EJCDC C-700 (2007 Edition). All provisions which are not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Condition s have the meanings stated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

The address system used in these Supplementary Conditions is the same as the address system used in the General Conditions, with the prefix "SC" added thereto.

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

Owner shall furnish to Contractor up to 3 printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

SC-2.03 Delete Paragraph 2.03.A in its entirety and insert the following in its place:

A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed.

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

A. No reports or drawings related to Hazardous Environmental Conditions at the Sites are known to Owner.

B. Not Used.

SC-5.01 Add the following language after the last sentence of paragraph 5.01 A:

"All bonds must be countersigned by a resident agent of the State in which the Project is done."

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

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

B. Workers' Compensation, and related coverages under Paragraphs 5.04.A.1 and A.2 of the General Conditions:

1. State:	Statutory
2. Applicable Federal (e.g., Longshoreman's):	Statutory

3. Employer's Liability: Statutory

C. Contractor's General Liability under Paragraphs 5.04.A.3 through A.6 of the General Conditions which shall include completed operations and product liability coverages and eliminate the exclusion with respect to property under the care, custody and control of Contractor:

1. General Aggregate $300,000

2. Products - Completed Operations Aggregate $300,000

3. Personal and Advertising Injury $300,000

4. Each Occurrence (Bodily Injury and Property Damage) $100,000

5. Property Damage liability insurance will provide Explosion, Collapse, and Under-ground coverages where applicable.

6. Excess or Umbrella Liability

General Aggregate	$1,000,000
Each Occurrence	$300,000

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

1. Bodily Injury:
   Each person $100,000
   Each Accident $300,000

2. Property Damage:
   Each Accident $300,000

Or

3. Combined Single Limit of $500,000

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

1. Bodily Injury:
   Each person $100,000
   Each Accident $300,000

2. Property Damage:
   Each Accident $300,000

SC-5.06.A. Delete Paragraph 5.06.A in its entirety and insert the following in its place:

A. Contractor shall purchase and maintain property insurance upon the Work at the Sites in the amount of the full replacement cost thereof. Contractor shall be responsible for any deductible or self-insured retention. This insurance shall:

1. include the interests of Owner, Contractor, Subcontractors, Engineer, and the officers, directors, partners, employees, agents and other consultants and subcontractors of any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or loss payee;

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

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

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

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

I. include testing and startup;

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

K. comply with the requirements of Paragraph 5.06.C of the General Conditions.

SC-5.06.B Change the first word "Owner" to "Contractor" in paragraph 5.06.B of the General Conditions. The Contractor shall be responsible for this coverage.

SC-6.06 Add a new paragraph immediately after Paragraph 6.06.G:

H. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by a particular Subcontractor or Supplier.

C-9.00 All ENGINEER duties will be addressed through the Owner/Project Manager.

SC-9.03 Add the following new paragraphs immediately after Paragraph 9.03.A:

B. The Resident Project Representative (RPR) will be Owner's employee or agent at the Site, will act as directed by and under the supervision of Engineer, and will confer with Engineer regarding RPR's actions. RPR's dealings in matters pertaining to the Work in general shall be with Engineer and Contractor. RPR's dealings with Subcontractors shall be through or with the full knowledge and approval of Contractor. The RPR shall:

1. *Schedules:* Review the progress schedule, schedule of Shop Drawing and Sample submittals, and schedule of values prepared by Contractor and consult with Engineer concerning acceptability.

2. *Conferences and Meetings:* Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences and other project-related meetings, and prepare and circulate copies of minutes thereof.

3. *Liaison*:

a. Serve as Engineer's liaison with Contractor, working principally through Contractor's authorized representative, assist in providing information regarding the intent of the Contract Documents.

b. Assist Engineer in serving as liaison with Contractor when Contractor's operations affect Owner's on-Site operations.

c. Assist in obtaining from Owner additional details or information, when required for proper execution of the Work.

4. *Interpretation of Contract Documents:* Report to Engineer when clarifications and interpretations of the Contract Documents are needed and transmit to Contractor clarifications and interpretations as issued by Engineer.

5. *Shop Drawings and Samples:*

a. Record date of receipt of Samples and approved Shop Drawings.

b. Receive Samples which are furnished at the Site by Contractor and notify Engineer of availability of Samples for examination.

6. *Modifications:* Consider and evaluate Contractor's suggestions for modifications in Drawings or Specifications and report such suggestions, together with RPR's recommendations, to Engineer. Transmit to Contractor in writing decisions as issued by Engineer.

7. *Review of Work and Rejection of Defective Work*:

a. Conduct onsite observations of Contractor's work in progress to assist Engineer in determining if the Work is in general proceeding in accordance with the Contract Documents.

b. Report to Engineer whenever RPR believes that any part of Contractor's work in progress will not produce a completed Project that conforms generally to the Contract Documents or will imperil the integrity of the design concept of the completed Project as a functioning whole as indicated in the Contract Documents, or has been damaged, or does not meet the requirements of any inspection, test or approval required to be made; and advise Engineer of that part of work in progress that RPR believes should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.

8. *Inspections, Tests, and System Startups:*

a. Verify that tests, equipment, and systems start-ups and operating and maintenance training are conducted in the presence of appropriate Owner's personnel, and that Contractor maintains adequate records thereof.

b. Observe, record, and report to Engineer appropriate details relative to the test procedures and systems start-ups.

9. *Records:*

a. Record names, addresses, fax numbers, e-mail addresses, web site locations, and telephone numbers of all Contractors, Subcontractors, and major Suppliers of materials and equipment.

b. Maintain records for use in preparing Project documentation.

10. *Reports:*

a. Furnish to Engineer periodic reports as required of progress of the Work and of Contractor's compliance with the progress schedule and schedule of Shop Drawing and Sample submittals.

b. Draft and recommend to Engineer proposed Change Orders, Work Change Directives, and Field Orders. Obtain backup material from Contractor.

c. Immediately notify Engineer of the occurrence of any Site accidents, emergencies, acts of God endangering the Work, damage to property by fire or other causes, or the discovery of any Hazardous Environmental Condition.

11. *Payment Requests:* Review Applications for Payment with Contractor for compliance with the established procedure for their submission and forward with recommendations to Engineer, noting particularly the relationship of the payment requested to the schedule of values, Work completed, and materials and equipment delivered at the Site but not incorporated in the Work.

12. *Certificates, Operation and Maintenance Manuals:* During the course of the Work, verify that materials and equipment certificates, operation and maintenance manuals and other data required by the Specifications to be assembled and furnished by Contractor are applicable to the items actually installed and in accordance with the Contract Documents, and have these documents delivered to Engineer for review and forwarding to Owner prior to payment for that part of the Work.

13. *Completion*:

a. Participate in a Substantial Completion inspection, assist in the determination of Substantial Completion and the preparation of lists of items to be completed or corrected.

b. Participate in a final inspection in the company of Engineer, Owner, and Contractor and prepare a final list of items to be completed and deficiencies to be remedied.

c. Observe whether all items on the final list have been completed or corrected and make recommendations to Engineer concerning acceptance and issuance of the Notice of Acceptability of the Work.

C. The RPR shall not:

1. Authorize any deviation from the Contract Documents or substitution of materials or equipment (including "or-equal" items).

2. Exceed limitations of Engineer's authority as set forth in the Contract Documents.

3. Undertake any of the responsibilities of Contractor, Subcontractors, Suppliers, or Contractor's superintendent.

4. Advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences or procedures of Contractor's work unless such advice or directions are specifically required by the Contract Documents.

5. Advise on, issue directions regarding, or assume control over safety practices, precautions, and programs in connection with the activities or operations of Owner or Contractor.

6. Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by Engineer.

7. Accept Shop Drawing or Sample submittals from anyone other than Contractor.

8. Authorize Owner to occupy the Project in whole or in part.

SC-11.03.D Delete Paragraph 11.03.D in its entirety and insert the following in its place:

D. The unit price of an item of Unit Price Work shall be subject to reevaluation and adjustment under the following conditions:

L. if the Bid price of a particular item of Unit Price Work amounts to 25% percent or more of the Contract Price and the variation in the quantity of that particular item of Unit Price Work performed by Contractor differs by more than 10% percent from the estimated quantity of such item indicated in the Agreement; and

M. if there is no corresponding adjustment with respect to any other item of Work; and

N. if Contractor believes that Contractor has incurred additional expense as a result thereof or if Owner believes that the quantity variation entitles Owner to an adjustment in the unit price, either Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Article 10 if the parties are unable to agree as to the effect of any such variations in the quantity of Unit Price Work performed.

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

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

SC-Article 16 Delete Article 16 of the General Conditions in its entirety and replace with the following:

> "16.01 Any and all disputes that arise out of the performance of this Contract shall be litigated in the 23rd Judicial District Court in and for the Parish of Ascension. Any reference to arbitration in any Contract Documents is hereby expressly waived and deleted."

COMPLIANCE PROVISIONS FOR FEDERALLY ASSISTED CONSTRUCTION CONTRACTS AND SUBCONTRACTS

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1. EQUAL EMPLOYMENT OPPORTUNITY (Equal Opportunity Clause)

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

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

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

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

D. The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided by the agency contracting officer, advising the labor union or workers' representative of the Contractor's commitments under Section 202 of Executive Order No. 11246 of September 24, 1965, as amended, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

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

F. The Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, as amended, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

G. In the event of the Contractor's noncompliance with the nondiscrimination clauses of this contract or with any such rules, regulations, or orders, this contract may be cancelled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, as amended, and such other sanctions may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, as amended, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

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

2. <u>STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS (EXECUTIVE ORDER 11246, AS AMENDED)</u>

A. As used in these specifications:

1. "Covered area" means the geographical area described in the solicitation from which this contract resulted;

2. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;

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

4. "Minority" includes:

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

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

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

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

B. When the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of $10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

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

D. The Contractor shall implement the specific affirmative action standards provided in paragraphs G(1) through G(16) of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered construction contractors performing construction work in geographical areas where they do not have a federal or federally-assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notice form and such notices may be obtained from any Office of Federal

Contract Compliance Programs office or from Federal procurement contracting officers. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

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

F. In order for the 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.

G. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

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

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

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

4. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement have not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

5. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly includes minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under G(2) above.

6. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

7. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination, or other employment decisions including specific review of these items with onsite 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.

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

9. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the

above, describing the openings, screening procedures, and tests to be used in the selection process.

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

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

12. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

13. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

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

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

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

H. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (G(1) through G(16)). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the Contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under G(1) through G(16) of these specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The

obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's non-compliance.

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

J. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any persons because of race, color, religion, sex, sexual orientation, gender identity, national origin, disability, or veteran status.

K. The Contractor shall not enter into any subcontract with any person or firm debarred from government contracts pursuant to E.O. 11246.

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

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

N. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the government and to keep records. Records shall at least include for each employee, the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number where assigned, social security number, race, sex, status (e.g., mechanic, apprentice trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and location at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree

that existing records satisfy this requirement, Contractors shall not be required to maintain separate records.

O. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application or 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).

3. NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER 11246, AS AMENDED)

A. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.

B. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

Goals for minority participation: (See Table Below)

Goals for female participation: 6.9%

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both its federally involved and nonfederally involved construction.

The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3 (a) and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order, and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

MINORITY PARTICIPATION GOALS

PARISH	MINORITY GOAL (%)	PARISH	MINORITY GOAL (%)	PARISH	MINORITY GOAL (%)	PARISH	MINORITY GOAL (%)
Acadia	24.1	E. Baton Rouge	26.1	Madison	27.9	St. Landry	24.1
Allen	17.8	East Carroll	27.9	Morehouse	27.9	St. Martin	24.1
Ascension	26.1	East Feliciana	30.4	Natchitoches	29.3	St. Mary	24.1
Assumption	27.7	Evangeline	24.1	Orleans	31.0	St. Tammany	31.0
Avoyelles	29.3	Franklin	27.9	Ouachita	22.8	Tangipahoa	27.7
Beauregard	17.8	Grant	25.7	Plaquemines	27.7	Tensas	27.9
Bienville	29.3	Iberia	24.1	Pointe Coupee	30.4	Terrebonne	27.7
Bossier	29.3	Iberville	30.4	Rapides	25.7	Union	27.9
Caddo	29.3	Jackson	27.9	Red River	29.3	Vermilion	24.1
Calcasieu	19.3	Jefferson	31.0	Richland	27.9	Vernon	17.8
Caldwell	27.9	Jefferson Davis	17.8	Sabine	29.3	Washington	27.7
Cameron	17.8	Lafayette	20.6	St. Bernard	31.0	Webster	29.3
Catahoula	27.9	Lafourche	27.7	St. Charles	27.7	W. Baton Rouge	26.1
Claiborne	29.3	LaSalle	27.9	St. Helena	30.4	West Carroll	27.9
Concordia	30.4	Lincoln	27.9	St. James	27.7	West Feliciana	30.4
De Soto	29.3	Livingston	26.1	St. John the Baptist	27.7	Winn	29.3

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

D. As used in this Notice, and in the contract resulting from this solicitation, the "covered area" is St. Charles Parish, Louisiana.

4. <u>CERTIFICATION OF NONSEGREGATED FACILITIES</u>
(Applicable to contracts and subcontracts in excess of $10,000)

By the submission of this bid, the bidder, offeror, applicant or subcontractor certifies that he/she does not maintain or provide for his/her establishments, and that he/she does not permit employees to perform their services at any location, under his/her control, where segregated facilities are maintained. He/she certifies further that he/she will not maintain or provide for employees any segregated facilities at any of his/her establishments, and he/she will not permit employees to perform their services at any location under his/her control where segregated facilities are maintained. The bidder, offeror, applicant or subcontractor agrees that a breach of this certification is a violation of the equal opportunity clause of this contract.
As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker

rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, creed, color, religion, or national origin, because of habit, local custom, or any other reason.

The Contractor further agrees that (except where he/she has obtained identical certifications from proposed Subcontractors for specific time periods) he/she will obtain identical certifications from proposed Subcontractors prior to the award of subcontracts exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity clause; that he/she will retain such certifications in his/her files; and that he/she will forward the following notice to such proposed Subcontractors (except where the proposed Subcontractors have submitted identical certifications for specific time periods).

NOTICE TO PROSPECTIVE SUBBUILDERS OF REQUIREMENT FOR CERTIFICATION OF NON-SEGREGATED FACILITIES. A certification of Non-segregated facilities as required by the 9 May 1967 order on Elimination of Segregated Facilities, by the Secretary of Labor (32 Fed. Reg. 7439, 19 May 1967), must be submitted from the provisions either for each subcontract or for all subcontracts during a period (i.e. quarterly, semi-annually or annually).

NOTE: Whoever knowingly or willfully makes any false, fictitious or fraudulent representation may be liable to criminal prosecution under 18 U.S.C. 1001.

5. <u>CIVIL RIGHTS</u>

The Contractor shall comply with the provisions of Title VI and Title VII of the Civil Rights Act of 1964, which prohibits recipients of federal financial assistance from excluding from a program or activity, denying benefits of, or otherwise discriminating against a person on the basis of race, color or national origin (42 U.S.C. § 2000d et seq), as implemented by the Department of the Treasury's Title VI regulations, 31 C.F.R. Part 22, which are herein incorporated by reference and made a part of this contract (or agreement). Title VI also includes protection to persons with "Limited English Proficiency" in any program or activity receiving federal financial assistance, 42 U.S.C. § 2000d est seq., as implemented by the Department of the Treasury's Title VI regulations, 31 C.F.R. Part 22, and herein incorporated by reference and made a part of this contract or agreement. No person shall, on the grounds of race, color, religion, sex, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under programs and activities receiving federal financial assistance.

6. <u>SECTION 503 OF THE REHABILITATION ACT OF 1973 (29 USC §793)</u>
(Applicable to contracts and subcontracts in excess of $10,000)

AFFIRMATIVE ACTION FOR HANDICAPPED WORKERS

A. The contractor will not discriminate against any employee or applicant for employment because of physical or mental handicap in regard to any position for which the employee or applicant for employment is otherwise qualified. The contractor agrees to take affirmative action to employ, advance in employment and otherwise treat qualified handicapped individuals without discrimination based upon their physical or mental handicap in all employment practices such as the following: employment upgrading, demotion or transfer, recruitment, advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship.

B. The Contractor agrees to comply with the rules, regulations, and relevant orders of the Secretary of Labor issued pursuant to the Act.

C. In the event of the Contractor's noncompliance with the requirements of this clause, actions for noncompliance may be taken in accordance with the rules, regulations, and relevant orders of the Secretary of Labor issued pursuant to the Act.

D. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices in a form to be prescribed by the Director, provided by or through the contracting officer. Such notices shall state the Contractor's obligation under the law to take affirmative action to employ and advance in employment qualified handicapped employees and applicants for employment, and the rights of applicants and employees.

E. The Contractor will notify each labor union or representative of workers with which it has a collective bargaining agreement or other contract understanding, that the Contractor is bound by the terms of Section 503 of the Rehabilitation Act of 1973, and is committed to take affirmative action to employ and advance in employment physically and mentally handicapped individuals.

F. The Contractor will include the provisions of this clause in every subcontract or purchase order of $10,000 or more unless exempted by rules, regulations, or orders of the Secretary issued pursuant to Section 503 of the Act, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the Director of the Office of Federal Contract Compliance Programs may direct to enforce such provisions, including action for noncompliance.

7. SECTION 504 OF THE REHABILITATION ACT OF 1973, AS AMENDED (29 U.S.C. §794)

The Contractor agrees that no otherwise qualified individual with a disability in the United States shall, solely by reason of his or her disability, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance.

8. AGE DISCRIMINATION ACT OF 1975, AS AMENDED (42 U.S.C § 12101 et seq)

The Contractor shall comply with the provisions of the Age Discrimination Act of 1975, as amended. No person in the United States shall, on the basis of age, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under, any program or activity receiving Federal financial assistance.

9. CERTIFICATION OF COMPLIANCE WITH AIR AND WATER ACTS
(Applicable to all contracts and subcontracts greater than or equal to $150,000)

The Contractor and all Subcontractors shall comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act, as amended, (42 U.S.C. 7401-7671q), and the Federal Water Pollution Control Act, as amended, (33 U.S.C. 1251-1387). Violations must be reported to the Federal awarding agency and the Regional Office of the Environmental Protection Agency (EPA).

10. SPECIAL CONDITIONS PERTAINING TO HAZARDS, SAFETY STANDARDS AND ACCIDENT PREVENTION

A. **Lead-Based Paint Hazards.** (Applicable to contracts for construction or rehabilitation of residential structures) The construction or rehabilitation of residential structures is subject to the HUD Lead-Based Paint regulations, 24 CFR Part 35. The Contractor and Subcontractors shall comply with the provisions for the elimination of lead-based paint hazards under Subpart B of said regulations. The Owner will be responsible for the inspections and certifications required under Section 35.14 (f) thereof.

B. **Use of Explosives.** When the use of explosives is necessary for the prosecution of the work, the Contractor shall observe all local, state and federal laws in purchasing and handling explosives. The Contractor shall take all necessary precaution to protect completed work, neighboring property, water lines, or other underground structures. Where there is danger to structures or property from blasting, the charges shall be reduced and the material shall be covered with suitable timber, steel or rope mats.

The Contractor shall notify all owners of public utility property of intention to use explosives at least 8 hours before blasting is done close to such property. Any supervision or direction of use of explosives by the engineer does not in any way reduce the responsibility of the Contractor or his Surety for damages that may be caused by such use.

C. **Danger Signals and Safety Devices.** The Contractor shall make all necessary precautions to guard against damages to property and injury to persons. He shall put up and maintain in good condition, sufficient red or warning lights at night, suitable barricades and other devices necessary to protect the public. In case the Contractor fails or neglects to take such precautions, the Owner may have such lights and barricades installed and charge the cost of this work to the Contractor. Such action by the Owner does not relieve the Contractor of any liability incurred under these specifications or contract.

11. FLOOD DISASTER PROTECTION

This contract is subject to the requirements of the Flood Disaster Protection Act of 1973 (P.L. 93-234). Nothing included as a part of this contract is approved for acquisition or construction purposes as defined under Section 3(a) of said Act, for use in an area identified by the Secretary of HUD as having special flood hazards which is located in a community not then in compliance with the requirements for participation in the National Flood Insurance Program pursuant to Section 201(d) of said Act; and the use of any assistance provided under this contract for such acquisition for construction in such identified areas in communities then participating in the National Flood Insurance Program shall be subject to the mandatory purchase of flood insurance requirements or Section 102(a) of said Act.

Any contract or agreement for the sale, lease, or other transfer of land acquired, cleared or improved with assistance provided under this Contract shall contain, if such land is located in an area identified by the Secretary as having special flood hazards and in which the sale of flood insurance has been made available under the National Flood Insurance Act of 1968, as amended, 42 U.S.C. 4001 et seq., provisions obligating the transferee and its successors or assigns to obtain and maintain, during the ownership of such land, such flood insurance as required with respect to financial assistance for acquisition or construction purposes under Section 102(a) of Flood Disaster Protection Act of 1973.

12. ACCESS TO RECORDS--MAINTENANCE OF RECORDS

The State of Louisiana, the Federal agency providing the assistance for this contract, the Comptroller General of the United States, St. Charles Parish, or any of their duly authorized representatives, shall have access to any books, documents, papers, and records of the Contractor which are directly pertinent to this specific contract, for the purpose of audits, examinations, and making excerpts and transcriptions. All records connected with this contract will be maintained in a central location by the Contractor and St. Charles Parish, respectively, for a period of five (5) years from the date of submission of the grantee's final expenditure report.

13. INSPECTION

The authorized representative and agents of the State of Louisiana and the Federal agency providing the assistance for this contract shall be permitted to inspect all work, materials, payrolls, records of personnel, invoices of materials, and other relevant data and records.

14. REPORTING REQUIREMENTS

The Contractor shall complete and submit all reports, in such form and according to such schedule, as may be required by the Owner.

15. CONFLICT OF INTEREST

A. No officer or employee of the local jurisdiction or its designees or agents, no member of the governing body, and no other public official of the locality during his/her tenure or for one year thereafter, shall have any interest, direct or indirect, in any contract or subcontract, or the proceeds thereof, for work to be performed. Further, the Contractor shall cause to be incorporated in all subcontracts the language set forth in this paragraph prohibiting conflict of interest.

B. No member of or delegate to Congress, or Resident Commissioner, shall be admitted to any share or part of this contract or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

16. ACTIVITIES AND CONTRACTS NOT SUBJECT TO EXECUTIVE ORDER 11246, AS AMENDED
(Applicable to contracts and subcontracts of $10,000 and under)

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

A. The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, national origin, disability, or veteran status. The Contractor shall take affirmative action to ensure that applicants for employment are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, sexual orientation, gender identity, national origin, disability, or veteran status. Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship.

B. The Contractor shall post in conspicuous places, available to employees and applicants for employment, notices to be provided by Contracting Officer setting forth the provisions of this non-discrimination clause. The Contractor shall state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, disability, or veteran status.

C. Contractors shall incorporate foregoing requirements in all subcontracts.

17. PATENTS

A. The Contractor shall hold and save the Owner and its officers, agents, servants, and employees harmless from liability of any nature or kind, including cost and expenses for, or on account of any patented or unpatented invention, process, article, or appliance manufactured or used in the performance of the contract including its use by the Owner, unless otherwise specifically stipulated in the Contract Document.

B. License or Royalty Fees: License and/or Royalty Fees for the use of a process which is authorized by the Owner of the project must be reasonable, and paid to the holder of the patent, or his authorized license, direct by the Owner and not by or through the Contractor.

C. If the Contractor uses any design device or materials covered by letters, patent or copyright, he shall provide for such use by suitable agreement with the owner of such patented or copy-righted design device or material. It is mutually agreed and understood, that without exception the contract prices shall include all royalties or costs arising from the use of such design, device or materials, in any way involved in the work. The Contractor and/or his Sureties shall indemnify and save harmless the Owner of the project from any and all claims for infringement by reason of the use of such patented or copy-righted design, device or materials or any trademark or copy-right in connection with work agreed to be performed under this contract, and shall indemnify the Owner for any cost, expense, or damage which it may be obliged to pay by reason of such infringement at any time during the prosecution of the work or after completion of the work.

18. COPYRIGHT

No materials, to include but not limited to reports, maps, or documents produced as a result of this contract, in whole or in part, shall be available to the Contractor for copyright purposes. Any such materials produced as a result of this contract that might be subject to copyright shall be the property of the Owner and all such rights shall belong to the Owner.

19. TERMINATION FOR CAUSE
(Applicable to all contracts in excess of $10,000)

If, through any cause, the Contractor shall fail to fulfill in a timely and proper manner his obligations under this contract, or if the Contractor shall violate any of the covenants, agreements, or stipulations of this contract, the Owner shall thereupon have the right to terminate this contract by giving written notice to the Contractor of such termination and specifying the effective date thereof, at least five (5) days before the effective date of such termination. In such event, all finished or unfinished documents, data, studies, surveys, drawings, maps, models, photographs, and reports prepared by the Contractor under this

contract shall, at the option of the Owner, become the Owner's property and the Contractor shall be entitled to receive just and equitable compensation for any work satisfactorily completed hereunder. Notwithstanding the above, the Contractor shall not be relieved of liability to the Owner for damages sustained by the Owner by virtue of any breach of the contract by the Contractor, and the Owner may withhold any payments to the Contractor for the purpose of set-off until such time as the exact amount of damages due the Owner from the Contractor is determined.

20. TERMINATION FOR CONVENIENCE
(Applicable to all contracts in excess of $10,000)

The Owner may terminate this contract at any time by giving at least ten (10) days notice in writing to the Contractor. If the contract is terminated by the Owner as provided herein, the Contractor will be paid for the time provided and expenses incurred up to the termination date.

21. ENERGY EFFICIENCY

The Contractor shall comply with mandatory standards and policies relating to energy efficiency which are contained in the state energy conservation plan (LA R.S. 40:1730.49) issued in compliance with the Energy Policy and Conservation Act (Public Law 94-163, as amended).

22. SUBCONTRACTS

A. The Contractor shall not enter into any subcontract with any subcontractor who has been debarred, suspended, declared ineligible, or voluntarily excluded from participating in contacting programs by any agency of the United States Government or the State of Louisiana.

B. The Contractor shall be as fully responsible to the Owner for the acts and omissions of the Contractor's subcontractors, and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by the Contractor.

C. The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the work to bind subcontractor to the Contractor by the terms of the contract documents insofar as applicable to the work of subcontractors and to give the Contractor the same power as regards terminating any subcontract that the Owner may exercise over the Contractor under any provision of the contract documents.

D. Nothing contained in this contract shall create any contractual relation between any subcontractor and the Owner.

23. UNIQUE ENTITY IDENTIFIER (UEI) REQUIREMENTS

All contractors and sub-contractors must have an active UEI Number, as verified on https://www.sam.gov, prior to the award of the contract and maintain an active SAM registration with current information at all times during which it has a contract funded by federal assistance.

24. DEBARMENT, SUSPENSION, AND INELIGIBILITY

The Contractor represents and warrants that it and its Subcontractors are not debarred, suspended, or placed in ineligibility status under the provisions of the provisions of E.O.s 12549 and 12689. To ascertain whether a Contractor or Subcontractor has been excluded from participating in a contract or subcontract receiving Federal financial assistance, a search of the Excluded Parties List System can be conducted using the System for Award Management provided by the General Services Administration at https://www.sam.gov.

The Contractor must notify the Owner in the event of it and its Subcontractors being debarred, suspended, or declared ineligible by any department or agency of the Federal Government, or upon receipt of a notice of a proposed debarment or suspension, either prior to or after execution of a contract.

Upon notice of debarment, suspension, or declaration of ineligibility, the Contractor and/or its Subcontractors is/are ineligible to enter into contracts with the Owner, any department, or agency of the Federal Government. The Owner reserves the right to review cause for said debarment, suspension, or declaration of ineligibility, and to terminate this contract according to the terms of this section.

25. PROTECTION OF LIVES AND HEALTH

The Contractor shall exercise proper precaution at all times for the protection of persons and property and shall be responsible for all damages to persons or property, either on or off the worksite, which occur as a result of his prosecution of the work. The safety provisions of applicable laws and building and construction codes, in addition to specific safety and health regulations described by Chapter XIII, Bureau of Labor Standards, Department of Labor, Part 1518, Safety and Health Regulations for Construction, as outlined in the Federal Register, Volume 36, No. 75, Saturday, April 17, 1971, Title 29 - LABOR, shall be observed and the Contractor shall take or cause to be taken, such additional safety and health measures as the Owner may determine to be reasonably necessary.

26. BREACH OF CONTRACT TERMS

Any violation or breach of terms of this contract on the part of the Contractor or the Contractor's subcontractors may result in the suspension or termination of this contract or such other action that may be necessary to enforce the rights of the parties of this contract. The duties and obligations imposed by the contract documents and the rights and remedies available thereunder shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law.

27. PROVISIONS REQUIRED BY LAW DEEMED INSERTED

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

28. CHANGES

The Owner may, from time to time, request changes in the scope of the services of the Contractor to be performed hereunder. Such changes, including any increase or decrease in the amount of the Contractor's compensation which are mutually agreed upon by and between the Owner and the Contractor, shall be incorporated in written and executed amendments to this Contract.

29. PERSONNEL

The Contractor represents that it has, or will secure at its own expense, all personnel required in performing the services under this Contract. Such personnel shall not be employees of or have any contractual relationship with the Owner.

All the services required hereunder will be performed by the Contractor or under its supervision, and all personnel engaged in the work shall be fully qualified and shall be authorized or permitted under State and local law to perform such services.

No person who is serving sentence in a penal or correctional institution shall be employed on work under this Contract.

30. ASSIGNABILITY

The Contractor shall not assign any interest in this Contract and shall not transfer any interest in the same (whether by assignment or notation) without prior written approval of the Owner provided that claims for money due or to become due the Contractor from the Owner under this Contract may be assigned to a bank, trust company, or other financial institution, or to a Trustee in Bankruptcy, without such approval. Notice of any such assignment or transfer shall be furnished promptly to the Owner.

31. INTEREST OF CONTRACTOR

The Contractor covenants that he presently has no interest and shall not acquire any interest direct or indirect in the above described project or any parcels therein or any other interest which would conflict in any manner or degree with the performance of his services hereunder. The Contractor further covenants that in the performance of this Contract that no person having any such interest shall be employed.

32. COMPLIANCE WITH THE OFFICE OF MANAGEMENT AND BUDGET

The parties agree to comply with the regulations, policies, guidelines, and requirements of the Office of Management and Budget, Circulars A-95, A-102, A-133, and A-54, as they relate to the use of Federal funds under this contract.

33. DISCRIMINATION DUE TO BELIEFS

No person with responsibilities in operation of the project to which this grant relates will discriminate with respect to any program participant or any applicant for participation in such program because of political affiliation or beliefs.

34. CONFIDENTIAL FINDINGS

All of the reports, information, data, etc., prepared or assembled by the Contractor under this Contract are confidential, and the Contractor agrees that they shall not be made available to any individual or organization without prior written approval of the Owner.

35. LOBBYING

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

A. No Federally appropriated funds have been paid or will be paid, by or on behalf of the contractor, 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 the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

B. If any funds other than federally 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 contractor shall complete and submit Standard Form-LLL, Disclosure Form to Report Lobbying, in accordance with its instructions.

36. PROCUREMENT OF RECOVERED MATERIALS

The Contractor and its Subcontractors will comply with Section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act. The requirements of Section 6002 include procuring only items designated in the guidelines of the Environmental Protection Agency (EPA) at 40 CFR Part 247 that contain the highest percentage of recovered materials practicable, consistent with maintaining a satisfactory level of competition, where the Contractor purchases $10,000 or more worth of one of these items during the course of the fiscal year or where the cost of such items or of functionally equivalent items purchased during the preceding fiscal year was $10,000 or more; procuring solid waste management services in a manner that maximizes energy and resource recovery; and establishing an affirmative procurement program for the procurement of recovered materials identified in the EPA guidelines.

37. DRUG-FREE WORKPLACE

The Contractor and its Subcontractors will comply with the Drug-Free Workplace Act of 1988, as amended, in accordance with 48 CFR part 23.500 *et seq*., and 48 CFR 52.223-6. The Contractor, if other than an individual, shall - within 30 days after award (unless a longer period is agreed to in writing for contracts of 30 days or more performance duration); or as soon as possible for contracts of less than 30 days performance duration -

A. Publish a statement notifying its employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition;

B. Establish an ongoing drug-free awareness program to inform such employees about - The dangers of drug abuse in the workplace; The contractor's policy of maintaining a drug-free workplace; Any available drug counseling, rehabilitation, and employee assistance programs; and The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace.

C. Provide all employees engaged in performance of the contract with a copy of the statement required by subparagraph (A) of this clause;

D. Notify such employees in writing in the statement required by subparagraph (A) of this clause that, as a condition of continued employment on this contract, the employee will abide by the terms of the statement; and Notify the employer in writing of the employee's conviction under a criminal drug statute for a violation occurring in the workplace no later than 5 calendar days after such conviction.

E. Notify the Contracting Officer in writing within 10 calendar days after receiving notice under subdivision (D) of this clause, from an employee or otherwise receiving actual notice of such conviction. The notice shall include the position title of the employee;

F. Within 30 days after receiving notice under subdivision (D) of this clause of a conviction, take one of the following actions with respect to any employee who is convicted of a drug abuse violation occurring in the workplace:

   Taking appropriate personnel action against such employee, up to and including termination, consistent with the requirements of the Rehabilitation Act of 1973 (29 U.S.C 794), as amended; or Require such employee to satisfactorily participate in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency; and

G. Make a good faith effort to maintain a drug-free workplace through implementation of subparagraphs (A) through (F) of this clause.

H. The Contractor, if an individual, agrees by award of the contract or acceptance of a purchase order, not to engage in the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance while performing this contract; and if convicted of a criminal drug offense resulting from a violation occurring during the conduct of the contract you will notify the contracting agency within 10 calendar days of conviction.

I. In addition to other remedies available to the Government, the Contractor's failure to comply with the requirements of this clause may, pursuant to 31 CFR § 20.500 or §20.505, render the Contractor subject to suspension of contract payments, termination of the contract for default, and suspension or debarment.

40. <u>PROHIBITION ON CERTAIN TELECOMMUNICATIONS AND VIDEO SURVEILLANCE SERVICES OR EQUIPMENT (2 C.F.R. § 200.216)</u>
(Applies to all contracts)

The Contractor and subcontractors may not use federal funds to procure or obtain equipment, services, or systems that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system. As described in Public Law 115-232, section 889, covered

telecommunications equipment is telecommunications equipment produced by Huawei Technologies Company or ZTE Corporation (or any subsidiary or affiliate of such entities).

a. For the purpose of public safety, security of government facilities, physical security surveillance of critical infrastructure, and other national security purposes, video surveillance and telecommunications equipment produced by Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company (or any subsidiary or affiliate of such entities).

b. Telecommunications or video surveillance services provided by such entities or using such equipment.

c. Telecommunications or video surveillance equipment or services produced or provided by an entity that the Secretary of Defense, in consultation with the Director of the National Intelligence or the Director of the Federal Bureau of Investigation, reasonably believes to be an entity owned or controlled by, or otherwise connected to, the government of a covered foreign country.

DIVISION 0

BID FORMS

Division 0 – Article 1
LOUISIANA UNIFORM PUBLIC WORKS BID FORM

TO: ***Ascension Parish Government***
P.O. Box 2392
Gonzales, Louisiana 70707

(Owner to provide name and address of owner)

BID FOR: ***Ascension Parish Water Sector Program***
(Round 1)
Project No. PM-21-09-002
Engineer Project No. 08391-0010

(Owner to provide name of project and other identifying information)

The undersigned bidder hereby declares and represents that she/he: a) has carefully examined and understands the Bidding Documents, b) has not received, relied on, or based his bid on any verbal instructions contrary to the Bidding Documents or any addenda, c) has personally inspected and is familiar with the project site, and hereby proposes to provide all labor, materials, tools, appliances and facilities as required to perform, in a workmanlike manner, all work and services for the construction and completion of the referenced project, all in strict accordance with the Bidding Documents prepared by: McKim & Creed, Inc. and dated: February, 2023.
(Owner to provide name of entity preparing bidding documents.)

Bidders must acknowledge all addenda. The Bidder acknowledges receipt of the following **ADDENDA: (**Enter the number the Designer has assigned to each of the addenda that the Bidder is acknowledging) _____ **.**

TOTAL BASE BID: For all work required by the Bidding Documents (including any and all unit prices designated "Base Bid" * but not alternates) the sum of:
_____Dollars ($ _____)

ALTERNATES: For any and all work required by the Bidding Documents for Alternates including any and all unit prices designated as alternates in the unit price description.

Alternate No. 1 *(Owner to provide description of alternate and state whether add or deduct)* for the lump sum of:
_____Dollars ($ _____)

Alternate No. 2 *(Owner to provide description of alternate and state whether add or deduct)* for the lump sum of:
_____Dollars ($ _____)

Alternate No. 3 *(Owner to provide description of alternate and state whether add or deduct)* for the lump sum of:
_____Dollars ($_____)

NAME OF BIDDER: _____

ADDRESS OF BIDDER:_____
_____
_____

LOUISIANA CONTRACTOR'S LICENSE NUMBER: _____

NAME OF AUTHORIZED SIGNATORY OF BIDDER: _____

TITLE OF AUTHORIZED SIGNATORY OF BIDDER: _____

SIGNATURE OF AUTHORIZED SIGNATORY OF BIDDER **: _____

DATE: _____

THE FOLLOWING ITEMS ARE TO BE INCLUDED WITH THE SUBMISSION OF THIS LOUISIANA UNIFORM PUBLIC WORK BID FORM:

* The Unit Price Form shall be used if the contract includes unit prices. Otherwise it is not required and need not be included with the form. The number of unit prices that may be included is not limited and additional sheets may be included if needed.

**** A CORPORATE RESOLUTION OR WRITTEN EVIDENCE** of the authority of the person signing the bid for the public work as prescribed by LA R.S. 38:2212(B)(5).

BID SECURITY in the form of a bid bond, certified check or cashier's check as prescribed by LA R.S. 38:2218(A) attached to and made a part of this bid.

LOUISIANA UNIFORM PUBLIC WORK BID FORM
UNIT PRICE FORM

TO: *Ascension Parish Government*
P.O. Box 2392
Gonzales, Louisiana 70707

(Owner to provide name and address of owner)

BID FOR: *Ascension Parish Water Sector Program*
(Round 1)
Project No. PM-21-09-002
Engineer Project No. 08391-0010

(Owner to provide name of project and other identifying information)

UNIT PRICES: This form shall be used for any and all work required by the Bidding Documents and described as unit prices. Amounts shall be stated in figures and only in figures.

DESCRIPTION:	X Base Bid or ☐ Alt.# **MOBILIZATION**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
1	1	LUMP SUM		
DESCRIPTION:	X Base Bid or ☐ Alt.# **CONSTRUCTION PHOTOGRAPHS**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
2	1	LUMP SUM		
DESCRIPTION:	X Base Bid or ☐ Alt.# **AUDIO/VIDEO SURVEY**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
3	1	LUMP SUM		
DESCRIPTION:	X Base Bid or ☐ Alt.# **EXPLORATORY EXCAVATION**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
4	30	EACH		
DESCRIPTION:	X Base Bid or ☐ Alt.# **HOT TAP EXISTING 6" CI PIPE TYPE A**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
5	1	EACH		
DESCRIPTION:	X Base Bid or ☐ Alt.# **HOT TAP EXISTING 8" CI PIPE TYPE A**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
6	30	EACH		
DESCRIPTION:	X Base Bid or ☐ Alt.# **HOT TAP EXISTING 6" CI PIPE TYPE B**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
7	3	EACH		
DESCRIPTION:	X Base Bid or ☐ Alt.# **HOT TAP EXISTING 8" CI OR PVC PIPE TYPE B**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
8	3	EACH		
DESCRIPTION:	X Base Bid or ☐ Alt.# **8" DIPS HDPE DR11**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
9	9800	LINEAR FOOT		

DESCRIPTION:	X Base Bid or ☐ Alt.# **8"C900 PVC DR18**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
10	100	LINEAR FOOT		
DESCRIPTION:	X Base Bid or ☐ Alt.# **DUCTILE IRON FITTIGS**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
11	1	TON		
DESCRIPTION:	X Base Bid or ☐ Alt.# **8" ISOLATION VALVE**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
12	7	EACH		
DESCRIPTION:	X Base Bid or ☐ Alt.# **FIRE HYDRANT ASSEMBLY INSTALLED ON PIPE 0 TO 6 FT DEEP**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
13	30	EACH		
DESCRIPTION:	X Base Bid or ☐ Alt.# **FIRE HYDRANT ASSEMBLY INSTALLED ON PIPE 6.1 TO 12 FT DEEP**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
14	5	EACH		
DESCRIPTION:	X Base Bid or ☐ Alt.# **REMOVE AND REPLACE ASPHALT STREET**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
15	100	SQUARE YARD		
DESCRIPTION:	X Base Bid or ☐ Alt.# **REMOVE AND REPLACE CONCRETE STREET**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
16	50	SQUARE YARD		
DESCRIPTION:	X Base Bid or ☐ Alt.# **REMOVE AND REPLACE 6" THICK CONCRETE DRIVEWAY**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
17	50	SQUARE YARD		
DESCRIPTION:	X Base Bid or ☐ Alt.# **REMOVE AND REPLACE 4" THICK CONCRETE SIDEWALK**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
18	100	SQUARE YARD		
DESCRIPTION:	X Base Bid or ☐ Alt.# **TRAFFIC MAINTENANCE LIMESTONE**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
19	150	SQUARE YARD		
DESCRIPTION:	X Base Bid or ☐ Alt.# **RELOCATION OF INFRASTRUCTURE ITEMS**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
20	1	LUMP SUM	$50,000.00	$50,000.00
DESCRIPTION:	X Base Bid or ☐ Alt.# **REMOVAL OF STRUCTURES AND OBSTRUCTIONS**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
21	1	LUMP SUM		
DESCRIPTION:	X Base Bid or ☐ Alt.# **PROJECT SIGN**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
22	1	EACH		
DESCRIPTION:	X Base Bid or ☐ Alt.# **4" INSERTION VALVE**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
23	1	EACH		
DESCRIPTION:	X Base Bid or ☐ Alt.# 6" **INSERTION VALVE**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
24	2	EACH		
DESCRIPTION:	X Base Bid or ☐ Alt.# **CUT IN 3" GATE VALVE IN THE EXISTING 3" WATER MAIN**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
25	1	EACH		

DESCRIPTION:	X Base Bid or ☐ Alt.# **MCCALL BOOSTER STATION SYSTEM**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
26	1	LUMP SUM		
DESCRIPTION:	☐ Base Bid or X Alt.#1 **PALO ALTO CONTROL VALVE (ALT. NO. 1)**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
27	1	LUMP SUM		

BIDDER INFORMATION FORM
If BIDDER is:

An Individual

By: _____ (SEAL)
(Signature Individual)
Name (typed or printed): _____

Doing business as: _____

Business Address: _____

_____

Phone No.: _____ Fax No.: _____

A Partnership

Partnership Name: _____ (SEAL)

By:_____
(Signature of General Partner)
Name (typed or printed): _____ _____

Business Address: _____

_____

Phone No.: _____ Fax No.: _____

A Corporation

Corporation Name: _____ (SEAL)

State of Incorporation: _____

By:_____
(Signature - attach evidence of authority to sign)

Name (typed or printed): _____

Business Address: _____

_____

Phone No.: _____ Fax No.: _____

** (A Corporate Resolution Must Be Attached)

If BIDDER is:

A Limited Liability Company

Company Name: _____(SEAL)

By:_____
(Signature - attach evidence of authority to sign)

Name (typed or printed): _____

Business Address: _____

_____

Phone No.: _____ Fax No.: _____

A Joint Venture

Joint Venture Name:_____ (SEAL)

By: _____
(Signature of Joint Venture Partner)

Name (typed or printed): _____

Address: _____

_____

Phone No.: _____ Fax No.: _____

Joint Venture Name:_____ (SEAL)

By: _____
(Signature of Joint Venture Partner)

Name (typed or printed): _____

Address: _____

_____

Phone No.: _____ Fax No.: _____

Address, Phone Number, and Fax Number for receipt of official communications:

_____

_____

(Each joint venture partner must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above.

If BIDDER is:

A Limited Liability Company

Company Name: _____(SEAL)

By:_____
(Signature - attach evidence of authority to sign)

Name (typed or printed): _____

Business Address: _____

_____

Phone No.: _____ Fax No.: _____

A Joint Venture

Joint Venture Name:_____ (SEAL)

By: _____
(Signature of Joint Venture Partner)

Name (typed or printed): _____

Address: _____

_____

Phone No.: _____ Fax No.: _____

Joint Venture Name:_____ (SEAL)

By: _____
(Signature of Joint Venture Partner)

Name (typed or printed): _____

Address: _____

_____

Phone No.: _____ Fax No.: _____

Address, Phone Number, and Fax Number for receipt of official communications:

_____

_____

(Each joint venture partner must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above.

BID BOND FORM

Date: _____

KNOW ALL MEN BY THESE PRESENTS:

That_____ of _____, as Principal, and _____, as Surety, are held and firmly bound unto the Ascension Parish Government (Obligee), in the full and just sum of five (5%) percent of the total amount of this bid, including all alternates, lawful money of the United States, for payment of which sum, well and truly be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally firmly by these presents.

Surety represents that it is listed on the current U. S. Department of the Treasury Financial Management Service list of approved bonding companies *as* approved for an amount equal to or greater that the amount for which it obligates itself in this instrument or that it is a Louisiana domiciled insurance company with at least an A - rating in the latest printing of the A. M. Bests Key Rating Guide. If surety qualifies by virtue of its Best's listing, the Bond amount may not exceed ten percent of policyholders' surplus as shown in the latest A. M. Best's Key Rating Guide.

Surety further represents that it is licensed to do business in the State of Louisiana and that this Bond is signed by surety's agent or attorney-in-fact. This Bid Bond is accompanied by appropriate power of attorney.

THE CONDITION OF THIS OBLIGATION IS SUCH that, whereas said Principal is herewith submitting its proposal to the Obligee on a Contract for:

ASCENSION PARISH WATER SECTOR PROGRAM (ROUND 1)

NOW, THEREFORE, if the said Contract be awarded to the Principal and the Principal shall, within such time as may be specified, enter into the Contract in writing and give a good and sufficient bond to secure the performance of the terms and conditions of the Contract with surety acceptable to the Obligee, then this obligation shall be void; otherwise this obligation shall become due and payable.

_____	_____
PRINCIPAL (BIDDER)	SURETY
BY:_____	BY:_____
AUTHORIZED OFFICER-OWNER-PARTNER	AGENT OR ATTORNEY-IN-FACT (SEAL)

BIDDER'S NON-COLLUSION AFFIDAVIT
(FURNISH WITH BID PACKAGE)

STATE OF LOUISIANA

PARISH OF _____

BEFORE ME, the undersigned authority, personally came and appeared

_____ who after being by me duly sworn, deposed and said that he is the

fully authorized _____ of

_____(Herein after referred to as "BIDDER") the party who submitted a bid

for _____ which

bid was received by ASCENSION PARISH, LOUISIANA on _____ and

said affiant further said:

(1) That bidder employed no person, corporation, firm, asocial, or other organization, either directly or indirectly, to secure public contract under which he received payment, other than persons regularly employed by the affiant whose services in connection with the construction, alteration, or demolition of the public building or project or in securing the public contract were in the regular course of their duties for bidder, and

(2) That no part of the contract price received by bidder was paid or will be paid to any person, corporation, firm, association, or other organization for soliciting the contract, other than the payment of their normal compensation to persons regularly employed by the affiant whose services in connection with the construction, alteration, or demolition of the public building or project were in the regular course of their duties for bidder.

(3) Said bidder is genuine and the bidder has not colluded, conspired or agreed directly or indirectly with any other bidder to offer a sham or collusive bid.

(4) Said bidder has not in any manner directly or indirectly agreed with any other person to fix the bid price of affiant or any other bidder, or to fix any overhead profit or cost element of said bid price, of that of any other bidder, or to induce any other person to refrain from bidding.

(5) Said bid is not intended to secure an unfair advantage of benefit from Ascension Parish, Louisiana or in favor of any persons interested in the proposed contract.

(6) All statement contained in said bid are true and correct.

(7) Neither affiant nor any member of his company has divulged information regarding said bid or any data relative thereto to any person, firm, or corporation.

By:_____
(Signature)

_____
(Type or Print Name)

_____
(Type or Print Title)

SUBSCRIBED AND SWORN TO BEFORE ME THIS _____DAY OF _____, 20_____ in _____, Louisiana.

_____
Notary Public Signature

Written Name of Notary Public:_____

Notary Public Number: _____

My commission expires: _____

RESOLUTION AUTHORIZING SUBMISSION OF BID, SIGNATURE OF BID AND SIGNATURE OF CONTRACT

BE IT RESOLVED by the Board of Directors of _____, a Corporation organized and existing under the laws of the State of _____, and domiciled in the City of _____; that _____ President of the Corporation and/or _____ of the Corporation, be, and are hereby authorized and empowered to submit bids and to execute any and all contracts of whatever kind on behalf of the Corporation and to do all things necessary in the premises.

CERTIFICATE

I, _____, Secretary of _____ do hereby certify that the foregoing resolution is a true and exact copy unanimously adopted by the Board of Directors of said corporation at a meeting thereof legally held on the _____ day of _____ 20_____; that said resolution is duly entered into the records of said corporation; that it has not been rescinded or modified; and that it is now in full force and effect.

IN TESTIMONY WHEREOF, I have hereunto set my hand and the seal of said corporation this _____ day of _____, 20_____.

_____
(Secretary)

PERFORMANCE BOND

_____

_____ as Principal, and _____ a

surety company or companies authorized to do business in Louisiana, as Surety, are bound, in solido, unto

_____ and unto all subcontractors, workmen,

and furnishers of materials and equipment, jointly in the sum of

_____ Dollars($_____).

Payable in lawful money of the United States, and to this bond do obligate their heirs, successors and assigns. In the case of co-sureties, co-sureties assume an obligation in the sum of

_____

_____Dollars($_____).

For_____and

_____

_____Dollars($_____).

The consideration for this bond is such, that if the Principal shall perform this contract, made and entered into on the _____ day of _____, 20_____, To construct the project entitled: ***ASCENSION PARISH WATER SECTOR PROGRAM (ROUND 1)***, consisting of supply and erection of metal building according to the stipulations in said contract attached hereto and made a part hereof, at the time and in the manner and form specified; perform all labor and work; and shall furnish all materials as specified in said contract, and the drawings and specifications thereto attached and made a part thereof; this obligation shall be void; otherwise to remain in effect.

It is agreed by the parties that this bond is given in accordance with Louisiana Revised Statutes of 1950, Title 38, Chapter 10.

In faith whereof, we have subscribed this obligation at _____, Louisiana.

Witness our hands and seals, this_____ day of _____, 20_____.
Witnesses

_____ _____
Principal

_____ By_____

_____
Typed or Printed Name

_____ _____
First Surety

_____ By_____(Seal)
Attorney-in-Fact

_____
Typed or Printed Name

_____ _____
Second Surety

_____ By_____(Seal)
Attorney-in-Fact

_____
Typed or Printed Name

I certify that I am as of the date of this bond a licensed Resident Agent of Louisiana in good standing with the Louisiana Insurance Commission and authorized to countersign this bond on behalf of the Surety of Sureties.

First Surety	Second Surety
By_____	By_____
_____	_____
Typed or Printed Name	Typed or Printed Name
_____	_____
Typed or Printed Name	Typed or Printed Name
_____	_____
Address	Address

PAYMENT BOND FORM

_____

as Principal, and _____

a surety company or companies authorized to do business in Louisiana, as Surety, are

bound, in solido, unto _____ and unto

all subcontractors, workmen, and furnishers of materials and equipment, jointly in the sum of

_____

_____Dollars($_____).

Payable in lawful money of the United States, and to this bond do obligate their heirs, successors and assigns. In the case of co-sureties, co-sureties assume an obligation in the sum of

_____

_____Dollars($_____).

For_____and

_____

_____Dollars($_____).

The consideration for this bond is such, that if the Principal shall perform this contract, made and entered into on the _____ day of _____, 20_____, To construct the project entitled: ***ASCENSION PARISH WATER SECTOR PROGRAM (ROUND 1),*** consisting of supply and erection of a metal building according to the stipulations in said contract attached hereto and made a part hereof, pay all sums due on materials and supplies used and wages earned by workmen employed on the work; this obligation shall be void; otherwise to remain in effect.

It is agreed by the parties that this bond is given in accordance with Louisiana Revised Statutes of 1950, Title 38, Chapter 10.

Witness our hands and seals, this_____ day of _____, 20_____.

Witnesses

_____ _____
Principal

_____ By_____

_____
Typed or Printed Name

_____ _____
First Surety

_____ By_____(Seal)
Attorney-in-Fact

_____
Typed or Printed Name

_____ _____
Second Surety

_____ By_____(Seal)
Attorney-in-Fact

_____
Typed or Printed Name

I certify that I am as of the date of this bond a licensed Resident Agent of Louisiana in good standing with the Louisiana Insurance Commission and authorized to countersign this bond on behalf of the Surety of Sureties.

First Surety	Second Surety
By_____	By_____
Typed or Printed Name	Typed or Printed Name
_____	_____
Typed or Printed Name	Typed or Printed Name
_____	_____
Address	Address

HOLD HARMLESS AGREEMENT

OWNER: **PARISH OF ASCENSION**
P.O. BOX 1659
GONZALES, LOUISIANA 70707-1659

ENGINEER: **MCKIM & CREED, INC.**
1022 S. PURPERA AVE.
GONZALES, LA 70737

The Contractor shall indemnify and hold harmless the Owner and the Engineers and their agents and employees from and against all claims, damages, losses and expenses including attorney's fees arising out of or resulting from the performance of the work, provided that any such claim, damage, loss or expense: (a) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the work itself), including the loss of use resulting therefrom: and (b) is caused in whole or in part by any negligent act or omission of the Contractor, and subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether or not is caused in part by a party indemnified hereunder.

In any and all claims against the Owner or the Engineers, or any of their agents or employees by any employee of the Contractor, and subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may liable, the indemnification obligation under this Agreement shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any subcontractor under Workmen's Compensation acts, disability benefit acts or other employee benefit acts.

The obligations of the Contractor under this Agreement shall not extend to the liability of the Engineers, their agents or employees arising out of. (1) the preparation or approval of maps, drawings, opinions, reports, surveys, Change Orders, designs or specifications: or (2) the giving of or the failure to give directions or instructions by the Engineers, their agents or employees provided such giving or failure to give its primary cause of the injury or damage.

CONTRACTOR: _____

By: _____

WITNESSES:

_____

_____

ARTICLE 9

ASCENSION PARISH WATER SECTOR PROGRAM (ROUND 1)

Name of Project

PM-21-09-002

Project Number **Date of Bid**

ATTESTATION CLAUSE REQUIRED BY LA. R.S. 38:2227 (PAST CRIMINAL CONVICTIONS OF BIDDERS)

Appearer, as a Bidder on the above-entitled Public Works Project, does hereby attest that:

A. No sole proprietor or individual partner, incorporator, director, manager, officer, organizer, or member who has a minimum of a ten percent (10%) ownership in the bidding entity named below has been convicted of, or has entered a plea of guilty or nolo contendere to any of the following state crimes or equivalent federal crimes:

(a) Public bribery (R.S. 14:118)
(b) Corrupt influencing (R.S. 14:120)
(c) Extortion (R.S. 14:66)
(d) Money laundering (R.S. 14:23)

B. Within the past five years from the project bid date, no sole proprietor or individual partner, incorporator, director, manager, officer, organizer, or member who has a minimum of a ten percent (10%) ownership in the bidding entity named below has been convicted of, or has entered a plea of guilty or nolo contendere to any of the following state crimes or equivalent federal crimes, during the solicitation or execution of a contract or bid awarded pursuant to the provisions of Chapter 10 of Title 38 of the Louisiana Revised Statutes:

(a) Theft (R.S. 14:67)
(b) Identity Theft (R.S. 14:67.16)
(c) Theft of a business record (R.S.14:67.20)
(d) False accounting (R.S. 14:70)
(e) Issuing worthless checks (R.S. 14:71)
(f) Bank fraud (R.S. 14:71.1)
(g) Forgery (R.S. 14:72)
(h) Contractors; misapplication of payments (R.S. 14:202)
(i) Malfeasance in office (R.S. 14:134)

NAME OF BIDDER **NAME OF AUTHORIZED SIGNATORY OF BIDDER**

DATE **TITLE OF AUTHORIZED SIGNATORY OF BIDDER**

SIGNATURE OF AUTHORIZED SIGNATORY OF BIDDER

ARTICLE 10
AFFIDAVIT OF USE OF STATUS VERIFICATION SYSTEM

PURSUANT TO La. R.S. 38:2212.10C, a private employer shall not bid on or otherwise contract with a public entity for the physical performance of services within the state of Louisiana unless the private employer verifies in a sworn affidavit that the private employer is registered with, participates in, and utilizes the status verification system required by La. R. S. 38:2212.10B(2), known as the "E-Verify" program, in accordance with federal rules and regulations pertaining to E-Verify.

Name of Private Employer:_____

Name of Authorized Agent:_____

Mailing Address:_____

_____

ATTESTATION

I hereby attest that_____:
(name of private employer)

1. Is registered with and participates in the status verification system to verify that all new employees in the state of Louisiana are legal citizens of the United States or are legal aliens.

2. Will continue, during the term of the contract, to utilize the status verification system to verify the legal status of all new employees in the state of Louisiana.

3. Will require all subcontractors to submit an affidavit verifying that the subcontractor is registered with, participates in, and utilizes the status verification system to verify the legal status of all new employees in the State of Louisiana

CERTIFICATE OF ACCURACY:

I hereby certify that the information herein is true and correct to the best of my knowledge, information, and belief.

_____
Signature (Authorized Agent)

Sworn To And Subscribed, before me, this_____day of _____,20_____, in _____, Louisiana.

_____
Notary Public Signature

Written Name of Notary Public: _____

Notary Public Number: _____

My commission expires: _____

ARTICLE 11

ASCENSION PARISH WATER SECTOR PROGRAM (ROUND 1)
Name of Project

PM-21-09-002 _____
Project Number **Date of Bid**

BIDDER AFFIDAVIT

STATE OF LOUISIANA

PARISH/COUNTY OF _____

Before me, the undersigned notary public, duly commissioned and qualified in and for the parish and state aforesaid, personally came and appeared Affiant who, after being duly sworn, swore and testified as follows:

Affiant is the legal representative of the bidding entity, is authorized to act on its behalf, and has sufficient personal knowledge of the bidding entity to testify as to the following:

La. R.S. 12:163 Standing with Louisiana Secretary of State

A. R.S. 12:163 prohibits any corporation or limited liability company not in good standing with the Louisiana Secretary of State from engaging in commercial business operations with the state or its agencies, departments, boards, or commissions.

B. By signing this bid /proposal, Affiant attests that the bidding / proposing entity is in good standing with the Louisiana Secretary of State**.**

La. R.S. 23:1726(B) Unpaid Workers' Compensation Insurance

A. R.S. 23:1726 prohibits any entity against whom an Unemployment Compensation assessment is in effect under Part X of Chapter 11 of Title 23 of the Louisiana Revised Statutes of 1950 (Alternative Collection Procedures & Assessments), and whose right to appeal that assessment is exhausted, from submitting a bid or proposal for or obtaining any contract pursuant to Chapter 10 of Title 38 of the Louisiana Revised Statutes of 1950 and Chapters 16 and 17 of Title 39 of the Louisiana Revised Statutes of 1950.

B. By signing this bid /proposal, Affiant certifies that no such assessment is in effect against the bidding / proposing entity.

La. R.S. 48:251.4 Ownership

A. That bidder is cognizant that an architect or engineer, or representative thereof, who has performed architectural or engineering services, either directly or indirectly, in connection with the public work for this

bid is prohibited from having a substantial financial interest, either directly or indirectly, in any corporation, firm, partnership, or other organization which supplies materials for the construction of a public work. If bidder becomes aware of any violation of LRS 48:251.4, a representative shall advise the Department of Transportation and Development.

B. For the purposes of this law, a "substantial financial interest" shall exclude any interest in stock being traded on the American Stock Exchange or the New York Stock Exchange.

La. R.S. 48:254 Financial Interest in Other Bids Prohibited

That bidder has not submitted more than one bid on this project, has not submitted any additional bid under another or different name, and has no direct financial interest in any bid submitted by another bidder.

_____ _____
NAME OF BIDDER **NAME OF AFFIANT**

_____ _____
DATE **TITLE OF AFFIANT**

_____
SIGNATURE OF AFFIANT

Sworn To And Subscribed, before me by Affiant, this___day of_____, 20__in _____, Louisiana.

_____
Notary Public Signature

Written Name of Notary Public: _____

Notary Public Number: _____

My commission expires:_____

(Seal)

DIVISION 0

CONTRACT FORMS

NOTICE OF AWARD

Date of Award: _____

TO: _____

ADDRESS: _____
_____

PROJECT: _____

Owner's Contract No.: _____ Engineer's Project No.: **08391-0010**
Contract For: ***ASCENSION PARISH WATER SECTOR PROGRAM (ROUND 1)***
ASCENSION PARISH
PROJECT # PM-21-09-002

You are notified that your Bid dated _____for the above Contract has been considered. You are the apparent Successful Bidder and have been awarded a Contract for:
ASCENSION PARISH WATER SECTOR PROGRAM (ROUND 1)

The Contract Price of your Contract is: _____
_____

__4__Copies of each of the proposed Contracts accompany this Notice of Award.
__3__Sets of the complete Contract Documents, including Drawings, will be delivered separate During the Pre-Construction Conference or otherwise made available to you immediately.

You must comply with the following conditions precedent within fifteen (15) days of the date of this Notice of Award, this is by:_____

1. You must deliver to the Owner four (4) fully executed counterparts of the proposed Contract, including the Agreement. Each copy of the Contract must bear your signature on all signatory lines within the Agreement

2. You must deliver with the executed Agreement, the Contract Security (Bonds) as specified in the Instructions to Bidders (Section 1.8) and General Conditions (Section 5.01).

NOTICE OF AWARD (Continued)

3. You must deliver with the executed Agreement, Certificate of Insurance including certificates verifying additional insurers as required in General Conditions (Section 5.03)

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

Within ten (10) days after you comply with the above conditions, the Owner will return to you one (1) fully signed counterpart of the Agreement with the Contract Documents attached.

PARISH OF ASCENSION _____
(Owner)

By: _____
(Authorized Signature)

_____
(Title)

ACCEPTANCE OF AWARD

_____
(Contractor)

By: _____
(Authorized Signature)

_____
(Title)

_____
(Date)

NOTICE TO PROCEED

TO: _____

ADDRESS: _____

_____

PROJECT: _____

Owner's Contract No.: **PM-21-09-002** Engineer's Project No.: **08391-0010**
Contract For: ***ASCENSION PARISH WATER SECTOR PROGRAM (ROUND 1)***
ASCENSION PARISH
PROJECT # PM-21-09-002

You are notified that the Contract Times under the above Contract will commence to run on _____. By that date, you are to start performing your obligations under the Contract Documents. In accordance with Article 3 of the Agreement, the dates of Substantial Completion and completion and readiness for Final Payment are:_____ and_____

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

Also, before you may start any Work at the site you must notify Owner/Engineer of Start Date.

PARISH OF ASCENSION
(Owner)

By:_____
(Authorized Signature)

_____
(Title)

ACKNOWLEDGED:

_____
(Contractor)

By: _____
(Authorized Signature)

_____
(Title)

_____
(Date)

APPLICATION FOR PAYMENT

NO. _____
TO: Ascension Parish Government
Contract For: ***ASCENSION PARISH WATER SECTOR PROGRAM (ROUND 1)***

Owner's Contract No.: PM-21-09-002 Engineer's Project No.: **08391-0010**
For Work accomplished through the date of: _____

ITEM	CONTRACTORS Schedule of Values			Work Completed	
	Unit Price	Quantity	Amount	Quantity	Amount
Total (Original Contract)			$		$

Accompanying Documents
_____
_____
_____
_____

Gross Amount Due: $_____
Less (%) Retainage: $_____
Amount Due to Date: $_____
Less Previous Payments: $_____
Amount Due this Application: $_____

CONTRACTOR's Certification:

The undersigned CONTRACTOR certifies that: (1) all previous progress payments received from OWNER on account of Work done under the Contract referred to above have been applied to discharge in full all obligations of CONTRACTOR incurred in connection with Work covered by prior Applications for Payment numbered _____ through _____ inclusive; (2) title to all Work materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to OWNER at time of payment free and clear of all liens, claims, security interest and encumbrances (except such as are covered by Bond acceptable to OWNER indemnifying OWNER against any such lien, claim, security interest or encumbrance); and (3) all Work covered by this Application for Payment is in accordance with the Contract Documents and not defective as that term is defined in the Contract Documents.

Dated: _____ _____
CONTRACTOR
By: _____
Authorized Signature

Dated: _____ _____
ENGINEER
By: _____
Authorized Signature

Payment of the above AMOUNT DUE THIS APPLICATION is recommended.

NO._____

WORK CHANGE DIRECTIVE

PROJECT: ***ASCENSION PARISH WATER SECTOR PROGRAM (ROUND 1)***
DATE OF ISSUANCE:_____ EFFECTIVE DATE: _____

OWNER: PARISH OF ASCENSION_____ OWNER'S CONTRACT NO.: **PM-21-09-002**

ENGINEER: MCKIM & CREED, INC._____ ENGINEER'S PROJECT NO.: **08391-0010**

CONTRACTOR:_____

You are directed to make the following changes in the Contract Documents:

Description:

Purpose of Work Change Directive:

Attachments (List documents supporting changes):

If a claim is made that the above change(s) have affected the Contract Price or Contract Times, any claim for a change order based thereon will involve one or more of the following methods of determining the effect of the change(s).

Method of determining change in Contract Price:
_____Unit Prices
_____Lump Sum
_____Other: _____

Estimated increase (decrease) in Contract Price:
_____$_____-____

If the change involves an increase, the estimated amount is not to be exceeded without further authorization.

Method of determining change in Contract Times
_____Contractor's Records
_____Engineer's Records
_____Other: _____

Estimated increase (decrease) in Contract Times:
Substantial Completion: _____Days
Ready for Final Payment: _____Days
If the change involves an increase, the estimated are not to be exceeded without further authorization.

RECOMMENDED: By: _____ Date: _____
Engineer (Authorized Signature)

APPROVED: By: _____ Date: _____
Owner (Authorized Signature)

ACCEPTED: By: _____ Date: _____

Contractor (Authorized Signature)

EJCDC No. 1910-E-F (1990 Edition)
Prepared by the Engineers Joint Contract Documents Committee and Endorsed by
The Associated General Contractors of America

CHANGE ORDER

CHANGE ORDER NO. _____

Date of Issuance:
Effective Date:
Owner: Ascension Parish Government
Owner's Contract No.: PM-21-09-002
Contractor:
Contractor's Project No.:
Engineer: MCKIM & CREED, INC.
Engineer's Project No.: 08391-0010
Project: **ASCENSION PARISH WATER SECTOR PROGRAM (ROUND 1)**
Contract Name:

The Contract is modified as follows upon execution of this Change Order:
Description:

Attachments: *[List documents supporting change]*

CHANGE IN CONTRACT PRICE	**CHANGE IN CONTRACT TIMES** **[note changes in Milestones if applicable]**
Original Contract Price: $_____	Original Contract Times: _____ Substantial Completion: _____ Ready for Final Payment: _____ days or dates
[Increase] [Decrease] from previously approved Change Orders No. ___ to No. ___: $_____	[Increase] [Decrease] from previously approved Change Orders No. ___ to No. ___: Substantial Completion: _____ Ready for Final Payment: _____ days or dates
Contract Price prior to this Change Order: $_____	Contract Times prior to this Change Order: Substantial Completion: _____ Ready for Final Payment: _____ days or dates
[Increase] [Decrease] of this Change Order: $_____	[Increase] [Decrease] of this Change Order: Substantial Completion: _____ Ready for Final Payment: _____ days or dates
Contract Price incorporating this Change Order: $_____	Contract Times with all approved Change Orders: Substantial Completion: _____ Ready for Final Payment: _____ days or dates

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

Approved by Funding Agency (if applicable)
By: _____ Date: _____
Title: _____
OWNER Ascension Parish Government DATE _____

CERTIFICATE OF SUBSTANTIAL COMPLETION

Project: **ASCENSION PARISH WATER SECTOR PROGRAM (ROUND 1)**	
Owner: Ascension Parish Government	Owner's Contract No.: PM-21-09-002
Contract:	Engineer's Project No: **08391-0010**

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

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

_____

_____

_____

_____

_____
Date of Substantial Completion

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

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

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

☐ Amended Responsibilities ☐ Not Amended

Owner's Amended Responsibilities:

_____

_____

_____

CERTIFICATE OF SUBSTANTIAL COMPLETION (Continued)

Contractor's Amended Responsibilities:

_____

_____

_____

_____

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

_____

_____

_____

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

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

ENGINEER CERTIFICATION

The following Contract Documents and Technical Specifications have been prepared under my direct supervision and guidance in conjunction with the Plans and for the explicit use by the Owner and Contractors for the bidding and construction of the Project.

ASCENSION PARISH
WATER SECTOR PROGRAM (ROUND 1)
FEBRUARY 2023

MCKIM & CREED, INC.

Drawings, Details & Large Documents
Division 0-Artcile 1 Louisiana Uniform Public Works Bid Form
Article 9 – Attestation Clause
Article 10 – Affidavit of Use of Status Verification System
Article 11 – Bidder Affidavit

Section 01010 – General Requirements for a Large and/or Complex Project
Section 01030 – Special Project Requirements
Section 01033 – Special Project Requirements
Section 01035 – Procedures for Modification of the Contract
Section 01091 – Reference Standards
Section 01200 – Project Meetings
Section 01250 – Measurement and Payment
Section 01300 – Project Meetings
Section 01310 – Submittals
Section 01330 – Progress Schedules
Section 01340 – Schedule of Values
Section 01341 – Project Coordination
Section 01350 – Construction Photographs
Section 01360 – Cleaning
Section 01370 – Contract Closeout
Section 01371 – Project Record Documents
Section 01372 – Operating and Maintenance Data

Section 01373 – Warranties and Bonds
Section 01400 – Quality Control
Section 01410 – Testing Laboratory Services
Section 01420 – Resident Project Representative Services
Section 01450 – Field Engineering
Section 01460 – Regulatory Requirements
Section 01510 – Temporary Utilities
Section 01580 – Project Identification and Signs
Section 01600 – Material and Equipment
Section 01705 – Mobilization
Section 01720 – Traffic Regulation
Section 01746 – Modification to Existing Structures, Piping and Equipment
Section 01748 – Utilities Coordination
Section 02200 – Construction Layout
Section 02300 – Excavation, Backfill, and Compaction
Section 02513 – Water Systems
Section 02533 – Horizontal Directional Drilling (HDD) for Pressure and Gravity Mains
Section 02700 – Paving and Surfacing
Section 02905 – Lawns and Grass
Section 03200 – Concrete Reinforcement
Section 03300 – Cast-in-Place Concrete
Section 05500 – Miscellaneous Metal
Section 10100 – Relocation of Infrastructure Items

ENGINEER CERTIFICATION

The following Contract Documents and Technical Specifications have been prepared under my direct supervision and guidance in conjunction with the Plans and for the explicit use by the Owner and Contractors for the bidding and construction of the Project.

ASCENSION PARISH
WATER SECTOR PROGRAM (ROUND 1)
FEBRUARY 2023

PARISH ENGINEERING

STATE OF LOUISIANA
MICHAEL LEE TERRY, III
License No. 42812
PROFESSIONAL ENGINEER
IN
ELECTRICAL ENGINEERING

2/24/23

26 01 00	Basic Electrical Requirements
26 05 00	Basic Electrical Materials and Methods
26 05 72	Overcurrent Protective Device Short-Circuit Study
26 05 73	Overcurrent Protective Device Coordination Study
26 05 74	Overcurrent Protective Device Arc-Flash Study
26 20 00	Service and Distribution
26 43 00	Surge Protection Devices for Low-Voltage Electrical Power Circuits
26 50 00	Lighting

ENGINEER CERTIFICATION

The following Contract Documents and Technical Specifications have been prepared under my direct supervision and guidance in conjunction with the Plans and for the explicit use by the Owner and Contractors for the bidding and construction of the Project.

ASCENSION PARISH
WATER SECTOR PROGRAM (ROUND 1)
FEBRUARY 2023

OWEN & WHITE, INC.

STATE OF LOUISIANA
DAVID W. KOZAN
REG. No. 28548
REGISTERED PROFESSIONAL ENGINEER IN CIVIL ENGINEERING

2/24/23

31 20 00	Earth Moving
33 11 00	Water Utility Piping
33 12 00	Water Utility Equipment
33 12 10	Palo Alto Control Valve
46 83 04	Booster Pump Station

DRAWINGS, DETAILS, AND LARGE DOCUMENTS

No.:	Sheet Name:
GENERAL	
G1	Title & Index Sheet
G2	General Notes and Sequence of Construction
G3	Fire Hydrant, Valve, and Tapping Details
G4	Pavement and Trenching Details
G5	HDD Details
CIVIL	
Water Line Rehab	
C1	Proposed Layout Map
C2	Plan View (STA: 0+00 to STA: 10+50)
C3	Plan View (STA: 10+50 to STA: 20+37)
C4	Plan View (STA: 30+00 to STA: 34+44)
C5	Plan View (STA: 40+00 to STA: 54+00)
C6	Plan View (STA 54+00 to STA: 65+00) (STA: 80+00 to STA: 82+79) (STA: 90+00 to STA: 92+76)
C7	Plan View (STA: 65+00 to STA: 77+47)
C8	Plan View (STA: 100+00 to STA: 113+09) (STA: 110+00 to STA: 113+09)
C9	Plan View (STA: 120+00 to STA: 129+95)
System Tie-Ins	
CT1	LA 1 North Tie-In
CT2	LA 1 South Tie-In
CT3	LA 1 South Tie-In
CT4	LA 308 Tie-In
CT5	LA 308 Tie-In
Traffic	
T1	TTC-00(A)
T2	TTC-00(B)
T3	TTC-00(C)
T4	TTC-00(D)
T5	TTC-01

T6	TTC-02
T7	TTC-03

MECHANICAL

M-01	Overall Booster System Site
M-02	Booster System Schematic
M-03	Booster System P&IDs
M-04	Booster Tie-In Piping Plan
M-05	Existing McCall Booster Site
M-06	Proposed McCall Booster Site
M-07	Existing Palo Alto Site
M-08	Proposed Palo Alto Site Plan
M-09	Pipe Restraint
M-10	Piping Details

ELECTRICAL

E-01	McCall Electrical Site Plan
E-02	Palo Alto Electrical Site Plan
E-03	Electrical Riser Diagram & Details
E-04	Electrical Details

TECHNICAL SPECIFICATIONS
DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01010 – GENERAL REQUIREMENTS FOR A LARGE AND/OR COMPLEX PROJECT

PART - I GENERAL

1.01 Scope of Work - The work to be done under these specifications consists of furnishing all equipment, labor and materials and performing all work required in the construction and installation of those facilities shown on the Drawings and described herein. The Work shall conform to the Drawings prepared by the Engineer, McKim & Creed, Inc., which Drawings along with these Specifications and any Addenda issued during the bidding process form the Contract Documents, and which are filed in the office of the Owner. All work under the Contract Documents is under direct observation of the Engineer. A brief summary of work covered by the Contract Documents includes:

This project will consist of the consolidation of the Parish Utilities of Ascension (PUA) and ACUD No. 1 water systems within the City of Donaldsonville at three different tie-in points to include: 1) LA 1 North, 2) La 1 South, and 3) LA 308. It will also consist of the addition of a pressure booster station near the McCall Elevated Storage Tank and rehabilitation/replacement of various water lines within the historic area of the City of Donaldsonville with mostly 8” DR 11 HDPE.

1.02 Owner-Furnished Items - The following is a list of Owner-Furnished items:

None

1.03 Source and Status of Funds - Funding for this project are as follows:

SOURCE	STATUS
Water Sector Program	Funds are in Place

1.04 Contractor's Responsibility Concerning Contract Documents

A. All Contract Documents are mechanically reproduced. The Contractor is responsible for checking his sets of the Contract Documents to assure they are complete in number and all sheets are legible. The Engineer will replace any copies of sheets as necessary without additional charge to the Contractor when notified.

B. Contractor is responsible for compliance with all Contract Documents, whether or not the set(s) issued to the Contractor are complete and totally legible.

C. It shall be understood that the failure of the Contractor to review and verify his set(s) of Contract Documents for completeness and legibility which results in additional costs to the Contractor shall in no way increase the cost of the project to the Owner or the Owner's Engineer after bids are received.

D. Contractor shall have present on the jobsite at all times a minimum of two (2) complete sets of Contract Documents. One (1) set shall be used for record keeping for preparation of record drawings upon completion of project.

1.05 Existing Facilities - The Owner reserves the right to maintain, operate and occupy the following existing facilities in conjunction with the project:

The Contractor must coordinate with the Owner in order to allow the Owner to continue to operate the water distribution system and associated booster stations with only designated periods of shutdowns for booster station and valve tie-ins, as well as consolidation of both the PUA and ACUD No. 1 water systems.

1.06 Existing Utilities Coordination - If available to the Engineer during the design, the approximate location of known utilities has been indicated on the construction drawings. Exact location of these and any other utilities shall be made by the Contractor prior to Work or if unavailable by the Utility Owner, as work progresses.

A. The Contractor shall be responsible for notifying all public or private utilities, or other interested parties to make necessary adjustment of utility structure or appearances affected by Work in accordance with the Louisiana Underground Utilities and Facilities Damage Prevention Law (LARS 40:1749.11 through 40:1749.26). The Contractor may directly notify each utility owner or contact LA ONE CALL; however, he shall be solely responsible for contacting each utility.

B. The Contractor will be responsible for any damages done by him to any utility structure owned or controlled by any agency, public or private, when the Contractor has followed the utility location procedure prescribed by state law and when that utility has been properly located or the utility has failed to locate their facilities. The Contractor shall perform and carry on the work so as not to interfere with or damage utility structures mentioned herein or shown on the Drawings or discovered during construction, which are to be left within the limits of the work.

C. The Owner will not be responsible for any delay or inconvenience to the Contractor in carrying out the work resulting from the existence, removal or adjustment of any properly located public utility. Additional costs incurred as a result thereof shall be at no additional expense to the Owner or Engineer.

D. The Contractor shall provide 48 hours notice to the respective utility owner prior to excavation near or the crossing of highways, railroads, pipelines, cables, other utilities, unless a permit requires a longer period for notification. The Contractor shall make the location of the Work available to any representative of the respective utility owner for a site visit. The utility owner representative shall locate the underground utility structure in accordance with the provisions of state law, and when necessary as determined by the utility owner shall approve the method of excavation to be utilized by the Contractor.

1.07 Scheduling of Work and Sequence of Construction

A. Prior to commencement of work, a proposed schedule of work and sequence of construction shall be submitted to the Engineer by the Contractor for review and approval as required elsewhere in Division 01 of the Contract Documents. Monthly updates of the progress schedule are required as part of the performance of the Work and the Contractor is hereby notified that periodic progress payments will be withheld should the required schedule updates not be submitted. The failure of the Owner or Engineer to request progress schedule updates shall not relieve the Contractor from the responsibility to provide adequate forces and equipment to maintain progress on the project so that the Work will be completed within the required period as stated in the Agreement.

B. Should special sequence of construction be required, the sequence will be detailed in the Specification that is entitled "Special Project Requirements" in Division 01 of the Contract Documents.

1.08 Continuation of Existing Systems - The construction of the proposed modifications and their connection to the existing systems shall be completed in accordance with a schedule developed by the Contractor and approved by the Engineer. The schedule shall insure that the operation of the facilities shall not be interrupted during the construction period. All temporary facilities including piping, pumping equipment and power required to maintain the operation of these facilities shall be provided, constructed and maintained by the Contractor as an integral part of the required Work under the contract provisions.

1.09 General Terms and Abbreviations

A. The standard units of measure shall be the inch-pound as defined by the U.S. National Bureau of Standards. Metric conversion, when necessary, shall be in accordance with ASTM SI10.

B. Abbreviations for words or terms utilized in the construction industry shall conform to the CSI Standard. Drawing symbols shall conform to applicable industry standards.

C. A list of abbreviations of various standards and regulatory organizations is provided elsewhere in Division 01 of the Contract Documents along with contact addresses.

1.10 Submittals - Requirements for submittals required as part of the Work are included elsewhere in Division 01 of the Contract Documents.

1.11 Alternates

A. When required by these specifications, pre-qualification of certain material and/or equipment will be required during the bidding phase of the project. The pre-qualification process requires all data and information be submitted to the Engineer seven days prior to receipt of bids in accordance with State Law LARS38:2295(C) and as required by the General Conditions. Refer to the General Conditions for submittal requirements of product data and information.

B. Notification of approval or disapproval will be made in writing within three working days of receipt of the submittal as required by LARS 38:2295(C). If Engineer approves any proposed item, such approval will be set forth in an Addendum issued to all prospective Bidders. Bidders shall not rely upon approvals made in any other manner. If alternate material and/or equipment is not approved by Addenda and requires a pre-qualification by this paragraph, only those items specified in these specifications can be bid. No equipment and/or qualification can be submitted after the bid under the provisions of General Conditions. If an alternate material and/or equipment is approved by Addendum, the Contractor shall be responsible for providing design calculations and drawing revisions for alternate products which affect the existing design, specifications and drawings, including, but not limited to, hydraulics, structural, piping and electrical.

C. The costs for these alterations or revisions shall be solely borne by the Contractor under the prices submitted in the Bid Form and no additional cost to the Owner will be considered for such alterations or revisions to the Work. All design changes shall be approved by the Engineer prior to incorporation into the project. Items for which pre-qualification submittals are requested for this Project are as follows:

None

1.12 Quality Control

A. If desired by the Owner, a qualified testing laboratory will make field visits to sample such items as Portland cement concrete, hot or cold-mix asphalt, earthwork fill and compaction, aggregate, welding, etc. The frequency of testing will be at the discretion of the Owner and the recommendations of the Engineer to the Owner.

B. Items that are measured in a delivery vehicle shall require presentation of delivery tickets that indicate volume or weight delivered to the Project Site. Delivery tickets shall be presented to the Resident Project Representative when the material is delivered to the project site. When such delivery of vehicle measured material is required, it shall be the Contractor's responsibility to coordinate the delivery with other operations on the project so that the Resident Project Representative's presence will not be required at more than one location at the same time.

C. When materials are to be measured by weight, the tare weight of the vehicle shall be made when the vehicle’s fuel tanks are half full. The level of fuel in the vehicle when the tare weight is determined shall be certified by the scale operator on the weight ticket. Should it be found that the tare weight for an individual vehicle was erroneously or fraudulently determined, the vehicle shall either be banned from further use on the project or the tare weight shall be redetermined based on full fuel tanks and all loads previously hauled by the vehicle shall be adjusted based on the redetermined tare weight and the redetermined tare weight shall be used for all subsequent loads hauled by the vehicle.

SECTION 01010 – GENERAL REQUIREMENTS FOR A LARGE AND/OR COMPLEX PROJECT

1.13 Regulatory Requirements - See Supplementary Conditions for articles, if such articles are included, detailing additional requirements of U.S. Government Agencies providing financial assistance to the project or any State Agency labor requirements.

1.14 Mobilization - Details for administration of the Contractor's mobilization to the project site are included elsewhere in Division 01 of the Contract Documents.

1.15 Field Office - The Contractor is not required to provide on-site field office for the Engineer and the Resident Project Representative. If an office is required, it shall be a minimum of 10' x 10' x 8' with adequate lighting, heating, phone service, and sanitary facilities.

1.16 Adverse Weather Days

A. If requested the Contractor shall be granted time extensions for excessive adverse weather days, beyond the reasonably anticipated days of adverse weather. An adverse weather day is defined as a day when the Contractor, due to adverse weather conditions, cannot perform the normal construction operations on the critical work item for at least six hours. Adverse weather days shall also include days subsequent to an adverse weather event where, in the opinion of the Engineer or his duly designated representative, weather conditions have rendered soil conditions unworkable to the point that at least six hours of normal construction operations cannot be performed. This time extension shall be requested monthly. Should time extension for excess adverse weather not be requested in the monthly time limit as required herein, the Contractor has forfeited by default the opportunity to make a claim for excess adverse weather days. Time Extensions due to water events or natural disasters must be submitted within seven days of the event to be considered. Time shall be the only compensation for water events.

B. A certain amount of adverse weather days have been considered in setting the contract time on the project. The following are considered reasonably anticipated days of adverse weather on a monthly basis.

January	11	days	July	6	days
February	10	days	August	5	days
March	8	days	September	4	days
April	7	days	October	3	days
May	5	days	November	5	days
June	6	days	December	8	days

1.17 Project Photographs and Audio-Video Records - When required as part of the Work, requirements for project photographs and audio-video records are included elsewhere in Division 01 of the Contract Documents.

1.18 Protection of Work - Until the acceptance of the work by the Engineer as evidenced in writing, said work shall be under the charge and care of the Contractor. The Contractor shall take every necessary precaution against damages to any part thereof by the elements

or from any other cause. The Contractor shall replace, rebuild, restore, repair, and make good, at no additional expense to the Owner, all injuries or damages to any portion of the work occasioned by any of the above causes before its completion and acceptance.

1.19 Examination of Site - By submitting a bid for this project, the Contractor verifies that he has made a visit the site and has become familiar with existing conditions under which the project is to be executed. No additional allowances will be made to the Contractor for any error or negligence on his part.

1.20 Tolerances -

A. Before any material or equipment is fabricated, Contractor shall verify in the field all critical dimensions, when dimensions of existing structures or equipment are dependent as correctness of such information. Contractor shall control new construction to be dimensionally correct for the installation of the equipment that has been proposed via shop drawings. Should dimensions as shown on the drawing vary from the field, the Contractor shall notify the Engineer and jointly resolve the figure in favor of the correct dimensions.

B. All work and materials shall be within reasonably accepted manufacturing and construction tolerances as defined by the Contract Documents and the manufacturer of material and equipment. If those tolerances exceed limits, the Owner, with or without the Engineer's recommendation, may accept the work at a reduced value as allowed by the General Conditions, provided the work will not be materially affected by the change and the interests of the Owner are protected.

1.21 Material and Workmanship - Unless otherwise indicated in these specifications or drawings, all materials and equipment shall be new and free from defects. The workmanship and methods of construction utilized shall be in accordance with accepted industry practices.

1.22 Field Engineering - With the Engineer's assistance, the Contractor shall stake off the improvements and check dimensions and refer any discrepancies to the Engineer for correction. Elevations shall be established by the Contractor and then approved by the Engineer before the work proceeds.

A. Basic horizontal control points have been established or designated by the Engineer. These points shall be used as control datum for the work. All vertical control points are to be verified and certified by a registered professional land surveyor and, along with additional survey, layout, and measurement work, shall be performed by the Contractor as a part of the Work.

B. The Contractor shall furnish all utility locating equipment, survey equipment, stakes and personnel, including competent, suitably qualified instrument men, rodmen, and chainmen for laying out the work and for measuring the work from boundary, baseline, and established benchmark reference points furnished by the Owner and Engineer.

C. Cut sheets, where required for lines laid to grade, especially for those items to be paid for by various increments of depth, will be prepared from surveys developed by the Contractor and submitted to the Engineer for review and approval.

D. The Contractor shall keep the Engineer informed, a reasonable time in advance, of the times and places which he wishes to do work so that horizontal and vertical control points may be established and any checking deemed necessary by the Engineer may be done with minimum inconvenience to the Engineer and minimum delay to the Contractor.

E. The Contractor shall remove and reconstruct work which is improperly located.

1.23 Temporary Facilities -

A. Regulations - The Contractor shall comply with governing regulations and recommendations for temporary facilities, including (but not necessarily limited to) code compliance, permits, inspections, testing and health and safety compliance.

B. The Contractor shall provide and maintain in a neat, sanitary condition, such accommodations for the use of his employees, including portable toilets, as may be necessary to comply with the requirements and regulations of the State Department of Health in the State in which the work is being done or of other authorities having jurisdiction. He shall commit no public nuisance.

C. Temporary Utilities:

1. Temporary fuel, power, and telephone will be paid by the Contractor. Water for testing pipe will be provided by the Contractor.
2. Removal - When need for a temporary utility has terminated, the Contractor shall promptly remove such service unless requested by the Engineer to retain it for a longer period. Upon removal of temporary service, the Contractor shall leave the job site clean and level.

1.24 Measurement and Payment -

A. Measurement - See appropriate Measurement and Payment Section in Division 01 of the Contract Documents for the method of measurement and basis of payment. Measurement of unit price items will generally be by the standard inch-pounds system of units commonly used in the United States which are defined by the U.S. National Bureau of Standards.

B. Application for Payment - Application for payment by the Contractor shall be submitted on the form provided in the Contract Documents. For both unit price and lump sum contracts, an updated progress form indicating varying degrees of work completed shall accompany the Application for Payment. The frequency of progress payment submittals shall be jointly agreed to by the Owner and Contractor; however, if no agreement is made in writing to the Engineer then progress payment will be processed on a once-a-month

basis preferably at the beginning of each month. Five (5) copies of the Application for Payment and the updated progress schedule shall be submitted to the Engineer.

1. In order to expedite the progress payment, the Contractor field foreman and the Resident Project Representative should review the quantities of work together prior to submitting the Application for Payment, including reduction in quantities of stored materials on which advance payment has been made.
2. Upon receipt of the Application for Payment, the Engineer will review the work completed and prepare the Engineer's recommendation for payment transmittal letter for submission to the Owner.
3. Based on the unit price or an approved schedule of values, partial payment will be made for only that percentage of work completed and in place. Portions of unit price or lump sum contracts will be withheld until the entire item is completed. Cost of material and equipment on hand may be included in the estimate by inclusion of a list showing quantities, unit prices, and total costs for each item of material property stored at the site.
4. Insurance coverage, secure storage, and protection of the Owner's interest are also required for payment of material or equipment not incorporated into the Work. Material invoices shall be submitted for all materials in which payment is requested. Partial payment shall in no way be taken as an acceptance of the equipment involved, or as a release from the responsibility of any portion thereof. Payment of pipe items shall be divided into phases of work so that the total unit price is broken down for payment of 85% for the installation, 5% for the testing and 10% for the clean-up, including fertilizer and seeding/sodding, when no separate pay item is provided for this work. The Application for Payment shall show the above breakdown, listing the unit price for each phase of the work by multiplying the total unit price by the above percentage values. Values resulting in fractions less than one one-hundredth of a dollar shall be rounded to the next lowest one one-hundredth of a dollar for the installation and testing phases and the remaining portion of the unit price shall be entered for the unit price of the cleanup phase.
5. All excess material inventory at the completion of the project shall revert back or remain the property of the Contractor. The Owner at the completion of the project will pay for only that material that was actually incorporated into the project. No payment will be made for excess material inventory stored on the project that will not be utilized or eventually incorporated into the project.

C. Partial or Progress Payments - Partial or progress payments will be made for only that portion of the Work completed and in place based on unit priced items or an approved schedule of values as described in the General Conditions for lump sum priced items. Less than full payment for an item and only proportional payments will be made prior to completion of all work components of the item, such as testing, clean up and equipment start-up.

1. If the Owner has secured Federal or State Funds from which he is required to make payments to the Contractor, extend periods of payment processing may be required.

Refer to Supplementary Conditions for period of payment processing by Engineer, Owner, and funding agency.

2. All work for the previous month shall be summarized for the 25th day of each month and submitted to the Engineer on or about the first of each month.

1.25 Final Payment - Final payment will be made in accordance with the section of the specifications entitled "Contract Closeout."

1.26 Change Order Procedures - See General and Supplemental Conditions.

PART - II PRODUCTS (NOT USED)

PART - III EXECUTION (NOT USED)

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01030 - SPECIAL PROJECT REQUIREMENTS

PART - I GENERAL

1.01 SEQUENCE OF CONSTRUCTION

A. The Contractor shall follow the Sequence of Construction listed in the Plans for this project.

B. The Contractor shall take note that there are a number of exploratory items necessary at the beginning of the project that will affect the overall scope of the project. Thus, these exploratory excavations must be carried out in order to confirm various line locations and piping sizes.

1.02 PROTECTION AND RESTORATION FOR WORK AFFECTING PRIVATE PROPERTY

A. The Contractor shall conduct his operations so as to disturb the least amount of vegetation and improvements adjacent to the construction work that is required on or adjacent to private property.

B. The Contractor shall ensure that all fusing activities for HDD drills do not block ingress/egress along commercial and residential driveways if at all possible. Should any blockage be absolutely necessary for piping installations, the Contractor must give at least 72 hours of advance notice to business owners and residents so that they can make proper preparations for activities.

C. The Contractor must proceed with directional drills immediately upon completion of fusing to minimize length of disturbances to individual property owners and businesses. Within one week of completion of HDD drills, the Contractor must return to such sites to clean and dress the private property to finished grade matching the terrain adjacent to the Work and install fertilizer and seed to restore vegetative cover. Should weather conditions prevent the cleaning and dressing operations within the specified time limit, the cleaning and dressing operations shall be performed as soon as weather conditions permit.

1.03 REMOVE AND REPLACE PAVEMENT

The intent of these specifications is to install the Work in locations where the least amount of pavement will be disturbed. When necessary, existing pavement shall be removed and replaced to the minimum extent necessary to perform the required installation work. Pavement shall be replaced as soon as possible after completion of the force main on each street.

1.04 RESTORE AGGREGATE DRIVE

Requirements for replacement of aggregate drives shall be performed as soon as the construction work affecting the drive is complete. Aggregate drives shall be restored within one day of the completion of the installation of force mains and shall be

maintained with additional aggregate. The Contractor shall make weekly inspections to ascertain the condition of aggregate drives and shall have forces and materials available to make any repairs that ate needed.

PART - II PRODUCTS – NOT USED

PART - III EXECUTION – NOT USED

3.01 INCIDENTAL REQUIREMENTS

A. Domestic limestone only will be allowed for aggregate surface course (shoulder & drives) or base course. Porous limestone shall not be used on this project for aggregate surface courses.

B. Whenever Portland cement concrete is required, mix designs including Fly Ash added at the mixing plant will not be acceptable; however, factory blended pozzolan cements meeting LADOTD requirements will be allowed.

C. No fuel or asphalt adjustments – there shall be no adjustments for the prices or costs of any fuel, diesel, asphalt, asphalt cement, or asphalt products on this project, arising out of the work on this project/contract or arising out of this contract. Further, the Contractor hereby waives any price adjustment for fuel or asphalt or the ability or right to request any price adjustment for fuel or asphalt. Particularly, the LA DOTD provisions (or any such or similar provisions by a third party) pertaining to or related to fuel or asphalt adjustments are not part of this Contract, are not incorporated by reference or otherwise in this Contract, and shall not apply in any form or fashion to the contract.

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01033 – SPECIAL PROJECT PROCEDURES

PART - I GENERAL

1.01 DESCRIPTION

This section describes special procedures for alterations, preservation, security, hazardous material, and other types of projects demanding unique procedures.

1.02 INSTALLATION OF EQUIPMENT

A. Special care shall be taken to ensure proper alignment of all equipment with particular reference to mechanical equipment such as pumps and electric drives. The units shall be carefully aligned on their foundations by qualified millwrights and their base plates shimmed to correct elevation and alignment at the anchor bolts. The anchor bolts shall be set in place and the nuts tightened against the shims. The alignment of equipment shall be further checked after securing to the foundations, and, after confirmation of all alignments, the base plates shall be finally grouted in place. The Contractor shall be responsible for the exact alignment of equipment with associated piping, and under no circumstances will "pipe springing" be allowed to force the fit between the equipment and the pipe.

B. All wedges, shims, filling pieces, keys, packing, grout, and other materials necessary to properly align, level, and secure equipment in place shall be furnished by the Contractor at no additional cost to the Owner. All parts intended to be plumb or level must be proven so.

1.03 SLEEVES, OPENINGS, AND ANCHORS

A. The Contractor shall provide all openings, channels, chases, etc., and install anchor bolts and other items to be embedded in concrete as required to complete the work under this Contract, together with those required by subcontractors, and shall do all cutting and patching, except cutting and patching of materials of a specified trade and as stated otherwise in the following paragraph.

B. The Contractor shall coordinate with equipment suppliers and subcontractors to provide all sleeves, inserts, hangers, anchor bolts, etc. of the proper size and material for the execution of the work. The Contractor shall be responsible for any corrective cutting and refinishing required to make necessary openings, chases, etc. In no case shall beams, lintels or other structural members be cut without the written approval of the Engineer.

1.04 PROVISIONS FOR CONTROL OF EROSION AND POLLUTANTS

A. Sufficient precautions shall be taken during construction to minimize the runoff of polluting substances such as silt, clay, fuels, oils, bitumens, calcium chloride, or other materials harmful to humans, fish, or other life, into the ground and surface waters of the state. Control measures must be adequate to assure that turbidity in the receiving waters will not be increased more than 10 nephelometric turbidity units (NTU), or as otherwise

required by the state or other controlling agency, in water used for public water supply or fishing unless limits have been established for the particular water. In surface water used for other purposes, the turbidity must not exceed 25 NTU unless otherwise required by the state or other controlling agency. Special precautions shall be taken in the use of construction equipment to prevent operations which promote erosion.

B. The State of Louisiana has a general storm water discharge permit and requiremnts for an individual storm water permit for discharges from construction activities depending on the size of the disturbed area as discussed in the following paragraphs.

1. It should be noted that a Stormwater Pollution Prevention Plan is required for each site on the project and an aggregate of the disturbed area of all sites on a project determines qualification as being under the General Permit or requiring an Individual Permit. Compliance for control of construction activities storm water discharges is the sole responsibility of the Contractor and any permit fees, preparation of Stormwater Pollution Prevention Plans, and/or penalties for non-compliance shall be paid by the Contractor at no additional cost to the Owner.
2. It should be noted that the State of Louisiana General Permit Number LAR200000 governs storm water discharges from small construction projects that are equal to or greater than One Acre but are less than Five Acres. Contractors are not required to file a Notice of Intent under this permit, but shall conform to the requirements of the permit. The General Permit can be downloaded from the Louisiana Department of Environmental Quality's (LaDEQ) web site under the LPDES General Permits link at:

   www.deq.louisiana.gov/portals/DIVISIONS/WaterPermits/LPDESPermits.aspx

3. Projects that disturb an area equal to or greater than Five Acres will require submitting a joint Notice of Intent (NOI) to LaDEQ naming both the Contractor and the Owner. The NOI form can be found on LaDEQ's web site under the LPDES Permit Application Forms link at:

   www.deq.louisiana.gov/portals/DIVISIONS/WaterPermits/LPDESPermits.aspx

1.05 ROADSIDE CULVERTS AND STRUCTURES

Should the scope or location of the Work require the removal of roadside culverts and/or structures (i.e., bridges, pipes), their removal and relaying or replacement shall be included in the cost of the various other pay items at no additional cost to the Owner. Relaying roadside pipe culverts, replacing broken pipe, setting driveway bridges, or replacing bridges shall be equal to or better than that which existed before the work. Replacements of broken pipe or bridges may be with used materials that are acceptable to the Owner.

1.06 PROTECTION OF WORK

Until the acceptance of the work by the Engineer as evidenced in writing, said work shall be under the charge and care of the Contractor. The Contractor shall take every

necessary precaution against damages to any part thereof by the elements or from any other cause. The Contractor shall rebuild, restore, repair, and make good, at no additional cost to the Owner, all losses, injuries or damages to any portion of the work occasioned by any cause before its completion and acceptance. Loss, injury or damage to material stored in an Owner's facility shall in no wise limit the Contractor's responsibility as stated herein.

1.07 INCLEMENT WEATHER PREPAREDNESS PLAN

A. Within thirty (30) days of the date of Notice to Proceed, the Contractor shall submit to the Engineer an Inclement Weather Preparedness Plan. The plan shall outline the necessary measures which the Contractor will perform in case of the occurrence of storm conditions and/or hurricanes.

B. In the event of inclement weather, or whenever Engineer shall direct, Contractor and Subcontractors will carefully protect the Work and materials against damage or injury from the weather, including sudden rises in storm water and/or sewer flows due to storms outside the immediate construction zones. Damaged Work and materials shall be removed and replaced at no additional cost to the Owner. If, in the opinion of the Engineer, any portion of Work or materials shall have been damaged or injured by reason of failure on the part of the Contractor or Subcontractors to so protect the Work, no additional contract time for removal and replacement will be given by the Owner.

1.08 WATERTIGHTNESS

A. Special precautions shall be taken in the curing of concrete to reduce concrete cracking as called for in Division 03 of the Contract Documents. Each water-retaining structure (those which are intended to hold a liquid) shall be filled and tested for leaks by the Contractor with clean water prior to surface coating or painting. Leaks shall be repaired by the Contractor. The procedure and manner in which leaks are repaired shall meet the approval of the Engineer. All costs associated with the testing and repair of leaks shall be at no additional expense to the Owner. Prior to the beginning of the leakage test, the structure shall be filled to the highest working water level (to grade level in pump stations) and allowed to stand for a period of 24 hours to allow for absorption.

B. Leakage limitations shall be as follows:

1. All water visibly flowing through a concrete wall shall constitute a leak and shall be repaired by pumping and sealing the crack with a two-part water intensive epoxy.
2. Damp areas not exceeding one percent of the total wall wetted area and not having visible seepage shall be conditionally acceptable subject to all said dampness being eliminated by application of the water side surface treatment as may be specified. In the absence of a specified water side surface treatment or where said treatment does not eliminate wall dampness, the water side of the wall shall be prepared in accordance with the manufacturer's instructions for application of an approved epoxy concrete surface coating.
3. All leakage testing shall be performed prior to tank backfill.

4. To check for leakage through the tank bottoms, the fall in surface water level during tank testing shall be measured and shall not exceed 0.5 inch in a 24 hour period, providing allowance for evaporation at a rate approved by the Engineer. Visual leaks, either flowing or damp areas, observed during the filling, absorption, or test periods shall be marked and locations recorded and repaired.

1.09 SALVAGE

The Owner may desire to salvage certain items of existing equipment which are to be dismantled and removed during the course of construction. Prior to removal of any existing equipment from the site of the work, the Contractor shall ascertain from the Engineer whether or not the particular item or items are to be salvaged. Items to be salvaged shall be stockpiled on site or transported to a location as determined by the Owner. All other items of equipment shall be disposed of off-site by the Contractor at no additional expense to the Owner.

1.10 PUBLIC NUISANCE

A. The Contractor shall not create a public nuisance, including, but not limited to, encroachment on adjacent lands, flooding of adjacent lands, or excessive noise.

B. Sound levels from Contractor operations shall not exceed 45 dBA 7 P.M. to 7 A.M. or 55 dBA 7 A.M. to 7 P.M. This sound level shall be measured at the exterior of the nearest exterior wall of the nearest residence. Levels at operating equipment shall not exceed 85 dBA at the equipment at any time. Sound levels in excess of these values are sufficient cause to have the work halted until equipment can be quieted to these levels. If requirements of a local noise ordinance are more restrictive than the above limits, then the Ordinance shall have precedence over the above requirements. Work stoppage by the Engineer for excessive noise shall not relieve the Contractor of any obligations under the Contract, including, but not limited to, performance of the work at the contract time and contract price.

C. No extra payment will be made for time lost due to work stoppage resulting from the creation of a public nuisance.

1.11 UNFAVORABLE CONSTRUCTION CONDITIONS

A. The Contractor shall confine his operations to Work which will not be affected adversely by unfavorable weather, wet ground, or other unsuitable construction conditions. No portion of the work shall proceed under conditions which would adversely affect the quality or efficiency of the work, unless suitable special precautions or countermeasures are taken by the Contractor.

B. During suspension of the work from any cause, the work shall be suitably covered and protected so as to preserve it from injury by the weather.

C. If the Contractor's work may be damaged or rendered inferior by unfavorable weather conditions, the Engineer may issue an order to suspend work. Compensation for additional Contract Time under other sections of this Specification will be awarded for suspended work as a result of unfavorable weather conditions and shall be the sole remedy for such delays. The authority of the Engineer to issue such an order shall not be interpreted as a requirement to do so.

D. Any work constructed during unfavorable weather conditions and found to be damaged or of inferior quality shall be removed and replaced at no additional costs to the Owner or Engineer.

1.12 RELOCATIONS

The Contractor shall be responsible for the relocation of structures, including but not limited to, light poles, signs, sign poles, fences, piping, conduits and drains that interfere with the positioning of the work as set out on the Drawings. The cost of all such relocations shall be included in the costs of work.

1.13 SUBSURFACE AND SURFACE OBSTRUCTIONS

In the event unforeseen subsurface or surface obstructions occur in the progression of work, the Contractor shall confer with the Engineer and obtain his written consent before undertaking any deviations from the plans. At the direction of the Engineer, the Contractor may be permitted to temporarily suspend construction in the obstruction area; however, the Contractor shall make no claim for damage by this delay other than an adjustment to Contract Time.

1.14 PUMPING

A. The Contractor shall provide necessary equipment to perform all pumping necessary to prevent flotation of any part of the structures during construction operations.

B. The Contractor shall, for the duration of the contract and with his own or rented equipment, pump out water and wastewater which may seep or leak into the excavations or structures at the work sites which shall be kept "in-the-dry," as defined in the Division 02 specification stating requirements for backfilling and compaction, at all times.

1.15 HAZARDOUS LOCATIONS

A. The existing wet wells, manholes, sewers, force mains, pipes, and other related areas are hazardous locations in that explosive and/or toxic concentrations of sewage gas may be present. The Contractor is cautioned that these areas, especially the wet well, may be deficient in oxygen. Checks shall be made by the Contractor whenever personnel are working in these areas to insure that adequate ventilation has been provided.

B. In his operations in hazardous locations, the Contractor shall use spark-proof tools and explosion-proof temporary lighting and shall not use electric power tools, open flame

devices, electric welding or any device or methods which might conceivably cause ignition or explosion.

C. If a working area atmosphere is unsafe, the Contractor shall furnish, install, operate, and later remove such temporary auxiliary ventilating facilities as are necessary to provide a safe atmosphere.

D. The Contractor shall also instruct and caution his employees and the employees of his subcontractors to avoid smoking while in the hazardous areas. Suitable prominent "No Smoking" signs shall be placed at locations where sewage gas could be present.

1.16 OPERATING REQUIREMENTS FOR EXISTING PUMPING AND COLLECTION SYSTEMS

During construction of the new facilities and rehabilitation of existing facilities the Owner's operators will be responsible for operating and maintaining the existing pumping and collection system. The Contractor shall provide access to Owner at all times and not interfere with normal operation and maintenance of existing facilities.

1.17 NOTIFICATION OF WORK ON EXISTING FACILITIES

Before commencing work on any of the existing structures or equipment, the Contractor shall notify the Engineer in writing at least ten (10) calendar days in advance of the date he proposes to commence such work.

PART - II PRODUCTS - NOT USED

PART - III EXECUTION - NOT USED

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01035 - PROCEDURES FOR MODIFICATION OF THE CONTRACT

PART - I GENERAL

1.01 REQUIREMENTS

A. Refer to Articles 10, 11 and 12 of the General Conditions with regards to submitting claims and changes in Contract Price and Contract Time.

B. Promptly implement Change Order procedures.

1. Provide full written data required to evaluate changes.
2. Maintain detailed records of work done on a time and material/force account basis.
3. Provide full documentation to Engineer on request.

C. Designate in writing the member of Contractor's organization:

1. Person that is authorized to accept changes in the work.
2. Person that is responsible for informing others in the Contractor's employ of the authorization of changes in the work.

D. Owner will designate in writing the person who is authorized to execute Change Orders.

1.02 DOCUMENTATION

A. Contractor may initiate a change by submitting a written notice to the Engineer containing:

1. Description of the proposed change.
2. Statement of the reason for making the change.
3. Statement of the effect on the Contract Price and the Contract Time.
4. Statement of the effect on the work of other Contractors.
5. Documentation supporting any change in Contract Price or Contract Time as appropriate and adequate for proper review by the Engineer.

B. If not required by any U.S. Government Agencies, Change Order shall be on the form provided in the Contract Documents. Notification of the intent to submit a claim for changed conditions and the subsequent Change Order request shall be presented within the time limits and in the detail as required by the General Conditions.

1.03 CONSTRUCTION CHANGE AUTHORIZATION

A. Change Orders will describe changes in the Work, both additions and deletions, with attachments of revised Contract Documents, as necessary, to define details of the change and will designate the method of determining any change in the Contract Sum and Contract Time.

B. Change orders must have the Owner's and Contractor's approvals. Change orders on projects funded in whole or in part by loans or grants from agencies of the U.S.

Government must be approved by the respective agency prior to their incorporation into the Project.

1.04 DOCUMENTATION OF PROPOSALS AND CLAIMS

A. Contractor shall support proposed lump sum proposal pricing and each unit price which has not previously been established with sufficient substantiating data to allow the Engineer to evaluate the pricing.

B. Contractor shall provide the following data to support proposed time and pricing of lump sum proposals, unit pricing, and time and material proposals:

1. Labor required.
2. Equipment required.
3. Materials required.
   a. Recommended source of purchase and unit cost.
   b. Quantities required.
4. Taxes, insurance and bonds.
5. Credit for work deleted from Contract, similarly documented.
6. Contractor's and Subcontractors' fees (Note: Per the General Conditions, Taxes, among other excluded costs, cannot be applied in the calculation of the Contractor's fee.)
7. Justification for any change in Contract Time.

C. In addition, Contractor shall support each claim for work done on a time and material/force account basis with the following additional information:

1. Dates and times work was performed and by whom.
2. Time record, summary of hours actually worked on the time and material/force account, and hourly rates paid.
3. Receipts and invoices for:
   a. Equipment used, listing dates and times of use.
   b. Products used, listing quantities purchased.
   c. Subcontractors used, showing the same data as above.

1.05 PREPARATION OF CHANGE ORDERS

A. Engineer will prepare each Change Order.

B. Change Order will describe changes in the work, both additions and deletions, with attachments of revised Contract Documents to define details of the change.

C. Change Order will provide an accounting of the adjustment in the Contract Price and in the Contract Time.

SECTION 01035 - PROCEDURES FOR MODIFICATION OF THE CONTRACT

1.06 LUMP SUM/FIXED PRICE CHANGE ORDER

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

B. Once Engineer has completed and signed the form, all copies will be sent to Contractor for execution. The Contractor shall execute the change order documents and return it to the Engineer within seven (7) days. After execution by Contractor, all copies will be sent to the Owner for execution. Engineer will make distribution of executed copies.

1.07 UNIT PRICE CHANGE ORDERS

A. Content of Change Orders will be based on either:

1. Engineer's definition of the scope of the required changes.
2. Contractor's proposal for a change, as recommended by Engineer.
3. Survey of complete work.

B. The amounts of the unit prices to be:

1. Those stated in the Contract Bid Form.
2. Those mutually agreed upon between Owner and Contractor.

1.08 CORRELATION WITH CONTRACTOR'S SUBMITTALS

A. Contractor shall revise the Schedule of Values and Application for Payment forms to record each Change Order as a separate item of work and to record the adjusted Contract Price.

B. Contractor shall revise the Construction Schedule to reflect each change in Contract Time, to include sub-schedules to show changes for other items of work affected by the changes.

C. Upon completion of work under a Change Order, the Contractor shall enter pertinent changes in Record Documents.

1.09 PROCEEDINGS WHEN CONTRACTOR DOES NOT EXECUTE THE CHANGE ORDER

It is anticipated that at the time of Change Order submittal to the Contractor, negotiations will have been completed with all parties agreeing to the change(s) in the work, change in Contract Price, and change in Contract Time. In the event that no agreement can be reached and the Contractor fails to execute the Change Order within the specified time limit, the Owner may issue a Change Order without signature of the Contractor establishing a change to Contract Price or Contract Time in accordance with the provisions of Article 10 of the General Conditions. The Contractor will then be paid or

assessed time on the basis of the Change Order for the change in work with the Contractor not relinquishing his rights to submit a claim in accordance with Article 12 of the General Conditions.

PART - II PRODUCTS - NOT USED

PART - III EXECUTION - NOT USED

END OF SECTION

SECTION 01091 - REFERENCE STANDARDS

PART - I GENERAL

1.01 UNIT OF MEASURE

The standard units of measure shall be the inch-pound as defined by the U.S. National Bureau of Standards. Metric conversion shall be in accordance with ASTM E380.

1.02 STANDARD STATUS

A. All Standards referred to shall be current with latest addenda and supplements as of the date of the Contract Documents.

B. All work shall comply with all governing building and safety laws, ordinances and regulations relating to building and public health and safety laws having jurisdiction.

1.03 REFERENCE MATERIAL

All reference material utilized in the formation of these specifications can be obtained from local libraries or from the Engineer at the costs of reproduction.

1.04 The following standards are referenced in the Contract Documents. The Contractor shall obtain copies of reference standards directly from the publication source when needed for proper performance of Work or when required for submittal by Contract Documents.

AA Aluminum Association
1525 Wilson Blvd.
Arlington, VA 22209 Phone: 703.358.2960
www.aluminum.org

AABC Associated Air Balance Council
1518 K Street NW
Washington, DC 20005 Phone: 202.737.0202
www.aabc.com

AAMA American Architectural Manufacturer's Association
1827 Walden Office Square, Suite 550
Schaumburg, IL 60173.4268 Phone: 847.303.5664
www.aamanet.org

ACA American Coatings Association
(Merger of NPCA - National Paint and Coatings Association and FSCT - Federation of Societies for Coatings Technologies)
1500 Rhode Island Ave. NW
Washington, DC 20005 Phone: 202.462.6272
www.paint.org

SECTION 01091 - REFERENCE STANDARDS

ANLA	American Nursery and Landscape Association 1200 G Street NW Washington, DC 20005 www.anla.org	Phone: 202.789.2900
AASHTO	American Association of State Highway and Transportation Officials 444 North Capitol Street NW, Suite 249 Washington, DC 20001 www.aashto.org	Phone: 202.624.5800
AATCC	American Association of Textile Chemists and Colorists P.O. Box 12215 Research Triangle Park, NC 27709.2215 www.aatcc.org	Phone: 919.549.8141
ACI	American Concrete Institute 38800 Country Club Dr. Farmington Hills, MI 48331 www.concrete.org	Phone: 248.848.3700
ACIL	American Council of Independent Laboratories 1725 K Street NW Washington, DC 20006 www.acil.org	Phone: 202.887.5872
ACPA	American Concrete Pavement Association 9450 Bryn Mawr, Suite 150 Rosemont, IL 60018 www,pavement.com	Phone: 847.966.2272
ACPA	American Concrete Pipe Association 8445 Freeport Parkway, Suite 350 Irving, TX 75063.2595 www.concrete.pipe.org	Phone: 972.506.7682
ADC	Air Diffusion Council 1901 Roselle Road, Suite 800 Schaumburg, IL 60195 www.flexibleduct.org	Phone: 847.706.6750
AF&PA	American Forest and Paper Association 1111 Nineteenth Street NW, Suite 800 Washington, DC 20036 www.afandpa.org	Phone: 800.878.8878

SECTION 01091 - REFERENCE STANDARDS

AGA	American Gas Association 400 North Capitol Street, NW Washington, DC 20001 www.aga.org	Phone: 202.824.7000
AGMA	American Gear Manufacturers Association 1001 N. Fairfax Street Alexandria, VA 22314.1587 www.agma.org	Phone: 703.648.0211
AHA	American Hardboard Association 1210 West Northwest Highway Palatine, IL 60067 www.domensino.com/aha	Phone: 847.934.8800
AHRI	Air Conditioning Heating and Refrigeration Institute 2111 Wilson Blvd., Suite 500 Arlington, VA 22201 www.ahrinet.org	Phone: 703.562.1942
AI	Asphalt Institute 2692 Research Park Drive Lexington, KY 40511.8480 www.asphaltinstitute.org	Phone: 859.288.4960
AIA	American Institute of Architects 1735 New York Ave. NW Washington, DC 20006.5292 www.aia.org	Phone: 202.626.7300
A.I.A.	American Insurance Association 2101 L Street, NW Suite 400 Washington, DC 20037 www.aiadc.org	Phone: 202.828.7100
AIHA	American Industrial Hygiene Association 2700 Prosperity Avenue, Suite 250 Fairfax, VA 22031 www.aiha.org	Phone: 703.849.8888
AISC	American Institute of Steel Construction One East Wacker Drive, Suite 700 Chicago, IL 60601.1802 www.aisc.org	Phone: 312.670.2400

SECTION 01091 - REFERENCE STANDARDS

AISI	American Iron and Steel Institute 1140 Connecticut Ave. NW, Suite 705 Washington, DC 20036 www.steel.org	Phone: 202.452.7100
AITC	American Institute of Timber Construction 7012 Revere Parkway, Suite 140 Centennial, CO 80112 www.aitc.glulam.org	Phone: 303.792.9559
ALI	Associated Laboratories (Address & Phone not verified) Eight Brush Street Pontiac, MI 48053 www.associatedlabs.org	Phone: 313.335.6114
ALSC	American Lumber Standards Committee P.O. Box 210 Germantown, MD 20875.0210 www.alsc.org	Phone: 301.972.1700
AMCA	Air Movement and Control Association 30 W. University Drive Arlington Heights, IL 60004 www.amca.org	Phone: 847.394.0150
ANSI	American National Standards Institute 1899 L Street NW, 11th Floor Washington, DC 20036 www.ansi.org	Phone: 202.293.8020
APA	American Plywood Association 7011 S. 19th Street Tacoma, WA 98466.5333 www.apawood.org	Phone: 253.565.6600
API	American Petroleum Institute 1220 L Street NW Washington, DC 20005.4070 www.api.org	Phone: 202.682.8000
AREMA	American Railway Engineering and Maintenance-of-Way Association 4501 Forbes Blvd., Suite 130 Lanham, Maryland 20706 www.arema.org	Phone: 301.459.3200

SECTION 01091 - REFERENCE STANDARDS

ARMA	Asphalt Roofing Manufacturers Association 750 National Press Building 529 14th Street NW Washington, DC 20045 www.asphaltroofing.org	Phone: 202.207.0917
ASA	Acoustical Society of America Suite 1NO1 2 Huntington Quadrangle Melville, NY 11747.4502 www.acousticalsociety.org	Phone: 516.576.2360
ASC	Adhesive and Sealant Council 7101 Wisconsin Avenue, Suite 990 Bethesda, MD 20814 www.ascouncil.org	Phone: 301.986.9700
ASCE	American Society of Civil Engineers 1801 Alexander Bell Drive Reston, VA 20191 www.asce.org	Phone: 800.548.2723
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers 1791 Tullie Circle NE Atlanta, GA 30329 www.ashrae.org	Phone: 404.636.8400
ASME	American Society of Mechanical Engineers Three Park Avenue New York, NY 10016.5990 www.asme.org	Phone: 800.843.2763
ASPE	American Society of Plumbing Engineers 2980 S River Road Des Plains, IL 60018 www.aspe.org	Phone: 847.296.0002
ASSE	American Society of Sanitary Engineering 901 Canterbury, Suite A Westlake, OH 44145 www.asse-plumbing.org	Phone: 440.835.3488

SECTION 01091 - REFERENCE STANDARDS

ASTM	ASTM International 100 Barr Harbor Drive West Conshohocken, PA 19428.2959 www.astm.org	Phone: 610.832.9500
ATIS	Alliance for Telecommunications Industry Solutions (formerly Exchange Carriers Standards Association) 1200 G Street NW, Suite 500 Washington, DC 20005 www.atis.org	Phone: 202.628.6830
AWI	Architectural Woodwork Institute 46179 Westlake Drive, Suite 120 Potomac Falls, VA 20165 www.awinet.org	Phone: 571.323.3630
AWPA	American Wood Protection Association P.O.Box 361784 Birmingham, AL 35236-1784 www.awpa.com	Phone: 205.733.4077
AWS	American Welding Society 550 N.W. Le Jeune Road Miami, FL 33126 www.awsnow.org	Phone: 800.443.9353
AWWA	American Water Works Association 6666 W. Quincy Ave. Denver, CO 80235 www.awwa.org	Phone: 303.794.7711
BHMA	Builders' Hardware Manufacturers Association 355 Lexington Avenue, 15th Floor New York, NY 10017 www.buildershardware.com	Phone: 212.297.2122
BIA	Brick Industry Association 1850 Centennial Park Drive Reston, VA 20191 www.gobrick.com	Phone: 703.620.0010
BIFMA	Business and Institutional Furniture Manufacturers Association 678 Front Avenue NW, Suite 150 Grand Rapids, MI 49504-5368 www.bifma.org	Phone: 616.285.3963

SECTION 01091 - REFERENCE STANDARDS

CAUS	Color Association of the United States 33 Whitehall Street, Suite M3 New York, NY 10004 www.colorassociation.com	Phone: 212.947.7774
CAGI	Compressed Air and Gas Institute 1300 Summer Avenue Cleveland, OH 44115 www.cagi.org	Phone: 216.241.7333
CBM	Certified Ballast Manufacturers Association Hanna Building, Suite 772 1422 Euclid Avenue Cleveland, OH 44115 (no web site)	Phone: 216/241.0711
CDA	Copper Development Association 260 Madison Avenue New York, NY 10016 www.copper.org	Phone: 212.251.7200
CGA	Compressed Gas Association 14501 George Carter Way, Suite 103 Chantilly, VA 20151 www.cganet.com	Phone: 703.788.2700
CISPI	Cast Iron Soil Pipe Institute 1064 Delaware Avenue SE Atlanta, GA 30316 www.cispi.org	Phone: 404.622.0073
CLFMI	Chain Link Fence Manufacturers Institute 10015 Old Columbia Road, Suite B-215 Columbia, MD 21046 (no web site)	Phone: 410.290.6267
CRI	Carpet and Rug Institute Box 2048 Dalton, GA 30720-2048 www.carpet-rug.org	Phone: 706.278.3176
CRSI	Concrete Reinforcing Steel Institute 933 North Plum Grove Road Schaumburg, IL 60173-4758 www.crsi.org	Phone: 847.517.1200

SECTION 01091 - REFERENCE STANDARDS

CTI	Ceramic Tile Institute of America 12061 Jefferson Blvd. Culver City, CA 90230-6219 www.ctioa.org	Phone: 310.574.7800
DHI	Door and Hardware Institute 14150 Newbrook Drive Chantilly, VA 20151 www.dhi.org	Phone: 703.222.2010
DIPRA	Ductile Iron Pipe Research Association 245 Rivercase Parkway East, Suite 0 Birmingham, AL 35244 www.dipra.org	Phone: 205.402.8700
FCI	Fluid Controls Institute 1300 Summer Avenue Cleveland, OH 44115 www.fluidcontrolsinstitute.org	Phone: 216.241.7333
GANA	Glass Association of North America (consolidation of Flat Glass Marketing Association and Glass Tempering Association) 800 SW Jackson Street, Suite 1500 Topeka, KS 66612-1200 www.glasswebsite.com	Phone: 785.271.0208
FM	Factory Mutual Engineering and Research 1151 Boston Providence Turnpike Norwood, MA 02062 www.fmglobal.com	Phone: 781.762.4300
GA	Gypsum Association 6525 Belcrest Road, Suite 480 Hyattsville, MD 20782 www.gypsum.org	Phone: 301.277.8686
HEI	Heat Exchange Institute 1300 Summer Avenue Cleveland, OH 44115-2851 www.heatexchange.org	Phone: 216.241.7333
HI	Hydraulic Institute 6 Campus Drive Parsnippany, NJ 07054-4406 www.pumps.org	Phone: 973.267.9700

SECTION 01091 - REFERENCE STANDARDS

HMA	Hardwood Manufacturers Association 665 Rodi Road, Suite 305 Pittsburg, PA 15235 www.hmamembers.org	Phone: 412.224.0440
ICEA	Insulated Cable Engineers Association, Inc. P.O. Box 1568 Carrolton, GA 30112 www.icea.net	
IEC	International Electrotechnical Commission 446 Main Street Worchester, MA 01608 www.iec.ch	Phone: 508.755.5663
IEEE	Institute of Electrical and Electronic Engineers 445 Hoes Lane Piscataway, NJ 08854-4141 www.ieee.org	Phone: 732.981.0060
IES	Illuminating Engineering Society 120 Wall Street, Floor 17 New York, NY 10005-4001 www.iesna.org	Phone: 212.248.5000
IGCC	Insulating Glass Certification Council P.O. Box 730 Sackets Harbor, NY 13685 www.igcc.org	Phone: 315.646.2234
ILI	Indiana Limestone Institute of America 1502 I Street, Suite 400 Bedford, IN 47421 www.iliai.com	Phone: 812.275.4426
IMSA	International Municipal Signal Association P.O. Box 539 Newark, NY 14513-0539 www.imsasafety.org	
ISA	Instrument Society of America 67 Alexander Drive Reseach Triangle Park, NC 27709 www.isa.org	Phone: 919.549.8411

SECTION 01091 - REFERENCE STANDARDS

LAP	Laboratory Products Association (formerly SAMA - Scientific Apparatus Makers Association) P.O. Box 428 Fairfax, VA 22038 www.lpanet.org	Phone: 703.836.1360
LPI	Lightning Protection Institute P.O. Box 99 Maryville, MO 64468 www.lightning.org	Phone: 800.488.6864
MBMA	Metal Building Manufacturers Association 1300 Sumner Avenue Cleveland, OH 44115-2851 www.mbma.com	Phone: 216.241.7333
MCAA	Mechanical Contractors Association of America 1385 Picard Drive Rockville, MD 20850 www.mcaa.org	Phone: 301.869.5800
MFMA	Maple Flooring Manufacturers Association 111 Deer Lake Road, Suite 100 Deerfield, IL 60015 www.maplefloor.org	Phone: 888.480.9138
MIA	Marble Institute of America 28901 Clemens Rd. Cleveland, OH 44145 www.marble-institute.com	Phone: 440.250.9222
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry 127 Park Street NE Vienna, VA 22180 www.mss-hq.org	Phone: 703.281.6613
NAAMM	National Association of Architectural Metal Manufacturers 800 Roosevelt Rd. Bldg. C, Suite 312 Glen Ellyn, IL 60137 www.naamm.org	Phone: 630.942.6591

SECTION 01091 - REFERENCE STANDARDS

NAIMA North American Insulation Manufacturers Association
44 Canal Center Plaza, Suite 310
Alexandria, VA 22314 Phone: 703.684.0084
www.naima.org

NAPA National Asphalt Pavement Association
5100 Forbes Blvd.
Latham, MD 20706 Phone: 888.468.6499
www.asphaltpavement.org

NBGQA National Building Granite Quarries Association
1220 L Street NW, Suite 100-167
Washington, DC 20005 Phone: 800.557.2848
www.nbgqa.com

NCMA National Concrete Masonry Association
13750 Sunrise Valley Drive
Herndon, VA 20171-4662 Phone: 703.713.1900
www.ncma.org

NCRPM National Council on Radiation Protection and Measurement
7910 Woodmont Avenue, Suite 400
Bethesda, MD 20814-3095 Phone: 301.657.2652
www.ncrponline.org

NEC National Electric Code (by NFPA)

NECA National Electrical Contractors Association
2 Bethesda Metro Center, Suite 1100.
Bethesda, MD 20814 Phone: 301.657.3110
www.necanet.org

NEIl National Elevator Industry, Inc.
P.O. Box 838
Salem, NY 12865-3257 Phone: 518.854.3100
www.neii.org

NEMA National Electrical Manufacturers Association
1300 North 17th Street, Suite 1752
Rosslyn, VA 22209 Phone: 703.841.3200
www.nema.org

NFPA National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471 Phone: 617.770.3000
www.nfpa.org

SECTION 01091 - REFERENCE STANDARDS

NHLA National Hardwood Lumber Association
P.O. Box 34518
Memphis, TN 38184 Phone: 901.377.1818
www.nhla.com

NKCA National Kitchen Cabinet Association
P.O. Box 6830
Falls Church, VA 22046 Phone: 703.237.7580
(Note: Could not verify the address and organization does not have a web site.)

NPA National Particleboard Association
18928 Premiere Court
Gaithersburg, MD 20879-1569 Phone: 301.670.0604
(Note: Could not verify the address and organization does not have a web site.)

NRCA National Roofing Contractors Association
10255 W. Higgins Road, Suite 600
Rosemont, IL 60018-5607 Phone: 847/299.9070
www.nrca.net

NSF NSF International
P.O. Box 130140
Ann Arbor, MI 48113-0140 Phone: 800.673.6275
www.nsf.org

NSPE National Society of Professional Engineers
1420 King Street
Alexandria, VA 22314 Phone: 703.684.2800
www.nspe.org

NSSEA National School Supply and Equipment Association
8380 Colesville Road, Suite 250
Silver Spring, MD 20910 Phone: 301.495.0240
www.nssea.org

NTMA National Terrazzo and Mosaic Association, Inc.
P.O. Box 2605
Fredericksburg, TX 78624 Phone: 800.323.9736
www.ntma.com

NWFA National Wood Flooring Association
111 Chesterfield Industrial Boulevard
Chesterfield, MO 63005 Phone: 800.422.4556
www.nwfa,org

SECTION 01091 - REFERENCE STANDARDS

NWMA National Woodwork Manufacturers Association (See NWWDA)

PCA Portland Cement Association
5420 Old Orchard Road
Skokie, IL 60077 Phone: 847.966.6200
www.cement.org

PCI Precast/Prestressed Concrete Institute
200 W. Adams Street, Suite 2100
Chicago, IL 60606 Phone: 312.786.0300
www.pci.org

PDI Plumbing and Drainage Institute
800 Turnpile Street, Suite 300
North Andover, MA 01845 Phone: 978.557.0720
www.pdionline.org

PEl Porcelain Enamel Institute, Inc.
P.O. Box 90220
Norcross, GA 30010 Phone: 770.676.9366
www.porcelainenamel.com

PVCPA PVC Pipe Association
2711 LBJ Freeway, Suite 1000
Dallas, TX 75234 Phone: 972.243.3902
www.uni-bell.org

RFCI Resilient Floor Covering Institute
115 Broad Street, Suite 201
La Grange, GA 30240
www.rfci.com

RIS Redwood Inspection Service (Division of California Redwood Assn.)
818 Grayson Road, Suite 201
Pleasant Hill, CA 94523 Phone: 925.935.1499
www.redwoodinspection.com

RMA Rubber Manufacturers Association
1400 K Street NW, Suite 900
Washington, DC 20005 Phone: 202.682.4800
www.rma.org

SDI Steel Deck Institute
P.O. Box 25
Fox River Grove, IL 60021 Phone: 847.458.4647
www.sdi.org

SECTION 01091 - REFERENCE STANDARDS

S.D.I. Steel Door Institute
30200 Detroit Road
Westlake, OH 44145 Phone: 440.899.0010
www.steeldoor.org

SGCC Safety Glazing Certification Council
P.O. Box 730
Sackets Harbor, NY 13685 Phone: 315.646.2234
www.sgcc.org

SHLMA Southern Hardwood Lumber Manufacturers Assoc. (Now HMA)

SIGMA Sealed Insulating Glass Manufacturers Association
401 N Michigan Ave., Suite 2400
Chicago, IL 60601 Phone: 312.644.6610
(no web site)

SJI Steel Joist Institute
234 W. Cheves Street
Florence, SC 29501 Phone: 843.407.4091
www.steeljoist.org

SMACNA Sheet Metal and Air Conditioning Contractors National Assoc.
4201 Lafayette Center Drive
Chantilly, VA 20151-1219 Phone: 703.803.2980
www.smacna.org

SPIB Southern Pine Inspection Bureau
P.O. Box 10915
Pensacola, FL 32524-0915 Phone: 850.434.2611
www.spib.org

SPRI Single Ply Roofing Institute
411 Waverly Oaks Road, Suite 331B
Waltham, MA 02452
www.spri.org

SSPC The Society for Protective Coatings (formerly Steel Structures Painting Council)
info@sspc.org Phone: 877.281.7772
www.sspc.org

SWI Steel Window Institute
1300 Sumner Avenue
Cleveland, OH 44115-2851 Phone: 216.241.7333
www.steelwindows.com

SECTION 01091 - REFERENCE STANDARDS

TCNA	Tile Council of North America (formerly TNA – Tile Council of America) 100 Clemson Research Blvd. Anderson, SC 29625 www.tileusa.com	Phone: 864.646.8453
TPI	Truss Plate Institute 218 North Lee Street, Suite 312 Alexandria, VA 22314 www.tpinst.org	Phone: 703.683.1010
UL	Underwriters Laboratories 2600 NW Lake Road Camas, WA 98067-8542 www.ul.com	Phone: 877.854.3577
WCLIB	West Coast Lumber Inspection Bureau P.O. Box 23145 Portland, OR 97281 www.wclib.org	Phone: 503.639.0651
WDMA	Window & Door Manufacturers Association (Formerly NWWDA - National Wood Window & Door Association) 401 N. Michigan Ave., Suite 2200 Chicago, IL 60611 www.wdma.com	Phone: 312.321.6802
WRI	Wire Reinforcement Institute 942 Main Street Hartford, CT 06103 www.wirereinforcementinstitute.org	Phone: 860.240.9545
WSC	Water Systems Council 1101 30th Street NW, Suite 500 Washington, DC 20007 www.watersystemscouncil.org	Phone: 202.625.4387
WSFI	Wood and Synthetic Flooring Institute (absorbed by MFMA 1993)	
WWPA	Western Wood Products Association 522 SW Fifth Ave., Suite 500 Portland, OR 97204-2122 www.wwpa.org	Phone: 503.224.3930

SECTION 01091 - REFERENCE STANDARDS

W.W.P.A. Woven Wire Products Association
P.O. Box 610280
Birmingham, AL 35261-0280 Phone: 800.529.6691
www.wovenwire.org

1.05 Names and titles of federal government standard or specification producing agencies are frequently abbreviated. The following acronyms or abbreviations as referenced in the contract documents indicate names of standard or specification producing agencies of the federal government.

CFR Code of Federal Regulations
Available from the Government Printing Office
North Capitol Street
between G and H Streets NW
Washington, DC 20402 Phone: 202.783.3238
(Material is usually first published in the Federal Register)
www.gpoaccess.gov/cfr/

COE Corps of Engineers (US Department of the Army)
Headquarters US Army Corps of Engineers
441 G Street NW
Washington, DC 20314-1000 Phone: 202.761.0011
www.usace.army.mil

CPSC Consumer Product Safety Commission
Office of the Executive Director Phone: 301.504.0121
www.cpsc.gov

DOC Department of Commerce
www.commerce.gov

DOT Department of Transportation
1200 New Jersey Avenue SE
Washington, DC 20590 Phone: 202.366.4000
www.dot.gov

EPA Environmental Protection Agency
www.epa.gov

FAA Federal Aviation Administration
(U.S. Department of Transportation)
800 Independence Avenue SW
Washington, DC 20591 Phone: 866.835.5322
www.faa.gov

SECTION 01091 - REFERENCE STANDARDS

FCC	Federal Communications Commission 445 12th Street SW Washington, DC 20554 www.fcc.gov	Phone: 888.225.5322
FHA	Federal Housing Administration (U.S. Department of Housing and Urban Development) 451 Seventh Street SW Washington, DC 20410 www.fha.com	
FS	Federal Specification (General Services Administration) www.gsa.gov/portal/content/100847	
GSA	General Services Administration www.gsa.gov	
LADOTD	Louisiana Department of Transportation & Development 1201 Capital Access Road Baton Rouge, LA 70802 www.dotd.louisiana.gov	Phone: 225.379.1232
MIL	Military Standardization Documents www.everyspec.com	
NIST	National Institute of Standards and Technology (U.S. Department of Commerce) 100 Bureau Drive, Stop 1070 Gaithersburg, MD 20899-1070 www.nist.gov	Phone: 301.975.6478
OSHA	Occupational Safety and Health Administration (U.S. Department of Labor) 200 Constitution Ave. NW Washington, DC 20210 www.osha.gov	Phone: 800.321.6742
RUS	Rural Utility Service Electric Program (U.S. Department of Agriculture) www.usda.gov/rus/electric	
USDA	U.S. Department of Agriculture 1400 Independence Avenue SW Washington, DC 20250	Phone: 202.720.2791

SECTION 01091 - REFERENCE STANDARDS

www.usda.gov

USPS U.S. Postal Service
www.usps.com

1.06 Names and addresses are subject to change but are believed to be, but are not assured to be, accurate and up.to.date as of the date of the contract documents.

PART - II NOT USED

PART - III NOT USED

END OF SECTION

TECHNICAL SPECIFICATIONS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01200 - PROJECT MEETINGS

PART - I GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Engineer shall schedule and administer a preconstruction conference at the Engineer's office. Construction progress meetings and specially called meetings throughout the progress of the work will be held in the field office or at another prearranged location, when no field office is provided under the project requirements. The Engineer will:
1. Prepare agenda for meetings.
2. Make arrangements for meetings.
3. Preside at meetings.
4. Record the minutes; include significant proceedings and decisions.
5. Reproduce and distribute copies of minutes.

B. The Contractor and representatives of, where appropriate, subcontractors and suppliers shall attend meetings. The representative shall be qualified and authorized to act on behalf of the entity each represents.

C. The Contractor shall attend and identify at the meetings the actual status of the Contract Work and, when the Work is not being performed consistently with the Contract Documents and construction schedules, shall identify at the meetings the steps he is taking to resolve the inconsistency.

1.02 PRE-CONSTRUCTION CONFERENCE

A. The Contractor shall participate in a preconstruction conference to be held after the effective date of the Agreement and/or on the date of Notice to Proceed.

B. The following are expected to be in attendance:
1. Owner's Representative and other staff as appropriate.
2. Engineer and his professional consultants as appropriate.
3. Engineer's Resident Project Representative.
4. Contractor's Representative and Construction Superintendent.
5. Subcontractors as appropriate.
6. Utility representative as appropriate.
7. Others as appropriate.

C. The purpose of the conference is to designate responsible personnel and establish a working relationship. Matters requiring coordination will be discussed and procedures for handling such matters established. The agenda will include:

1. Description of all parties including contract representatives, phone numbers, and addresses.
2. Responsibilities of Owner.
3. Responsibilities of authorities of the Engineer.
4. Responsibilities of the Contractor.
5. Responsibilities and Authorities of Resident Project Representative.
6. Responsibilities and Authorities of Testing Laboratory.
7. General Project Status and Information.
8. Location of Items.
9. Regulatory Requirements.
10. Site Conditions.
11. Labor Requirements.
12. Submittals required by Contractor.
13. Payment to Contractor.
14. Project Closeout.

1.03 CONSTRUCTION PROGRESS MEETING

A. Construction progress meetings will be held monthly with the first meeting within 30 days after the date of Notice to Proceed.

B. Special construction progress meetings will be held as required by progress of the Work.

C. The following are expected to be in attendance:
1. Owner Representative and other staff as appropriate.
2. The Engineer and his professional consultants as appropriate.
3. Contractor's Representative and/or Construction Superintendent.
4. Subcontractors as appropriate.
5. Suppliers as appropriate.
6. Others as appropriate.

D. The following matters are expected to be addressed:

1. Review and approve minutes of previous meeting.
2. Review of work progress.
3. Field observations, problems, conflicts.
4. Problems which impede Construction Schedule.
5. Review of off-site fabrication, delivery schedules.
6. Corrective measures and procedures to regain Construction Schedule.
7. Revisions to Construction Schedule.
8. Progress and schedule during succeeding work period.
9. Payment applications and processing.

10. Submittals.
11. Maintenance of quality standards.
12. Changes, substitutions, and change orders.
13. Review proposed changes for:
    a. Effect on Construction Schedule and completion date.
    b. Effect on other contracts of the Project.
14. Other matters as appropriate.
15. Record drawings.

E. The Contractor shall be prepared to discuss the above topics and to make commitments for resolving deficiencies.

F. The Engineer shall provide a current submittal log at each progress meeting in accordance with the Section of the Specifications entitled "Progress Schedules".

PART - II PRODUCTS – NOT USED

PART - III EXECUTION – NOT USED

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01250 - MEASUREMENT AND PAYMENT

PART - I GENERAL

1.01 SCOPE OF WORK

A. The scope of this section defines the method of measurement for each bid item. Payment will be made based on the description of each item included in this section as stated in the Bid Form.

B. All contract prices included in the Bid Form will be full compensation for all labor, materials, tools, equipment and incidentals necessary to complete the construction as detailed on the Drawings and/or as describes in the Specifications for the Work to be performed in the Contract. Actual quantities of each item bid on a unit price basis will be determined upon completion of the construction. Payment for all items in the Bid Form will constitute full compensation for the Work to be performed in the Contract. Any item appearing in this Measurement and Payment Section which is not listed in the proposal form shall be included in the cost of other items listed in the Proposal Form.

C. The Contractor is advised that other items of work (for which no specific payment items have been established) may be necessary to complete the Work in accordance with the Contract Documents. No payment or claim for payment shall be made for these items of work and their cost shall be included in items for which payment items have been established.

1.02 MOBILIZATION (ITEM 1)

A. Measurement - Measurement of work for payment of this item shall be on a lump sum basis.

B. Payment - Payment for Mobilization shall be made at the contract unit price bid and shall be full compensation for all preparatory work including those necessary for movement of personnel, equipment, supplies and incidentals to the project site; the establishment of offices, buildings, and other facilities necessary for the work on the project; the cost of bonds and any required insurance; and other pre-construction expenses necessary for start of work, excluding the cost of construction materials.

C. Payment for mobilization shall be subject to the following provisions:

1. Partial payment for mobilization will be made in accordance with the following schedule up to a maximum of 10 percent of the original total contract amount, including this item, and payment of any remaining amount will be made upon completion of all work under this Contract.
2. Contractor shall present a breakdown of costs under this payment item in accordance with the requirements for preparing a Schedule of Values to show costs for 1) Bonds, 2) Insurance, 3) Audio/Video Survey (unless a separate payment item has been provided for this work), and 4) other costs under this pay item. Upon presentation of invoices with the first payment application for the Bonds the Insurance and the

Audio/Video Survey items, payment will be made for the cost of these items and the remaining cost under this pay item shall be made by the following schedule.

PERCENT OF TOTAL CONTRACT AMOUNT EARNED	ALLOWABLE PERCENT OF LUMP SUM PRICE FOR THE ITEM
1st Partial Estimate	25
10	50
25	75
50	100

1.03 CONSTRUCTION PHOTOGRAPHS (ITEM 2)

A. Measurement - Measurement of work for payment of this item shall be on a lump sum basis and shall include all construction photographs required by the Project Specifications, with the exception of any photographs included in the audio-video survey.

B. Payment – Payment of the amount bid for this item shall be full compensation for furnishing all necessary labor, materials, tools, equipment, film, recording material, and any other incidentals necessary to provide and deliver a full set of construction photographs in accordance with the requirements set forth in Section 01350, Construction Photographs, of the Project Specifications.

1.04 AUDIO/VIDEO SURVEY (ITEM 3)

A. Payment of the lump sum established in the bid will be full compensation for all labor, materials, and equipment required to do all work specified in the Contract Documents, with the exception of construction photographs.

B. Payment for this item shall occur only after the audio/video tapes have been completed and are satisfactory to the Engineer and Owner and/or his approved agent.

1.05 EXPLORATORY EXCAVATION (ITEM 4)

A. Measurement - Measurement of this work shall include all labor, equipment, materials, incidentals (such as, but not necessarily limited to, temporary sheet piling if standard side slopes not used and dewatering pumps if groundwater encountered) and qualified personnel to perform exploratory excavation with dimensions of up to 20 feet long by 10 feet wide by 10 feet deep, in those areas identified on the Plans or when requested by the Engineer or his representative, for other areas where underground utility locations are not well defined. The operation includes all necessary equipment, materials, incidentals, and labor for excavation, as well as all such work, equipment, materials, incidentals and labor for the additional work of backfilling and restoration of the excavated holes and voids created by construction operations as per the Specifications. It shall also include the work, equipment, incidentals, and personnel necessary to determine the elevations of conflicting utilities and whether pipe joints require mechanical joint restraint.

B. Payment - Beyond those areas designated on the Plans for exploratory excavation, payment will only be given for this item when directed to perform such exploratory excavation by the Engineer. Payment for this item will be made on a per each basis at the contract unit price bid, measured as provided above, which price and payment shall be full compensation for furnishing all labor, materials, equipment and personnel to determine the elevations of conflicting utilities and verify line locations. If the Contractor digs two small pits immediately adjacent to each other and both pits are smaller than the overall allowable dimensions allowed for one pit, the Contractor will not be provided payment for two separate Exploratory Excavation items; the Contractor will be provided payment for only one item, unless otherwise designated by the Engineer.

C. Payment shall not be made under this item for excavating HDD entry and exit pits unless the existing water mains are not located by the normal entry/exit pit excavation.

1.06 HOT TAP EXISTING PIPE (ITEMS 5 through 8)

A. Measurement – Measurement of work for this item shall be for each hot tap that is made on an existing pipe, including providing and installing the tapping sleeve, tapping valve, MJ/HDPE adapters, ductile iron sleeves or reducers, HDPE tees or 90 degree bends, and any other incidentals required to complete this item in full accordance with the hot tap details.

B. Payment - Payment for this item shall be made at the contract unit price bid, measured as provided above, which price and payment shall be full compensation for furnishing all labor, materials (including tapping tee, full port tapping valve, appurtenances, and any other required materials), equipment and incidentals required to load, haul, unload, place, set, block, brace, backfill, compact, test, sterilize, chlorinate, etc., to complete Hot Tap Existing Pipe in full accordance with the Contract Documents.

Payment shall be according to the following bid items:

Hot Tap Existing 6” CI Pipe Type A	**Ea.**
Hot Tap Existing 8” CI Pipe Type A	**Ea.**
Hot Tap Existing 6” CI Pipe Type B	**Ea.**
Hot Tap Existing 8” CI Pipe Type B	**Ea.**

1.07 8” DIPS HDPE DR11 (ITEM 9)

A. Measurement and Payment of the quantity established in the Bid for this item shall be full compensation for furnishing all materials, labor, equipment (drill rig, fusing machine, data logger, etc. included), and incidentals required to fully complete the construction as specified and as shown on the Drawings and/or specified herein.

B. Measurement and Payment shall also include all necessary excavation associated with the setup and breakdown of entry and exit pits to perform the horizontal directional drills and to tie-in HDPE piping to existing water mains via the Hot Tap items listed above.

C. Measurement and Payment shall also include all HDPE piping required to be provided to achieve the horizontal directional drill. This shall include all necessary fittings, adapters, and incidentals required to transition and tie-in this piping into existing water mains depicted on the Plans. It also includes all materials, labor, equipment, and incidentals required to fuse piping, lay out piping in preparation for drill, lay out and set pipe on rollers (if required), attach drilling heads, mix and inject drilling mud fluid with any required additives, move and locate drilling rig, drill pilot holes, ream out pilot holes as required, directionally drill HDPE, and collect, haul off, and dispose of all generated cuttings and mud.

D. Measurement and Payment shall also include all HDPE necessary submittals indicated by the Specifications. This includes, but is not necessarily limited to, pre-qualifications experience, HDD methodology, instrumentation and surface settlement monitoring plans, daily work logs, record drawings of alignment and profile, and overall direction drill plan with pit locations, intended profile, entry and exit angles, drilling mud design and MSDS sheets, etc.

E. Payment – Payment for 8” DIPS HDPE DR11 will be made at the contract unit price, measured on a linear footage basis from horizontal station entry point to horizontal station exit point. Any additional footage necessary to complete the drills (including pipe footage to ground level, both entry and exit points, and additional piping above ground to complete bore) in accordance with the Plans and these Specifications due to vertical elevation changes shall be accounted for in the per liner foot pricing. Relocations of the drill entry and exit points for contractor convenience shall not constitute justification for additional compensation beyond that indicated on the Plans.

1.08 8” C900 PVC DR18 (ITEM 10)

A. Measurement - Measurement of work for payment of this item shall be the actual measure per linear foot of 8” C900 PVC DR18 Water Main, Open Cut Installation of the size indicated complete, including testing and clean-up, and accepted without deduction for space occupied by valves or fittings and as approved by the Engineer.

B. Payment - Payment for this item shall be subdivided on the payment form providing for payment of 85% for installation, 5%, for successful testing and the remaining 10% for clean-up and restoration, including fertilizer and seeding when not paid under another pay item.

Payment for the pipe will be made at the contract unit price bid, measured as provided above, which price and payment shall be full compensation for furnishing all labor, materials, equipment and incidentals required to load, haul, unload, clearing and grubbing (unless a specific pay item has been included in the Bid Form), excavate, place, lay, join, bed, backfill, cover, compact, grade, test, sterilize, chlorinate, etc., the 8” C900 PVC DR18 Water) Main, Open Cut Installation of the size indicated and complete the item in accordance with the Contract Documents.

SECTION 01250 - MEASUREMENT AND PAYMENT

1.09 DUCTILE IRON FITTINGS (ITEM 11)

A. Measurement - Iron fittings for pipe size three inches (3") and larger will be measured by an actual count in units of U.S. short tons of fittings and payment for mechanical joint and flanged joint fittings shall be made on the basis of published body weight for ANSI/ AWWA C153 for compact ductile iron (not grey iron) mechanical joint and flanged fittings and ANSI/AWWA C110 for full body ductile iron mechanical joint and flanged fittings, exclusive of weight for mortar linings, gasket, gland, bolts, and packaging. The same basis of measurement shall be used for ductile iron fittings used on ductile iron pipe, asbestos cement pipe, PVC pressure class pipe, or G.F.R. pipe. No measurement will be made for fittings on pipe smaller than three inches (3") or for steel or concrete fittings or PVC or GFR pressure rated plastic fittings, where allowed, and their payment shall be included in the pay item for the pipe.

B. Where special fittings such as crosses or special pattern fittings are required, they will be measured as standard fittings as herein provided and any extra cost shall be included in the measurement and payment for the respective special type valve or appurtenance.

C. When flanged or mechanical joint ductile iron fittings are required for the construction of a lump sum payment item such as a pump station, the cost of the fittings shall be included in the lump sum and will not be measured under this pay item.

D. Ductile Iron Sleeves are considered to be incidental for the contractor's convenience or are to be included in the cost for tie-ins when indicated in the Bid Form and will not be measured for payment under this item.

E. This item does not include payment for special fittings and adapters required for the tie-in of HDPE piping to DI piping/fittings. Such costs for these items are to be included with their respective bid items of HDPE piping.

F. Payment - The total quantity of Ductile Iron Fittings in U.S. short tons, placed and accepted, measured as provided above, will be paid for at the contract unit price for ductile iron fittings, which price and payment shall constitute full compensation for furnishing; hauling; installing; concrete thrust blocks or other restraint; and other requirements as required, including testing and sterilizing, that are required for the pipe to which the fitting is attached; and furnishing of all equipment, tools, labor and incidentals necessary to complete the item in accordance with the Drawings and Specifications.

1.10 8" ISOLATION VALVE (ITEM 12)

A. Measurement - Measurement of work for payment of these items shall be the actual count (each) of valves installed as specified and as shown on the Drawings.

B. Payment - Payment for this item shall be full compensation for furnishing all labor, materials, equipment, and incidentals required to furnish and install valves, complete as specified and as shown on the Drawings. The actual count (each) of valves installed, measured as provided above, will be paid for at the respective unit price bid for the 8"

Isolation Valve for type and size of valve. No additional payment will be made for excavation; sheeting and bracing; backfill and compaction; testing; removal of excess earth; and other requirements, including testing and sterilizing, that are required for the pipe to which the valve is attached. No direct payment may be made for dewatering, including all pumping, well pointing, and other necessary operations. Payment shall include full compensation for furnishing, bedding and supporting, setting, joining, cleaning, sealing, testing, and all incidental work required in the installation of valves.

1.11 FIRE HYDRANT ASSEMBLY (ITEMS 13 AND 14)

A. Measurement - Measurement of work for payment of this item shall be the actual count (each) of Fire Hydrant Assembly installed at the indicated depth, including 6-Inch Isolation Valve installed and accepted by the Engineer.

B. Payment - Payment for this item shall be made at the contract unit price bid, measured as provided above, which price and payment shall be full compensation for furnishing all labor, materials, equipment and incidentals required to load, haul, unload, place, set, block, brace, backfill, compact, test and sterilize, etc., the Fire Hydrant Assembly, including but not limited to 6-Inch Isolation Valve, prefabricated fire hydrant leader of all lengths, 6” restrained joint PVC pipe in lieu of fire hydrant leader, thrust blocks, gravel drain beds, etc. complete in accordance with the Contract Documents and as instructed by the Engineer.

C. Payment for the tee to which the 6” valve is attached will be paid under the Ductile Iron Fittings pay item.

Payment shall be according to the following bid items:

Fire Hydrant Assembly Installed on Pipe 0 to 6 Feet Deep	**Ea.**
Fire Hydrant Assembly Installed on Pipe 6.1 to 12 Feet Deep	**Ea.**

1.12 REMOVAL AND REPLACEMENT OF ASPHALT OR CONCRETE (ITEMS 15 THROUGH 18)

A. Measurement - Measurement of work for payment of this item shall be the actual number of square yards removed and replaced, as determined by the product of the pavement slab width and length or appropriate measurements of irregular areas as determined by field measurement and as approved by the Engineer.

B. Payment - Payment for this item shall be at the contract unit price bid measured as provided above, which price and payment shall be full compensation for furnishing all labor, materials, equipment, and incidentals required to complete the removal of asphalt or concrete, complete as specified and as shown on the Drawings. Payment shall include full compensation for removal and disposal of asphalt or concrete.

Payment shall be according to the following bid items:

SECTION 01250 - MEASUREMENT AND PAYMENT

Remove and Replace Asphalt Street	**Sq. Yd.**
Remove and Replace Concrete Street	**Sq. Yd.**

1.13 TRAFFIC MAINTENANCE LIMESTONE (ITEM 19)

A. Measurement - Measurement of work for payment of this item shall be the actual measure per square yard placed, compacted, and accepted and as approved by the Engineer.

B. Payment - Payment for Traffic Maintenance Limestone shall be made at the contract unit price bid, measured as provided above, which price and payment shall be full compensation for furnishing all labor, materials, equipment and incidentals required to load, haul, unload, place, spread, and compact complete as specified and as shown on the Drawings. Maintenance of surface course aggregate shall be included in the bid price for this item and no additional payment will be paid for maintenance.

1.14 RELOCATION OF INFRASTRUCTURE ITEMS (ITEM 20)

A. Measurement - Measurement of work for payment of this item shall be on a lump sum basis.

B. Payment - Payment for Relocation of Infrastructure Items will be made at the contract lump sum price bid and shall be full compensation for the actual cost of relocating, repairing, replacing or removing any unforeseen utilities, structures, trees; such as but not limited to, water, sewer, gas, electrical, and subsurface drainage systems that are in conflict with the items to be installed in this project. Such relocations shall not be undertaken by the Contractor unless specifically approved by the Project Engineer prior to such work. Any deviation from this policy will result in lack of payment to the Contractor for such relocation work. Any remaining money in the designated unit price at the end of the Project will not be paid to the Contractor, but instead credited to the Owner in the final project closeout.

1.15 REMOVAL OF STRUCTURES AND OBSTRUCTIONS (ITEM 21)

A. Measurement - Measurement of work for payment of this item shall include any removal, relocation, and/or disposal of old and abandoned pipe/culverts not otherwise specified in the Contract Documents, structures, concrete, trees, tree stumps, roots, piping, signs, fencing, and any other miscellaneous items required for the construction of the upgrades associated with this project. The measurement of this item shall be on a lump basis as established in the unit bid price and shall also include all salvaging of material and backfilling of trenches, holes, and pits.

B. Payment - Payment for this item shall be at the contract unit price bid measured as provided above, which price and payment shall be full compensation for furnishing all labor, materials, equipment, and incidentals required to complete the satisfactory removal, relocation and/or disposal of installation of the culverts, structures, concrete,

buried trees, tree stumps, roots, piping, signs, fencing, and any other miscellaneous items encountered in, but not specifically limited to, the construction of the levee, roadways, and/or pond dredging and pond excavation, in accordance with the work items specified and shown on the Plans. It also includes salvaging of materials and backfilling trenches, holes, and pits created by the removal of such structures and obstructions with select backfill. Payment for clearing and grubbing is under separate bid item.

1.16 PROJECT SIGN (ITEM 22)

A. Measurement and Payment of the lump sum established in the Bid for each Project Sign shall be full compensation for furnishing shop drawings, fabricating and delivering the sign, erection, maintenance, and incidentals required to complete each Project Sign, in accordance with the Contract Documents. Payment shall include full compensation for all work required to complete each Project Sign.

1.17 INSERTION VALVE (ITEMS 23 AND 24)

A. Measurement for this item will be for each Insertion Valve in accordance with the size of the valve as shown on the Bid Form and on the Drawings, which shall include excavation, cleaning and inspecting the existing pipe, installation of the insertion valve body on the existing pipe, cutting an opening for the valve gate in the existing pipe, installation of the gate and operator onto the valve body, backfilling and dressing the ground surface at the excavation site.

B. Payment for installation of each Insertion Valve shall be full compensation for performing all work to complete the installation of each Insertion valve as described above and in accordance with the Specifications.

Payment shall be according to the following bid items:

4” Insertion Valve Ea.
6” Insertion Valve Ea.

1.18 CUT IN A 3” GATE VALVE IN THE EXISTING 3” WATER MAIN (ITEM 25)

A. Measurement for this item will be for each Cut In 3” Gate Valve In The Existing 3” Water Main as shown on the Bid Form and on the Drawings, which shall include excavation, cleaning and inspecting the existing pipe, cutting a section from the existing pipe, installation of the gate valve, including plain pipe spools and restrained pipe sleeves, backfilling and dressing the ground surface at the excavation site.

B. Payment for installation of each Cut In 3” Gate Valve In The Existing 3” Water Main shall be full compensation for performing all work to complete the installation of each valve as described above and in accordance with the Specifications and Drawings.

SECTION 01250 - MEASUREMENT AND PAYMENT

1.19 MCCALL BOOSTER STATION SYSTEM (ITEM 26)

A. Measurement and Payment for the McCall Booster Station System shall be lump. The lump sum amount will be full compensation for this item per 1.01 of this section. Investigative excavations called for on the drawings below shall be included in the lump sum. Work is required on two sites, as indicated on the Drawings.

B. This item shall include all work as shown on the following Drawings:

1. M-01 OVERALL BOOSTER SYSTEM SITE
2. M-02 BOOSTER SYSTEM SCHEMATIC
3. M-03 BOOSTER SYSTEM P&IDS
4. M-04 BOOSTER SYSTEM TIE IN PLAN
5. M-05 EXISTING MCCALL BOOSTER SITE
6. M-06 PROPOSED MCCALL BOOSTER SITE
7. M-07 EXISTING PALO ALTO SITE
8. M-08 PROPOSED PALO ALTO SITE PLAN
9. M-09 PIPE RESTRAINT
10. M-10 PIPING DETAILS
11. E-01 MCCALL ELECTRICAL SITE PLAN
12. E-02 PALO ALTO ELECTRICAL SITE PLAN
13. E-03 ELECTRICAL RISER DIAGRAM & DETAILS
14. E-04 ELECTRICAL DETAILS

1.20 PALO ALTO CONTROL VALVE (ITEM 27) (ALT. NO. 1)

A. Measurement for this item shall be measured on a lump sum basis for the piping, control valve, and electrical work shown on Sheets M-08 and E-02.

B. Payment shall be made for a complete and operable control valve as described above including the mechanical work shown on Drawings M-08 “Palo Alto Site Plan” and the electrical work shown on Drawing E-02.

PART - II PRODUCTS – NOT USED

PART - III EXECUTION – NOT USED

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01300 - PROJECT MEETINGS

PART - I GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Engineer shall schedule and administer a preconstruction conference at the Engineer's office. Construction progress meetings and specially called meetings throughout the progress of the work will be held in the field office or at another prearranged location, when no field office is provided under the project requirements. The Engineer will:

1. Prepare agenda for meetings.
2. Make arrangements for meetings.
3. Preside at meetings.
4. Record the minutes; include significant proceedings and decisions.
5. Reproduce and distribute copies of minutes.

B. The Contractor and representatives of, where appropriate, subcontractors and suppliers shall attend meetings. The representative shall be qualified and authorized to act on behalf of the entity each represents.

C. The Contractor shall attend and identify at the meetings the actual status of the Contract Work and, when the Work is not being performed consistently with the Contract Documents and construction schedules, shall identify at the meetings the steps he is taking to resolve the inconsistency.

1.02 PRE-CONSTRUCTION CONFERENCE

A. The Contractor shall participate in a preconstruction conference to be held after the effective date of the Agreement and/or on the date of Notice to Proceed.

B. The following are expected to be in attendance:

1. Owner's Representative and other staff as appropriate.
2. Engineer and his professional consultants as appropriate.
3. Engineer's Resident Project Representative.
4. Contractor's Representative and Construction Superintendent.
5. Subcontractors as appropriate.
6. Utility representative as appropriate.
7. Others as appropriate.

C. The purpose of the conference is to designate responsible personnel and establish a working relationship. Matters requiring coordination will be discussed and procedures for handling such matters established. The agenda will include:

1. Description of all parties including contract representatives, phone numbers, and addresses.
2. Responsibilities of Owner.

3. Responsibilities of authorities of the Engineer.
4. Responsibilities of the Contractor.
5. Responsibilities and Authorities of Resident Project Representative.
6. Responsibilities and Authorities of Testing Laboratory.
7. General Project Status and Information.
8. Location of Items.
9. Regulatory Requirements.
10. Site Conditions.
11. Labor Requirements.
12. Submittals required by Contractor.
13. Payment to Contractor.
14. Project Closeout.

1.03 CONSTRUCTION PROGRESS MEETING

A. Construction progress meetings will be held monthly with the first meeting within 30 days after the date of Notice to Proceed.

B. Special construction progress meetings will be held as required by progress of the Work.

C. The following are expected to be in attendance:

1. Owner Representative and other staff as appropriate.
2. The Engineer and his professional consultants as appropriate.
3. Contractor's Representative and/or Construction Superintendent.
4. Subcontractors as appropriate.
5. Suppliers as appropriate.
6. Others as appropriate.

D. The following matters are expected to be addressed:

1. Review and approve minutes of previous meeting.
2. Review of work progress.
3. Field observations, problems, conflicts.
4. Problems which impede Construction Schedule.
5. Review of off-site fabrication, delivery schedules.
6. Corrective measures and procedures to regain Construction Schedule.
7. Revisions to Construction Schedule.
8. Progress and schedule during succeeding work period.
9. Payment applications and processing.
10. Submittals.
11. Maintenance of quality standards.
12. Changes, substitutions, and change orders.
13. Review proposed changes for:
14. Effect on Construction Schedule and completion date.
15. Effect on other contracts of the Project.

16. Other matters as appropriate.
17. Record drawings.

E. The Contractor shall be prepared to discuss the above topics and to make commitments for resolving deficiencies.

F. The Engineer shall provide a current submittal log at each progress meeting in accordance with the Section of the Specifications entitled "Progress Schedules".

PART - II PRODUCTS (NOT USED)

PART - III EXECUTION (NOT USED)

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01310 - SUBMITTALS

PART - I GENERAL

1.01 DESCRIPTION

This section refers to the general procedures and requirements for submittals. Specific requirements for submittals are included in other sections of these specifications.

1.02 DEFINITION

The term "submittal" as used herein shall be understood to include schedules, detailed design calculations and drawings, shop drawings, fabrication and installation drawings, erection drawings, lists, graphs, operation and maintenance data, catalog sheets, data sheets, product data, samples, and similar items that are to be presented by the Contractor and delivered to the Engineer.

1.03 LIST OF SUBMITTALS

A. The following is a list of submittals (not necessarily inclusive of all necessary submittals) and the times required for completion of review and approval in accordance with the Contract Documents. Submittals should be made in advance of milestones shown in the approved construction schedule that allows adequate time for completion of the Engineer's review and comment process.

ITEM	TIME
1. Project Progress Schedule	Pre-Construction Conference*
2. Schedule of Payments	Pre-Construction Conference*
3. Schedule of Values	Pre-Construction Conference*
4. List of Manufacturers and Associated Products	Prior to Start of Work
5. Substitute Material/ Equipment	Prior to Start of Work, when allowed by the Contract Documents
6. Manufacturer's Certificate of Compliance	Prior to Substantial Completion
7. Change Orders	Description of the nature of the claim within 30 days of occurrence of the event initiating the change and complete claim within 60 days of the start of the event
8. Shop Drawings as follows	Prior to placement of final order or prior to installation. Note: The following list is a guide and it is not affirmed that all shop drawing requirements are included in the list. Contractor is responsible for meeting the submittal requirements stated in each specification section to ascertain shop drawing submittal data that is required for the project.

SECTION 01310 - SUBMITTALS

a. Audio/Video Survey and Construction Photographs
b. Project Sign Fabrication Details
c. Soil Test Analysis for Embankment Material, etc.
d. Tree removal and trimming schedule
e. Concrete Mix Design
f. Concrete Reinforcement
g. Fertilizer and Seed
h. Asphalt Paving Materials and Test Reports
i. Water System Pipe and Appurtenances
j. Gate Valve (if applicable)
k. Plug Valve (if applicable)
l. Ball Valve (if applicable)
m. Lever and Weight Check Valve (if applicable)
n. Ball Check Valve (if applicable)
o. Booster Station Equipment
p. Pumps
q. Motors
r. Precast Concrete Manholes and Wet Wells and Appurtenances
s. Brick, Concrete Block and Masonry Units
t. Structural Steel
u. Prefabricated Buildings
v. Sealants and Caulking Materials
w. Paint and Coating Materials
x. Traffic Signs
y. Project Sign
z. Backflow Preventer
aa. Electrical Panels
bb. Wire and Conduit
cc. Transformer
dd. On-Site Generator

10. Operation & Maintenance Manuals	Draft within 30 days of Shop Drawing Approval and Final Prior to startup
11. Spare Parts	Completion of Project
12. Tabulation of Equipment w/Data	Completion of Project
13. Certificate of Gradation of Aggregate	Prior to Installation

* If no Pre-Construction Conference is held, the submittal shall be made prior to First Payment.

SECTION 01310 - SUBMITTALS

1.04 The Engineer may require submittals not listed above to expedite the work. Contractor shall comply to all submittal requests made by Engineer.

PART - II PRODUCTS - NOT USED

PART - III EXECUTION - NOT USED

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01330 - PROGRESS SCHEDULES

PART - I GENERAL

1.01 GENERAL

Provide Construction Schedules for Work included in this Contract in accordance with the requirements in this Section. Create a critical path type Construction Schedule depicted on a Gantt Chart (Bar Chart) format.

1.02 SUBMITTALS

A. Submit Construction Schedule for review by the Engineer in accordance with the requirements for submittals stated elsewhere in the Contract Documents.

B. Provide the Contractor’s proposed construction schedule charts and activity listings at the preconstruction conference. The Engineer will provide review of the samples within 7 days of the submittal.

1. Within 21 days of the receipt of approval of the Contractor's format, submit a final Construction Schedule for review.

2. Construction Schedule Submittals shall include:

a. Printed bar charts that meet the criteria outlined in this Section.
b. Activity listings that meet the criteria outlined in this Section.

C. The Contractor must receive approval of the Engineer for the Construction Schedule prior to the first monthly Application for Payment. No payment will be made until the Construction Schedule is accepted.

D. If the Contractor desires to make changes in his method of operating and scheduling, after approval of the original planned operations or schedule has been given by the Engineer, the Contractor shall notify the Engineer in writing, stating the reasons for the change. If the Engineer considers these changes to be of significant nature, the Contractor may be required to revise and resubmit for approval all or the affected portion of the Contractor's Construction Schedule to show the effect on the entire Work.

E. Upon written request from the Engineer, the Contractor shall revise and submit for approval all or any part of the Construction Schedule Submittal to reflect changed conditions in the Work or deviations made from the original plan and schedule.

F. The Contractor's Construction Schedule shall thereafter be updated with the Actual Start and Actual Finish Dates, Percent Complete, and Remaining Duration of each Activity and submitted monthly at the progress meeting. The updated Construction Schedule shall coincide with the dates used in the monthly Application for Payment. This monthly update of the schedule shall be required before the monthly Application for Payment will be processed for payment.

G. Bar charts and activity listings may be printed or plotted on 8.5" x 11", 8.5" x 14" or 11" x 17" sheet sizes. Over-size plots may be acceptable after review of the specified plot sizes with written approval of the Engineer when the duration and complexity of the project warrants plotting the schedule on a larger format.

1.03 ANALYSIS OF CONTRACT TIME

A. Changes in Contract Time shall be analyzed on the basis of whether the change is due to conditions beyond the control of the Contractor as is defined elsewhere in the Contract Documents. Only those events that are judged to be beyond the control of the Contractor will be approved for analysis in determining an adjustment to the Contract Time.

B. The adjustment of Contract time will be evaluated as the change in Contract Time relates to the critical path of the Contract as established by the approved Construction Schedule as defined by this Section. Adjustment(s) to Contract time will be made on the basis of the following:

1. Float shall be determined as the number of contract days that are available between the scheduled completion date as shown on the approved Construction Schedule and the date when an activity, if not completed, would affect the critical path for the project.

2. All float shall be considered in the evaluation of Contract Time. Float will be used prior to issuance of any adjustment in contract time, including time for excess adverse weather, irrespective of the reason for the analysis of a time adjustment. The Owner reserves the right to issue changes in the Work, utilizing available float for completion of additional work and, thereby, not affecting either of the Contractual Completion Dates.

3. Should the approved change in time, irrespective of whether the change is initiated by the Owner or other event that is beyond the control of the Contractor, affect the critical path for completion of the contract by extending the completion of the contract beyond either the Contractual Substantial Completion Date or the Contractual Final Completion Date, an adjustment in the Contract Time will be granted by the Owner as provided by the Contract Documents.

4. Should the approved change in time, irrespective of whether the change is initiated by the Owner or other event that is beyond the control of the Contractor, affect the time line of any task, but not affect the critical path, the change in time will be taken from the available float and a Contractual Time adjustment will not be granted.

5. Should the approved change in time, irrespective of whether the change is initiated by the Owner or other event that is beyond the control of the Contractor, affect the time line of any task not on the critical path, but the change in time causes the non-critical task to become the critical path, a portion of the change in time will be taken

from the available float and the remainder will be granted in a Contractual Time adjustment by the Owner as provided by the Contract Documents.

PART - II PRODUCTS - Not Used

PART - III EXECUTION

3.01 The Construction Schedule Submittal shall be based on detailed activities that accurately depict the work that is to be performed.

3.02 The level of detail and number of activities required in the schedule is dependent on the tasks and project types. The work shall be categorized by work task in the schedule.

A. Project schedules shall include at least one activity for each unique combination of work that makes up a task.

B. Schedules for Sanitary Sewer Pump Station Rehabilitation Projects shall contain a sufficient number of activities, depending on the work tasks involved in the project, to adequately describe the complexity of the tasks to be performed. As a minimum, tasks shall be broken down into the following:

1. Preparatory
2. Application for and Connection of Temporary Electrical Service
3. Setup Bypass Pumping as Necessary
4. Removal of Existing Equipment
5. Cleaning and Repair of Existing Structures
6. Installation of Protective Coating System
7. Construction of New Structural Work
8. Installation of New Equipment
9. Application for and Connection of Permanent Electric Service
10. Startup of New Equipment
11. Demolition of Existing Structures to be Abandoned
12. Cleanup, Dressing of Excavated Areas, Re-establishment of Vegetative Cover, Etc.

C. Pipe Laying or Rehabilitation work shall include as a minimum the following tasks:

1. Preparatory (Mobilization to each specific site, clearing and grubbing as required, stripping topsoil as required, etc.)
2. Trench Excavation and Laying/Rehabilitation of Pipe
3. Backfill of Trenches
4. Initial Dressing of Excavated Areas
5. Testing of Pipes
6. Final Dressing of Excavated Area and Restoration of Surfaces and Vegetative Cover

SECTION 01330 - PROGRESS SCHEDULES

D. Earthwork and/or dredging work shall include as a minimum the following tasks:

1. Preparatory (Mobilization to each specific site, clearing and grubbing as required, stripping topsoil as required, etc.)
2. Excavation, Hauling and Construction of Embankment/Spoil Berm Operations
3. Initial Dressing of Areas Disturbed by all Earthwork Operations
4. Quality Control Measurements
5. Final Dressing of Disturbed Areas and Restoration of Surfaces and Vegetative Cover

E. Plant or facility work shall be broken down into the following tasks:

1. Preparatory, including securing necessary permits and mobilization of personnel and equipment.
2. Application for and Connection of Temporary Electric Service
3. Excavation
4. Civil
5. Coordination of Various Disciplines for Installation of New Equipment
   a. Mechanical
   b. Electrical
   c. Instrumentation
6. Application for and Connection of Permanent Electric Service
7. Startup of New Equipment
8. Final Cleanup and Installation of Landscaping

F. For projects with work at different physical locations or different facilities within a project, each location or facility shall be indicated separately within the schedule.

G. For projects with multiple crafts or significant subcontractor components, these elements shall be indicated separately within the schedule.

H. For projects with multiple types of tasks within the scope, these types of work shall be indicated separately within the schedule. For projects with multiple service areas, the Contractor may be required to separate work by service area.

I. For projects with significant major equipment items or materials work over 30 percent of the Total Contract Price, the schedule shall indicate dates when these items are to be purchased, when they are to be delivered, and when installed.

J. For projects where operating facilities are involved, each period of work that will require the shutdown of any process or operation shall be identified in the Schedule and must be agreed to by the Engineer and facility operations personnel prior to starting work in the area.

END OF SECTION

SECTION 01340 – SCHEDULE OF VALUES

PART - I GENERAL

1.01 REQUIREMENTS INCLUDED

A. Submit to the Engineer a Preliminary Schedule of Values in accordance with the requirements of the General Conditions.

B. The schedule of values for each lump sum item in the bid form shall include all items that equal the total bid cost of that item. Administration, supervision and other items listed as being part of the Contractor's fee, shall be included as a separate line item in the schedule of values, if so desired by the Contractor, to assure that the total value of the item in the schedule of values equals the bid cost shown in the bid form.

C. Upon request of the Engineer, support the values with data that will substantiate their correctness.

D. Refine the Schedule of Values to reflect the requirements of the General Conditions. The final Schedule of Values shall be used as the basis for the Contractor's Applications for Payments.

1.02 FORM AND CONTENT OF SCHEDULES OF VALUES

A. Type schedule on 8 1/2" x 11" or 8 1/2" x 14" white paper. Contractor's standard forms and automated printout will be considered for approval by the Engineer upon Contractor's request. Identify schedule with:

1. Title of Contract and location.
2. Engineer
3. Contract numbers.
4. Name and Address of Contractor.
5. Date of submission.

B. Schedule shall list the installed value of the component parts of each item of the Work in sufficient detail to serve as a basis for computing values for progress payments during construction.

C. Identify each line item with the number and title of the respective bid item.

D. For the various portions of the Work:

1. Each item shall include the directly proportional amount of the Contractor's overhead and profit as was included in the cost shown on the Bid Form when these items are not shown as a separate line item for the item of work.
2. For items on which progress payments will be requested for stored materials, break down the value into:

SECTION 01340 – SCHEDULE OF VALUES

a. The cost of the materials, delivered and unloaded, with taxes paid. Paid invoices are required submittal items as part of the next monthly payment request for materials on which advanced payment has been granted and upon request by the Engineer for other payment requests.
b. The total installed value.

E. Progress payments will follow the Bid Form Schedule of Prices as the format for listing component items for unit price project, however, lump sum items requiring several partial payments must have a detailed Schedule of Values breakdown of costs as stated herein. Partial progress payments on large lump sum items for which a Schedule of Values is not provided will not be approved and no payment will be approved until all work on the item has been completed.

PART - II PRODUCTS – NOT USED

PART - III EXECUTION – NOT USED

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01341 - PROJECT COORDINATION

PART - I GENERAL

1.01 WORK PROGRESS

The Contractor shall furnish personnel and equipment which will be efficient, appropriate and adequately sized to secure a satisfactory quality of work and a rate of progress which will insure the completion of the work within the time stipulated in the Contract. If at any time such personnel appear to the Engineer to be inefficient, inappropriate, or insufficient for performing the quality of work required or for producing the rate of progress aforesaid, he may order the Contractor to increase the efficiency, change the character or increase the personnel and equipment, and the Contractor shall conform to such order. Failure of the Engineer to give such order shall in no way relieve the Contractor of his obligations to perform the work at the specified quality and rate of progress.

1.02 PRIVATE LAND

A. The Contractor shall be aware that his work will be performed adjacent to private property. The Contractor shall notify all property owners adjacent to and along the route of construction by means of either a printed circular or form letter of the general details of the construction. The letter shall also include names and telephones numbers for key project personnel so that property owners can report problems. These contact telephone numbers shall be given so that appropriate personnel can be contacted 24 hours a day, seven days a week.

B. The Contractor shall not enter or occupy private land outside the Owner's land, rights-of-way, or servitudes except by written permission of both the Owner and the Owner of the private land. Such permission shall be obtained by and at the expense of the Contractor and at no additional cost to the Owner.

C. Owners of adjacent private land shall be inconvenienced as little as possible by the construction work. Where possible, the Contractor shall maintain access across or over the work to adjacent property. At locations where an adjacent property has more than one access point for vehicular traffic, such as paved or aggregate surfaced driveways, grassed ramps, gaps, etc., the Contractor shall schedule his work so that at least one access point is usable by the property owner, his associates, or his clientele in the case where the adjacent property is a business establishment.

1.03 CARE AND PROTECTION OF PROPERTY

A. The Contractor shall be responsible for the preservation of all public and private property, and shall use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work on the part of the Contractor, such property shall be restored by the Contractor, at no additional expense to the Owner, to a condition similar or equal to that existing before the damage was done, or

he shall make good the damage in another manner acceptable to the Engineer and property owner.

B. All sidewalks that are disturbed by the Contractor's operations shall be restored to their original or better condition by the use of similar or comparable materials. All curbing shall be restored in a condition equal to the original construction and in accordance with the best modern practice.

C. Along the location of this Work, all fences, walks, brushes, trees, shrubbery, and other physical features shall be protected and restored in a thoroughly workmanlike manner. Fences and other features removed by the Contractor shall be replaced in the location indicated by the Engineer as soon as conditions permit. All grass areas beyond the limits of construction which have been damaged by the Contractor shall be regraded and sodded.

D. Trees close to the Work shall be boxed or otherwise protected against injury. The Contractor shall trim all branches that are liable to damage because of his operations, but in no case shall any tree be cut or removed without prior notification of the Engineer. All injuries to bark, trunk, limbs and roots of trees shall be repaired by dressing, cutting, and painting according to approved methods, using only approved tools and materials.

E. The protection, removal, and replacement of existing physical features along the line of work shall be a part of the work under the Contract, and all costs in connection therewith shall be included in the unit and/or lump sum prices established under the items in the Proposal.

F. Where fences must be removed for construction purposes or access, they shall immediately be reconstructed or replaced. The Contractor shall provide adequate temporary fence and gates as necessary to contain or restrict domestic animals within their proper areas during the life of this contract and shall provide reasonable safe and convenient means of access where and when required.

1.04 WORK LOCATIONS

Structures and pipelines shall be located substantially as indicated on the Drawings, but the Engineer reserves the right to make such modifications in locations as may be found desirable to avoid interference with existing structures or for other reasons. Where fittings are noted on the Drawings, such notation is for the Contractor's convenience and does not relieve him from laying and jointing different or additional items where required.

1.05 OPEN EXCAVATIONS

A. All open excavations shall be adequately safeguarded by providing temporary barricades, caution signs, lights, and other means to prevent accidents to persons and damage to property. The Contractor shall, at no additional expense to the Owner, provide suitable and safe bridges and other crossings for accommodating travel by the public, Owner's

and Engineer's personnel, and workmen. Bridges provided for access to private property during construction shall be removed when no longer required. If the excavation becomes a hazard, or if it excessively restricts traffic at any point, the Engineer may require special construction procedures such as limiting the length of open trench and prohibiting the stacking of excavated material in the street. Open trench excavations shall not remain open overnight and other open excavations shall be fenced or otherwise protected to prevent unauthorized access.

B. The Contractor shall take precautions to prevent injury to the public due to open trenches. All trenches, excavated material, equipment, or other obstacles which could be dangerous to the public shall be barricaded and well lighted at all times when construction is not in progress.

1.06 MAINTENANCE OF TRAFFIC

A. Open pits, trenches, unpaved streets, debris, or other obstructions due to construction that will prevent the normal flow of traffic during an extended construction stoppage, for any reason, shall be minimized. In the event an extended construction stoppage is found to be necessary, Contractor shall provide for normal traffic flow during extended construction stoppage, regardless of the cause.

B. All excavated material shall be placed so that vehicular and pedestrian traffic may be maintained at all times. If the Contractor's operation causes traffic safety hazards, he shall repair the road surface, provide temporary roadways, erect wheel guards or fences, or take other safety measures that are satisfactory to the Engineer.

C. Detours around construction areas will be subject to the approval of the Owner and the Engineer. Where detours are permitted the Contractor shall provide all necessary barricades and signs as required to divert the flow of traffic. While traffic is detoured, the Contractor shall expedite construction operations. The periods when traffic may be detoured will be strictly controlled by the Owner. It is the Contractor’s responsibility to properly notify all emergency service providers of closed streets or roads and the duration of closure, including but not limited to law enforcement, fire protection, and ambulance services.

1.07 MAINTENANCE OF FLOW

The Contractor shall maintain the flow of sewers, drains, and water courses interrupted during the progress of the Work, including complete pumped bypass systems where necessary. The Contractor shall immediately remove all offensive matter. The entire procedure of maintaining existing flow shall be detailed in writing for approval by the Engineer well in advance of the interruption of any flow. All temporary works installed for flow maintenance shall be removed when the permanent work is finished and the areas cleaned and restored to good condition. Pavement removal and replacement which, in the opinion of the Contractor, is necessitated by placement of temporary flow control facilities, shall be considered as an item for convenience to the Contractor. Such costs for pavement removal and replacement shall, therefore, be born by the Contractor at no

additional expense to the Owner as required for other flow control measures. The intent of this Specification is that pavement removal be limited to the least amount possible and the Contractor shall investigate alternative methods for flow control which require the least amount of pavement removal.

1.08 CONNECTION TO WORK BY OTHERS

Pipeline construction by others may occur at the same time and in the same areas as work being done under this Contract. The Contractor will, therefore, conduct his operations as follows:

A. Sewer Lines

1. If shown on the Drawings, sewers built by others may be connected to sewers and/or manholes constructed under this Contract.
2. If the sewers and/or manhole by others have already been constructed, the manholes and/or sewers under this Contract shall be built at the exact locations of the connection as actually exist in the field. The Contractor is responsible for pot holing the connection points in advance of constructing manholes and/or sewers under this Contract to ensure the proper alignment at the connection point.
3. If the sewers and/or manholes by others have not been constructed, the sewers shall be built at the exact locations of the connection as shown on the Drawings and plugged.

B. Force Mains & Waterlines

1. Where shown on the Drawings, force mains and or water mains constructed under this Contract shall be connected to pipelines to be built by others. All connections at the Contract limits of force mains and or water mains shall be terminated with a standard mechanical joint bell end and plugged with a standard mechanical joint plug.
2. If the force main or water mains by others have already been constructed, the pipelines built under this Contract will be connected to the mains constructed by others by removing all necessary plugs and making the connection(s). The Contractor shall pot hole connection points in advance of development of laying schedules for all pipe size of 16 inches and larger to ensure the proper alignment at the connection point. Upon completion of the tie-in connection(s), Contractor shall deliver all removed plugs to the Owner's facility.
3. If the force mains or waterlines have not been constructed by others, the pipelines under this Contract shall be laid to the required line and grade, terminated as stated above at the location of the connection indicated on the Drawings, backfilled and marked with a stake.
4. The notation on the Drawings at tie-in points states that the Contractor shall tie to facilities constructed by others or provide a plug. The intent of this instruction is that, if a tie-in cannot be made, the Contractor shall furnish and install a plug at the terminal end as defined above.

SECTION 01341 - PROJECT COORDINATION

1.09 PROTECTION OF CONSTRUCTION AND EQUIPMENT

A. All newly constructed work shall be carefully protected from injury in any way. No wheeling or walking or placing of heavy loads on it shall be allowed. All injured portions of the Work shall be reconstructed by the Contractor at no additional expense to the Owner.

B. All structures shall be protected in a manner approved by the Engineer. Should any of the floors or other parts of the structures become heaved, cracked or otherwise damaged, all such damaged portions of the work shall be completely repaired and made good by the Contractor at no additional expense to the Owner and to the satisfaction of the Engineer. Special attention is directed to substructure bracing requirements, described in other sections. If, in the final inspection of the work, any defects, faults or omissions are found, the Contractor shall cause the same to be repaired or removed and replaced by proper materials and workmanship without extra compensation for the materials and labor required. Further, the Contractor shall be fully responsible for the satisfactory maintenance and repair of the construction and other work undertaken herein for at least the guarantee period described in the Contract.

C. The Contractor shall take all necessary precautions to prevent damage to any structure due to water pressure during and after construction and until such structure is accepted and taken over by the Owner.

D. After the buildings or structures have been made weathertight and ready for the installation of pumps, motors, piping and other equipment, the interior temperature shall be maintained at a minimum temperature of 50° F., and thereafter until the completion of the contract, temperature shall not be allowed to drop below 50° F.

1.10 CLEANUP DURING CONSTRUCTION

During the course of the Work, the Contractor shall keep the site of his operations in as clean and neat a condition as is possible. He shall dispose of all residue resulting from the construction work and, at the conclusion of the work, he shall remove and haul away any surplus excavation, broken pavement, lumber, equipment, temporary structures, and any other refuse remaining from the construction operations, and shall leave the entire site of the Work in a neat and orderly condition. . In no case shall cleanup work lag more than 1,000 feet behind installation operations, unless prevented by adverse weather conditions. Cleanup operations shall be brought to within the above stated limit as soon as weather and soil conditions allow as determined by the Engineer. Should cleanup operations lag, the Engineer reserves the right to require suspension of installation operations until cleanup is brought within the above stated limit. Suspension of installation operations in order to bring cleanup into compliance shall not be grounds for claim for additional contract time or compensation.

SECTION 01341 - PROJECT COORDINATION

1.11 COOPERATION WITHIN THIS CONTRACT

A. All firms or persons authorized to perform any work under this Contract shall cooperate with the General Contractor and his subcontractors or trades, and shall assist in incorporating the work of other trades where necessary or required.

B. Cutting and patching, drilling, and fitting shall be carried out where required by the trade or subcontractor having jurisdiction, unless otherwise indicated herein or directed by the Engineer.

PART - II PRODUCTS - NOT USED

PART - III EXECUTION - NOT USED

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01350 – CONSTRUCTION PHOTOGRAPHS

PART - I GENERAL

1.01 REQUIREMENTS INCLUDED

Contractor shall provide the preconstruction audio-video survey and digital still photography as specified herein.

1.02 PHOTOGRAPHY REQUIRED

A. Audio-Video Survey as specified herein (preconstruction).

B. Provide a minimum of 10 digital format still preconstruction photographs of each site specific portion of the work such a pump stations, water wells, water storage tanks, intersections, major drainage structure installation sites,, etc.

C. When piping is required within a plant site, additional photos will be required showing location of all piping, valves, and fittings with relationship to other objects or structures. Contractor shall include in photograph a colored yard stick or some other standard measurement device to allow viewer of photo to visualize the scale of the photograph.

1.03 COSTS OF PHOTOGRAPHY

Contractor shall pay costs for specified videotaping and digital photographs as is stated in the Measurement and Payment section.

PART - II PRODUCTS

2.01 AUDIO-VIDEO SURVEY

A. Specifications for Audio-Video Survey

1. Prior to the start of construction on the contract, the Contractor shall furnish to the Engineer, the survey of the construction areas on the specified audio-video media.
2. The survey shall be reviewed by the Engineer and accepted, rejected or additional coverage will be required to fully show the physical conditions of the work areas. When requested, the Contractor shall have the additional coverage photography performed and shall not begin work, including moving equipment and/or material on the project site, until the audio-video survey has been accepted by the Engineer.
3. After acceptance, the Contractor shall supply one original or original quality copy plus two copies of the audio-video survey to the Engineer.

    a. The original or original quality video shall remain in the Engineer’s office for use in settling property owner damage and improper restoration claims or for other purposes for determining pre-construction conditions. The original will also be used as a guide by the Engineer, prior to issuance of final payments, in

determining the adequacy of restoration and the extent of damages attributable to the Contractor's work.

b. One copy of the video will be placed in the project file as a back-up copy to the original.
c. The remaining copy of the audio-video survey will be delivered to the Owner.

B. Technical Requirements

1. The total audio-video recording system and the procedures employed in its use shall be such as to produce a finished product that will fulfill the technical requirements of the project, as well as those more subjective requirements of high-quality audio and video production.
2. The video portion of the recording shall reproduce bright, sharp, clear pictures with accurate colors and shall be free from distortion, tearing, rolls or any other form of picture imperfection.
3. The audio portion of the recording shall reproduce precise and concise explanatory notes by the camera operator with proper volume, clarity and freedom from distortion. The audio shall describe the conditions being viewed; however, the audio shall not provide judgements of the conditions being viewed (e.g., The audio shall state the presence of a crack in the foundation of a house but shall not state that the crack is “very bad” or other judgment of the condition.).

C. Camera and Recorder - The camera and recorder shall be an industrial grade device (Commercial grade recorders shall not be acceptable). The video images along with the accompanying audio description shall be recorded on an optically readable disk and shall be standard DVD format (MPEG-2). The recorder shall record the color signal to the DVD disk with a 720p resolution. Should the videographer’s equipment record to the DVD using a format other than the standard MPEG-2 DVD format, such as MPEG-3, decoding software for installation on the Owner’s and Engineer’s PCs shall be provided at no additional cost to either the Owner or Engineer.

D. Character Printout - All video recordings must, by electronic means, display continuously and simultaneously, generated digital information to include the date of the recording and the engineering stationing corresponding to the stationing on the plans. The beginning frames of the audio-video survey for each segment shall include a screen showing the project name, the project number, the name of the street, servitude, easement, or building being documented, the direction of travel and the viewing side when applicable. The date shall appear linearly in the bottom left hand corner (e.g. mm-dd-yy or mm-dd-yyyy). Plan stationing shall be expressed in feet and shall appear directly beneath the date information (e.g., 8703.26 for station number 87+03.26). If the stationing alignment contains an equation, an audio explanation shall be entered in audio description of the audio-video survey, the recording shall be stopped for adjustment of the station number, and the recording shall resume with an audio explanation that the footage meter was adjusted to conform to the station equation.

SECTION 01350 – CONSTRUCTION PHOTOGRAPHS

2.02 STILL PHOTOGRAPHY

A. Camera – The digital camera shall be rated 3 megapixels, minimum.

B. Technical Requirements – Individual photographs shall be taken with the camera set on the highest resolution setting.

C. Video imagery meeting the requirements for coverage of views as stated in subsequent paragraphs may be substituted for still photographs, provided the video imagery is submitted on a DVD disk providing the capability of printing still images from the video meeting the requirements for still photography.

D. Submittal Media – Photography shall be submitted on standard camera storage card, CD or DVD

PART - III EXECUTION

3.01 TECHNIQUE FOR STILL PHOTOGRAPHS

A. Factual presentation.

B. Correct exposure and focus.

C. High resolution and sharpness.

D. Maximum depth-of-field.

E. Minimum distortion.

3.02 VIEWS REQUIRED FOR STILL PHOTOGRAPHS

A. Contractor shall take a minimum of 10 photographs from locations to adequately illustrate the preconstruction conditions of not only the site, but surrounding conditions, especially houses or other buildings, landscaping, sidewalks, driveways, etc. One photograph shall be taken at each major compass point and each of the four primary minor compass points. These photographs shall be oriented such that the construction site is in the foreground and the condition of the adjacent areas is shown clearly in the background.

B. At least 6 additional still photographs shall be taken inside existing structures in which work is to be performed showing each wall, the ceiling and the floor.

C. The Contractor shall also inspect and photograph any structure within 100 feet of each construction site prior to beginning of work. Photographs of any existing damaged areas shall be taken.

D. The same sites and views shall be photographed at the completion of construction.

SECTION 01350 – CONSTRUCTION PHOTOGRAPHS

3.03 TECHNIQUE AND VIEWS REQUIRED FOR VIDEO DOCUMENTATION

A. At the start of production, and at the beginning of a new street, servitude, or easement, an identification summary shall be read into the record while, at the same time, a wide-angle view with numeric displays shall be provided for a visual record. This summary shall include (1) DVD number, (2) job title, (3) job location, (4) positional location at start of the video, (5) date and time, (6) weather and (7) any other notable conditions.

B. Recording Schedule - The recording shall be performed prior to the placement of any construction materials or equipment on the proposed construction site, but not more than seven weeks prior to the placement of materials or equipment.

C. DVD Indexing - All video DVDs and their storage cases shall be properly identified by video DVD index number, project title and general project location. An abbreviated index shall be displayed on the storage case of each video DVD to log that DVD's contents. A typed log detailing the contents of the DVD shall accompany the DVD describing 1) the various segments contained on that tape in terms of the names and the sides of the streets, servitudes, or easements, 2) coverage start, direction and endpoints, with corresponding counter or time stamp numbers when applicable.

D. Coverage

1. The recording shall include coverage of all surface features located within the construction zone-of-influence. This zone shall be defined as (1) the area within the permanent and temporary servitudes, easements and areas adjacent to these servitudes or easements which may be affected by routine construction operations, (2) road right-of-way, (3) other areas directed by the Engineer.
2. The surface features within the construction zone shall include, but not be limited to, all roadways, pavements, curbs, driveways, sidewalks, culverts, headwalls, retaining walls, buildings, landscaping, shrubbery and fences. Of particular concern shall be the existence, or non-existence, of any faults, fractures or defects.
3. The coverage shall be continuous (i.e., the camera shall not be turned off once photography has begun) to the greatest extent practicably possible. If the camera must be turned off, then a verbal message shall be inserted stating that the camera will be turned off and the reason for discontinuing coverage.
4. The audio portion of the survey is not intended to be a complete narrative, but to point out visible defects and their physical relationship to the primary orientation of the survey.

E. Visibility - No recording shall be done during periods of significant precipitation, mist or fog. The recording shall only be done when sufficient sunlight is present to properly illuminate the subjects of recording.

F. Rate of Travel

1. The vehicle's rate of travel shall be indirectly proportional to the number, size and value of the surface features within that construction area's zone-of-influence.

2. The average rate of travel shall not exceed forty-four feet per minute (0.5 mph).
3. Forward motion shall be halted when viewing objects or structures outside the limits of the street, servitude, or easement being documented.
4. Conversely, only the street, servitude, or easement being documented shall be viewed while the camera is being moved forward.

G. Camera Elevation - To ensure proper perspective and to capture optimal detail, the distance from the camera lens to the ground shall not be less than twelve feet when conventional wheeled vehicles are employed.

H. Experience - The operator in charge must have had previous experience video documenting a minimum of fifty miles of pre-construction work. Any apprentice operators must be continuously supervised by an above-described experienced operator.

I. Unacceptable Documentation - The Engineer shall have the authority to reject all or any portion of the video tape documentation not conforming to the specifications. Those rejected portions shall be retaped at no additional cost to the Owner.

J. Specification Deviations - Any deviation from these specifications must have the written approval of the Owner/Engineer.

3.04 DELIVERY OF MEDIA

A. After acceptance of the audio-video survey, deliver record copies to Engineer on the specified media.

B. Pre-construction photographs shall be delivered to the Engineer prior to the beginning of construction on each pump station site.

C. Deliver progress prints to Engineer to accompany each Application for Payment.

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01360 – CLEANING

PART - I GENERAL

1.01 REQUIREMENTS INCLUDED

Cleaning shall include daily "policing" of the work and surrounding areas to clear general debris, waste paper, wood scraps, broken concrete, and other objectionable material along with the final cleanup of site(s) required for project acceptance.

1.02 DISPOSAL REQUIREMENTS

Conduct cleaning and disposal operations to comply with codes, ordinances, regulations, and anti-pollution laws.

PART - II PRODUCTS - NOT USED

PART - III EXECUTION

3.01 DURING CONSTRUCTION

A. Execute daily cleaning to keep the Work, the site and adjacent properties, free from accumulations of waste materials, rubbish and windblown debris, resulting from construction operations.

B. Provide onsite containers for the collection of waste materials, debris and rubbish. All waste materials including containers, food debris and other miscellaneous materials must be disposed of daily in onsite containers.

C. Remove waste materials, debris and rubbish from the site periodically and dispose of at legal disposal areas away from the site.

3.02 FINAL CLEANING

A. Employ skilled workmen for final cleaning.

B. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials from sight-exposed interior and exterior surfaces.

C. Broom clean exterior paved surfaces; rake clean other surfaces of the grounds.

D. Prior to final completion or Owner occupancy, Contractor shall conduct an inspection of sight-exposed interior and exterior surfaces and all work areas to verify that the entire Work is clean.

SECTION 01360 – CLEANING

E. Apply a finished paint coat per the specifications in Division 09 to all equipment incorporated into the project. Final finish coat of paint shall be applied after equipment has been installed.

3.03 FUELING

Upon servicing all equipment, all fuel storage tanks shall be filled.

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01370 – CONTRACT CLOSEOUT

PART - I GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Contractor shall comply with the requirements stated in the General Conditions and in the Specifications for administrative procedures in closing out the work.

B. The following is a list of items required to complete the project.

1. Owner may request use of substantially completed portions of the work without such use constituting acceptance. Provision should be made for consent or notification of the surety and the insurers for the project;
2. Contractor to request Substantial Completion inspection of the project or a portion thereof in writing, that among other requirements provides certification that all excess excavation stored in temporary stockpiles has been removed from the project, when construction is sufficiently complete to be utilized for the purposes intended of in accordance with Louisiana Law and as further defined herein;
3. Owner, Engineer, Contractor, and Resident Project Representative to make substantial completion inspection. A list of incomplete items will be prepared by the Engineer.
4. Engineer will issue a Substantial Completion Certificate with the effective date of substantial completion, including an attached list of uncompleted items. In accordance with Louisiana Law, the list of incomplete items shall include the Engineer's estimate of the cost to complete the items shown on the Substantial Completion Punchlist. The Certificate of Substantial Completion will be submitted to the Qwner's legislative body for acceptance and then will be filed by the Owner for the period of time prescribed by Louisiana Law for clearance of leins. Besides listing the uncompleted items, the substantial completion shall designate the responsibilities for utilities, maintenance and insurance; and any exceptions to guarantees or warranties.
5. Contractor shall complete list of uncompleted items. Upon the completion of work, he shall request a final inspection in writing.
6. Final Inspection shall be made by Owner, Contractor, Engineer, Resident Project Representative, Regulatory Agencies, Funding Agency and any other agency involved in the project.
7. Contractor shall make final request for payment with the appropriate data (i.e., clear-lien certificate, release from surety, etc., all as required by Louisiana Law).
8. Engineer to process final payment request releasing retainage and present request to Owner for final payment.

1.02 SUBSTANTIAL COMPLETION

A. When the Contractor considers the Work is substantially complete, he shall submit to the Engineer:

1. A written notice that the Work or designated portion thereof is substantially complete.

2. A list of items to be completed or corrected.

B. Within five (5) working days after receipt of such notice, the Engineer will make an inspection to determine the status of completion. The Engineer's opinion as to the status of completion shall be based on completion of the following as applicable:

1. Installation of all piping, valves, mains, and/or service lines, including acceptable pressure, leakage or other required tests.
2. Installation of all equipment including, but not limited to pumps, motors, fans, blowers, aerators, dehumidifiers, and surge suppressors.
3. Installation or construction of structures including all required protective or aesthetic coatings or devices including required tests.
4. Installation of electrical conduits, wiring, load centers, controls, and all other electrical elements as required including tests, inspections, and approval by local agencies for compliance with ordinances and codes.
5. Backfill and compaction of backfill as indicated by required tests for all structures, pipelines, conduits, and other subterranean installations.
6. Installation or restoration of pavements including required tests for subbase, base and pavement materials, and approval by the Owner or governmental entity responsible for operation and maintenance of the roadway, where required. Pavements shall not be individually considered and shall be considered only with other portions of the Work requiring the installation or restoration of pavement.
7. All painting required by the Contract Documents except for touch-up.
8. All excess excavation stored in temporary stockpiles has been removed from the project,
9. Topsoiling, final grading, fertilizing, seeding, sodding, or landscaping except for growth of vegetation and watering to establish the required ground cover of vegetative growth.
10. Release of all permits whether or not the permit was acquired by the Contractor.
11. Installation of all doors, windows, louvers, and other building appurtenances including painting, finish hardware, glazing, locks, and other required devices to secure the Work.
12. All required instructions for the Owner's operation and maintenance personnel including the appropriate number of copies of the required operation and maintenance manual for use by the Owner's personnel.

C. Should the Engineer determine that the Work is not substantially complete:

1. The Engineer will promptly notify the Contractor in writing, giving the reasons therefore in accordance with the Contract Documents providing specific references to the General and Supplemental Conditions, Specifications and/or Drawings as applicable.
2. Contractor shall remedy the deficiencies in the Work, and send a second written notice of substantial completion to the Engineer.
3. The Engineer will reinspect the Work.

D. When the Engineer finds that the Work is substantially complete, he will:

1. Prepare and deliver to Owner a tentative Certificate of Substantial Completion with a tentative list of items to be completed or corrected before final payment in accordance with the General and Supplementary Conditions. In accordance with Louisiana Law, the list of incomplete items shall include the Engineer's estimate of the cost to complete the items shown on the Substantial Completion Punchlist.
2. After consideration of any objections made by the Owner as provided in the General and Supplemental Conditions of the Contract, and when the Engineer considers the Work substantially complete, he will execute and deliver to the Owner and the Contractor a definite Certificate of Substantial Completion with a revised tentative list of items to be completed or corrected.
3. The Owner will file the completed Certificate of Substantial Completion with the appropriate Parish office to begin the State mandated lien clearance period.

1.03 FINAL INSPECTION

A. When Contractor considers the Work is complete, he shall submit written certification that:

1. Contract Documents have been reviewed.
2. Work has been inspected for compliance with Contract Documents.
3. Work has been completed in accordance with Contract Documents.
4. Equipment and systems have been tested in the presence of the Engineer and Owner's representative and are operational.
5. Work is completed and ready for final inspection.

B. The Engineer will make an inspection to verify the status of completion with five working days after receipt of such certification.

C. Should the Engineer consider that the work is incomplete or defective:

1. The Engineer will promptly notify the Contractor in writing, listing the incomplete or defective work, including the Engineer's estimated cost to complete each item.
2. Contractor shall take immediate steps to remedy the stated deficiencies, and send a second written certification to the Engineer that the Work is complete.
3. The Engineer will reinspect the Work.

D. When the Engineer finds that the Work is acceptable under the Contract Documents, he shall request the Contractor to make closeout submittals.

1.04 REINSPECTION FEES

A. Should the Engineer perform reinspections due to failure of the Work to comply with the claims of status of completion made by the Contractor, the Engineer shall be due fees for additional services in accordance with the General and Supplemental Conditions of the Contract.

B. Owner shall compensate the Engineer for such additional services.

C. Owner shall deduct the amount of such compensation from the final payment to the Contractor.

1.05 CONTRACTOR'S CLOSEOUT SUBMITTALS TO ENGINEER

A. Evidence of compliance with requirements of governing authorities, including a clear lien certificate issued by the appropriate Parish office.

B. Project Record Documents.

C. Manufacturer's Certificates of Installation.

D. Warranties and Bonds.

E. Keys and Keying Schedule.

F. Spare Parts and Maintenance Materials.

G. Certificate of Insurance for Products and Completed Operations.

1.06 FINAL ADJUSTMENT OF ACCOUNTS

A. The Contractor shall submit a final statement of accounting to the Engineer.

B. Statement shall reflect all adjustments to the Contract Sum:

1. The original Contract Sum.
2. Additions and deductions resulting from:

    a. Previous Change Orders
    b. Changes in quantities of work for items paid under Unit Prices
    c. Deductions for uncorrected Work
    d. Penalties and Bonuses (when applicable)
    e. Deductions for liquidated damages
    f. Deductions for reinspection payments
    g. Other adjustments

3. Total Contract Sum, as adjusted.
4. Previous Payments.

C. Engineer will prepare a final Change Order reflecting approved adjustments to the Contract Sum which were not previously made by Change Orders.

D. In accordance with the requirements of the Contract Documents, the Engineer will submit the final Change Order and a recommendation for acceptance of the Work to the Owner for approval.

SECTION 01370 – CONTRACT CLOSEOUT

1.07 CONTRACT CLEAR LIEN CERTIFICATE AND FINAL APPLICATION FOR PAYMENT

A. Upon the Owner's approval of the Substantial Completion Certificate, the Owner shall make filings with the Recorder of Mortgages in the Parish where the Owner is located as required by Louisiana State Public Contract Statute.

B. In accordance with the Louisiana State Public Contract Statute, the Recorder of Mortgages shall issue a Clear Lien and Privilege Certificate upon expiration of a period of not less than forty-five (45) days, provided no liens are recorded against the Project. Note, it is the Contractor’s responsibility to coordinate with the Parish Recorder of Mortgages to obtain the Clear Lien Certificate.

C. Upon receipt of the Clear Lien and Privilege Certificate, the Contractor shall submit a Final Application for Payment to the Engineer requesting payment of all monies due to the Contractor, including the release of the project retainage with the certificate attached as evidence of authority for the Owner to pay the retainage.

D. The Engineer shall review the Final Application for Payment and if in order shall transmit the application to the Owner for final payment to the Contractor.

E. In accordance with the General Conditions, the Owner shall release the retainage and make payment to the Contractor the legal sum of the retainage with appropriate adjustments in accordance with the final Change Order for which the Contractor is entitled.

PART - II PRODUCTS - NOT USED

PART - III EXECUTION - NOT USED

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01371 - PROJECT RECORD DOCUMENTS

PART - I GENERAL

1.01 REQUIREMENTS INCLUDED

A. Maintain at the site for the Owner one record copy of:

1. Conformed Drawings.
2. Conformed Specifications.
3. Change Orders and other Modifications to the Contract.
4. Engineer's Field Orders or written instructions.
5. Approved Shop Drawings, Working Drawings and Samples.
6. Field Test records.
7. Construction photographs.
8. Latest, Approved Progress Schedule.

1.02 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. Store documents and samples in Contractor's field office, or other appropriate place when a field office is not required, apart from documents used for construction.

1. Provide files and racks for storage of documents.
2. Provide locked cabinet or secure storage space for storage of samples.
3. File documents and samples in accordance with Specification requirements.
4. Maintain documents in a clean, dry, legible, condition and in good order. Do not use record documents for construction purposes.
5. Make documents and samples available at all times for inspection by the Engineer.

B. As a pre-requisite for monthly progress payments, the Contractor is to exhibit the currently updated "record documents" for review by the Engineer and Owner. Should the "record documents" be found in a condition that is not up-to-date, the Owner may withhold progress payments until the Contractor updates the "record documents" to a condition showing the current status of the Work.

1.03 MARKING DEVICES

Provide felt tip marking pens for recording information in the color code designated by the Engineer.

1.04 RECORDING

A. Label each document "PROJECT RECORD" with rubber stamp.

B. Record information concurrently with construction progress and do not conceal any work until required information is recorded.

C. Legibly mark drawings to record actual construction:

1. The Contractor shall use the following color code in marking Record Drawings.
2. Yellow highlighter for no change.
3. Red to indicate additions, deletions and changes.
4. Elevations of various structure elements in relation to elevation datum.
5. Elevations referenced to control points established by the Owner's agent.

D. Specifically, elevations of drainage culvert inverts, building slabs, top of roadway and driveway curbs, bridges, sewer manhole top and invert elevation of the outlet pipe with invert elevations of each inlet pipe, top and invert elevations of air release manholes, etc.

E. All underground piping with elevations and dimensions, changes to piping location, horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements, actual installed pipe material, class, etc.

F. Elevations of constructed underground piping at 100 ft. increments and points where changes occur in either the slope or horizontal direction.

G. Three swing ties from referenced permanent surface improvements to the pipe centerline at 500 ft. increments and the center of each manhole cover, valve, wye branch, vent, end of service connection at the property line, other fittings and appurtenances.

H. Identify existing utilities which parallel the proposed construction, including size and offset distance horizontally and vertically, when exposed by the construction activity.

I. Identify existing utilities including size, material type, vertical clearance over or under, intersecting station, and angle of intersection crossing proposed construction.

J. Location of internal utilities and appurtenances concealed in the construction by referencing to visible and accessible features of the structure.

K. Field changes of dimension and detail.

L. Changes made by Field Order or by Change Order.

M. Details not on original contract drawings.

N. Equipment and piping relocations.

O. Identify the actual motor installed by manufacturer's name, nameplate horsepower and serial number.

P. Identify the actual pump installed by manufacturer's name, model number, impeller size, rated capacity and serial number.

Q. Major architectural and structural changes including relocation of doors, windows, etc.

R. Specifications and Addenda; Legibly mark each Section to record:

1. Manufacturer, trade name, catalog number, and supplier of each Product and item of equipment actually installed.
2. Changes made by Field Order or by Change Order.
3. Shop Drawings (after final review):

S. One set of shop drawings for each process equipment, piping, electrical system and instrumentation system.

T. Certified site survey and line elevations and stationing at 100 ft. increments and all points of change of direction of pipelines per the requirements of the Contract Documents by a registered land surveyor.

1.05 SUBMITTAL

A. At Contract close-out, deliver Record Documents to the Engineer for the Owner.

B. Accompany submittal with transmittal letter in duplicate containing:

1. Date.
2. Project title and number.
3. Contractor's name and address.
4. Title and number of each Record Document.
5. Signature of Contractor or his authorized representative.

PART - II PRODUCTS - NOT USED

PART - III EXECUTION - NOT USED

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01372 – OPERATING AND MAINTENANCE DATA

PART - I GENERAL

1.01 REQUIREMENTS INCLUDED

A. Compile product data and related information appropriate for Owner's operation and maintenance of equipment furnished under Contract.

1. Prepare operating and maintenance data as specified herein and as referenced in other pertinent Sections of the Contract Documents.
2. Submit operating and maintenance manuals as specified herein.

B. Instruct Owner's personnel in maintenance of products and in operation of equipment and systems.

1.02 QUALITY ASSURANCE

Preparation of data shall be done by personnel:

1. Trained and experienced in maintenance and operation of described products.
2. Familiar with requirements of this Section.
3. Skilled in technical writing to the extent required to communicate essential data.
4. Skilled draftsman competent to prepare required drawings.

1.03 FORM OF SUBMITTALS

A. Prepare data in form of an operating and maintenance manual for use by Owner's personnel.

B. Format:

1. Size: 8 1/2 inches x 11 inches, punched and reinforced for insertion into the binders.
2. Paper: 20 pound minimum white, for typed pages.
3. Text: Manufacturer's printed data, or neatly typewritten.
4. Drawings:
   a. Provide reinforced punched binder tabs, bind in with text.
   b. Reduce larger drawings and fold to size of text pages but not larger than 11 inches x 17 inches.
5. Provide fly-leaf for each separate product, or each piece of operating equipment.
   a. Provide typed description of product, and major component parts of equipment.
   b. Provide indexed tabs.
6. Cover: Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS" List:

   a. Title of Project.
   b. Identity of each separate structure as applicable.
   c. Identity of general subject matter covered in the manual.

C. Binders:

1. Commercial quality three-post binders with durable and cleanable plastic covers.
2. Maximum post size: 2-inches, D-ring.
3. When multiple binders are used, correlate the data into related consistent groupings.

1.04 CONTENT OF OPERATING AND MAINTENANCE MANUAL

A. A complete neatly typewritten table of contents listing documents in all volumes shall be included and arranged in systematic order.

1. Contractor, name of responsible principal, address and telephone number.
2. A list of each product required to be included, indexed to content of the volume.
3. List, with each product, name, address and telephone number of:
   a. Subcontractor or installer.
   b. Maintenance contractor, as appropriate.
   c. Identify area of responsibility of each.
   d. Local source of supply for parts and replacement.
4. Identify each product by product name and other identifying symbols as set forth in Contract Documents.

B. Product Data:

1. Include only those sheets that are pertinent to the specific product.
2. Annotate each sheet to:
   a. Clearly identify specific product or part installed.
   b. Clearly identify data applicable to installation.
   c. Delete references to inapplicable information.

C. Drawings:

1. Supplement product data with drawings as necessary to clearly illustrate:
   a. Relations of component parts of equipment and systems.
   b. Control and flow diagrams.
2. Coordinate drawings with information in Project Record Documents to assure correct illustration of completed installation.
3. Do not use Project Record Documents as maintenance drawings.

D. Written text, as required to supplement product data for the particular installation:

1. Organize in consistent format under separate headings for different procedures.
2. Provide logical sequence of instructions of each procedure.

E. Copy of each warranty, bond and service contract issued and provide information sheet for Owner's personnel, giving proper procedures in the event of failure and instances that might affect the validity of warranties or bonds. The warranty, bond and/or service contract shall be collated with the order of presentation of the equipment in the O&M

SECTION 01372 – OPERATING AND MAINTENANCE DATA

Manual and shall be placed in a separate section of the manual with a separator tab titled "WARRANTIES".

F. Provide for each unit of equipment and system, as appropriate:

1. Description of unit and component parts.
   a. Function, normal operating characteristics, and limiting conditions.
   b. Performance curves, engineering data and tests.
   c. Complete nomenclature number of replaceable parts including standard or manufacturer's part.
2. Operating procedures:
   a. Start-up, break-in, routine and normal operating instructions.
   b. Regulation, control, stopping, shutdown and emergency instructions.
   c. Summer and winter operating instructions.
   d. Special operating instructions.
3. Maintenance Procedures:
   a. Routine operations.
   b. Guide to "troubleshooting".
   c. Disassembly, repair, and reassembly.
   d. Alignment, adjusting and checking.
4. Servicing and lubrication schedule including a list of lubricants required.
5. Manufacturer's printed operating and maintenance instructions.
6. Description of sequence of operation by control manufacturer.
7. Original manufacturer's parts list, illustrations, assembly drawings and diagrams required for maintenance including the following:
   a. Predicted life of parts subject to wear.
   b. Items recommended to be stocked as spare parts.
8. As-installed control diagrams by controls manufacturer.
9. Each contractor's coordination drawings including as-installed color coded piping diagrams.
10. Charts of valve tag numbers, with location and function of each valve.
11. Cataloged list of manufacturer's spare parts supplied with the equipment or system, manufacturer's current prices, and recommended quantities to be maintained in storage.
12. Other data as required under pertinent sections of Specifications.

G. Content, for each electric and electronic system, as appropriate:

1. Description of system and component parts.
   a. Function, normal operating characteristics, and limiting conditions.
   b. Performance curves, engineering data and tests.
   c. Complete nomenclature including standard or manufacturer's part number for replaceable parts.
2. Circuit directories of panelboards.
   a. Electrical service.
   b. Controls.

c. Communications.
3. As-installed color coded wiring diagrams.
4. Operating procedures:
   a. Routine and normal operating instructions.
   b. Sequences required.
   c. Special operating instructions.
5. Maintenance procedures:
   a. Routine operations including recalibration procedures.
   b. Guide to "troubleshooting".
   c. Disassembly, repair and reassembly.
   d. Adjustment and checking.
6. Manufacturer's printed operating and maintenance instructions.
7. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.
8. Other data as required under pertinent sections of specifications.

H. Prepare and include additional data when the need for such data becomes apparent during instruction of Owner's personnel.

I. Additional requirements for operating and maintenance data as required by the respective sections of the Specifications.

1.05 SUBMITTAL SCHEDULE AND REQUIREMENTS

A. Submit two (2) copies of preliminary draft of proposed formats and outlines of contents of Operating and Maintenance Manual within thirty (30) days of first Engineer review of shop drawings for each equipment item. The Engineer will review the preliminary draft and return one copy with comments.

B. Submit five (5) copies of the final manual to the Engineer thirty (30) calendar days prior to the product shipment to the project site and preferably within thirty (30) days after the reviewed copy is received.

C. Submit five (5) copies of any addenda to the Operating and Maintenance Manual as applicable with certificates as specified in the Section entitled "Material and Equipment" within thirty (30) days after final inspection and start-up.

D. INSTRUCTION OF OWNER'S PERSONNEL

E. Prior to initial start-up inspection or request for substantial completion, fully instruct Owner's designated operating and maintenance personnel in operation, adjustment and maintenance of products, equipment and systems.

F. Operating and maintenance manual shall constitute the basis of instruction and shall review comments of manual with personnel in full detail to explain all aspects of operation and maintenance.

SECTION 01372 – OPERATING AND MAINTENANCE DATA

PART - II PRODUCTS - NOT USED

PART - III EXECUTION - NOT USED

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01373 – WARRANTIES AND BONDS

PART - I GENERAL

1.01 REQUIREMENTS INCLUDED

A. Compile specified warranties and bonds required by the General Conditions and other portions of the Contract Documents.

B. Co-execute documents for compliance with requirements of the Contract Documents

1. Manufacturers' warranties and the State mandated Contractor's one-year warranty should be for concurrent periods.
2. If a Manufacturer will not agree to provide warranty concurrent with the Contractor's one-year warranty, the Contractor shall provide a maintenance contract with the Manufacturer assuring concurrent Manufacturer warranty coverage with the Contractor's warranty at no additional cost to the Owner.

C. Review submittals to verify compliance with Contract Documents.

D. Submit to the Engineer for review and transmittal to Owner.

1.02 SUBMITTAL REQUIREMENTS

A. Assemble and include warranties, bonds and service and maintenance contracts, executed by each of the respective manufacturers, suppliers, and subcontractors including effective dates as required by the Supplemental Conditions.

B. Number of original signed copies required: Two each.

C. Additional copies of the original: One in each copy of the Operating and Maintenance Manual.

D. Table of Contents: Neatly typed in orderly sequence. Provide complete information for each item.

1. Product or work item.
2. Manufacturer with principal address and telephone number.
3. Manufacturer's representative with principal address and telephone number when applicable.
4. Scope of the warranty, bond or service and maintenance contract.
5. Date of beginning warranty, bond or service and maintenance contract.
6. Duration of warranty, bond or service maintenance contract.
7. Provide information for Owner's personnel:
   a. Proper procedure in case of failure.
   b. Instances which might affect the validity of warranty or bond.
8. Contractor, name of responsible principal, address and telephone number.

SECTION 01373 – WARRANTIES AND BONDS

1.03 FORM OF SUBMITTALS

A. Prepare in packets as required for submittal.

B. Format:

1. Size: 8 1/2 inches x 11 inches, punch and reinforce sheets for standard 3-post binder.
2. Fold larger sheets to fit into binder.
3. Cover: Identify each packet with typed or printed title "WARRANTIES AND BONDS" List:
   a. Title of Project.
   b. Name of Contractor.
   c. Manufacturer's order number.

1.04 WARRANTY SUBMITTAL REQUIREMENTS

A. For all major pieces of equipment, unless stated otherwise in the specifications for each individual item of equipment, submit a written warranty from the equipment manufacturer to replace promptly any equipment or component thereof which, in the sole opinion of the Engineer, has defects in design, workmanship, materials, or performance during warranty period prescribed in the Supplemental Conditions and herein.

B. The Contractor shall obtain manufacturer's warranties for all equipment which has 1 HP motor or larger and/or which has a retail list cost of more than $1,000.00. The Engineer reserves the right to request warranties for equipment not so classified. The Contractor shall warrant all equipment in the Contract for the State mandated one-year warranty period even though manufacturer's warranties may not be required.

C. In the event that the Contractor is unable to obtain the above required concurrent one-year warranty or an equivalent service contract from an equipment manufacturer, the Contractor shall provide, prior to acceptance for operation of the equipment by the Owner, a bank letter of credit in favor of the Owner in the amount of two-hundred percent (200%) of the purchase price of the equipment for a period of 18 months from the beginning of the warranty period on which the Owner may draw for replacement of defective equipment including both materials and labor.

PART - II PRODUCTS - NOT USED

PART - III EXECUTION - NOT USED

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01400 – QUALITY CONTROL

PART - I GENERAL

1.01 DESCRIPTION

This section includes general quality control procedures and requirements that are applicable to other sections.

1.02 TESTING LABORATORY

A. If desired by the Owner, a qualified testing laboratory will make field visits to sample such items as Portland cement concrete, hot or cold-mix asphalt, earthwork fill and compaction, aggregate, welding, etc. The frequency of testing will be at the discretion of the Owner and the recommendations of the Engineer to the Owner.

B. Refer to the Section titled “Testing Laboratory Services” for a detailed description of testing laboratory services.

1.03 PROJECT OBSERVATION SERVICES

A. The Owner may employ the services of a Resident Project Representative (RPR) to observe field operations, provide daily reports, and act as a liaison between the Engineer and Contractor.

B. Refer to the Section titled “Resident Project Representative Services” for a detailed description of the Resident Project Representative’s responsibilities.

1.04 CONFORMANCE STANDARDS

A. The manufacturer of equipment shall issue a manufacturer's conformance certificate indicating the product was assembled or constructed in accordance with specific standards and that the product performs under specific parameters.

B. Submit conformance certificates in accordance with the requirements of the Section titled “Shop Drawings, Project Data, and Samples”.

1.05 CERTIFIED TEST REPORTS

A. Test reports performed in the field or in the shop shall be certified by the manufacturer of the product.

B. Submit certified test reports in accordance with the requirements of the Section titled “Shop Drawings, Project Data, and Samples”.

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01410 – TESTING LABORATORY SERVICES

PART - I GENERAL

1.01 REQUIREMENTS INCLUDED

A. Owner will, at his discretion, employ and pay for the services of an Independent Testing Laboratory to perform testing specifically indicated in the Contract Documents and may at any other time elect to have materials and equipment tested for conformity with the Contract Documents.

B. Contractor shall cooperate with the laboratory to facilitate the execution of its required services.

C. Employment of the laboratory shall in no way relieve Contractor's obligations to perform the Work of the Contract.

D. Various portions of the work identify specific tests of a specialty nature (i.e., steel mill tests, NSF standard compliance, etc.) which are to be performed by an entity other than the Owner’s independent testing laboratory. These specialty tests shall be provided by the Contractor as an integral part of the work on the project and at no additional cost to the Owner.

1.02 LIMITATIONS OF AUTHORITY OF TESTING LABORATORY

Laboratory is not authorized to:

1. Release, revoke, alter or enlarge on requirements of Contract Documents.
2. Approve or accept any portion of the Work.
3. Perform any duties of the Contractor.

1.03 CONTRACTOR'S RESPONSIBILITIES

A. Coordinate and cooperate with laboratory personnel, provide access to Work and to Manufacturer's operations.

B. Secure and deliver to the laboratory adequate quantities of representative samples of materials proposed to be used and which require testing.

C. Provide to the laboratory the preliminary design mix proposed to be used for concrete, and other material mixes which require control by the testing laboratory.

D. Materials and equipment used in the performance of work under this Contract are subject to inspection and testing at the point of manufacture or fabrication. Standard specifications for quality and workmanship are indicated in the Contract Documents. The Engineer may require the Contractor to provide statements or certificates from the manufacturers and fabricators that the materials and equipment provided by them are manufactured or fabricated in full accordance with the Contract Documents for quality and workmanship. All costs of this testing and providing statements and certificates shall

be a subsidiary obligation of the Contractor, and no extra charge to the Owner shall be allowed on account of such testing and certification.

E. Furnish incidental labor and facilities:

1. To provide access to Work to be tested.
2. To obtain and handle samples at the Project site or at the source of the product to be tested.
3. To facilitate inspections and tests.
4. For storage and curing of test samples.

F. Notify laboratory at least 48 hours in advance of operations to allow for laboratory assignment of personnel and scheduling of sampling and tests. When tests or inspections cannot be performed after such notice, reimburse Owner for laboratory personnel labor and travel expenses incurred due to Contractor's negligence.

G. Employ and pay for the services of the same or a separate, equally qualified independent testing laboratory, to perform additional inspections, sampling and testing required for the Contractor's convenience and as approved by the Engineer.

H. The Owner will pay the laboratory costs for the first samples taken on any material. If the test results indicate the material or equipment complies with the Contract Documents, the Owner shall pay for the cost of the testing laboratory. The costs for any subsequent retests indicate that the materials and equipment either fails or is proven to not meet the requirements of the Contract Documents, the Contractor may pay for the laboratory costs directly to the testing firm or the total of such costs shall be deducted from any payments due the Contractor.

PART - II PRODUCTS - NOT USED

PART - III EXECUTION

3.01 REPORTS

Testing Laboratories are required to provide a minimum of four copies of each test report. Copies shall be submitted to the Engineer who will distribute to 1) Owner, 2) Engineer, 3) Contractor, and 4) Resident Project Representative.

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01420 – RESIDENT PROJECT REPRESENTATIVE SERVICES

PART - I GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Owner will employ the services of a Resident Project Representative (RPR), either from the Owners staff or on a contractual basis, in an effort to protect the Owner against defects and deficiencies in the work.

B. The RPR will:

1. act as the Owner’s and Engineer's agent at the site,
2. act as directed by and under the supervision of the Engineer, and
3. will confer with the Engineer regarding the RPR's actions.

C. RPR's dealings in matters pertaining to the on-site work shall in general be with Engineer and Contractor keeping Owner advised as necessary. RPR's dealings with subcontractors shall only be through or with the full knowledge and approval of Contractor. RPR shall generally communicate with Owner with the knowledge of and under the direction of Engineer.

1.02 DUTIES AND RESPONSIBILITIES OF RPR

A. Review the Progress Schedule, Schedule of Shop Drawing Submittals and Schedule of Values prepared by Contractor and consult with Engineer concerning acceptability.

B. Attend meetings with Contractor, such as pre-construction conferences, progress meetings, and other project-related meetings, and prepare and circulate copies of minutes thereof.

C. Serve as Engineer's liaison with Contractor, working principally through Contractor's superintendent and assist in understanding the intent of the Contract Documents; and assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's on-site operations.

D. Assist in obtaining from Owner additional details or information, when required for proper execution of the Work.

E. Shop Drawings and Samples -

1. Generally, shop drawings will be delivered directly to the Engineer but when shop drawings are delivered to the RPR, record date of receipt of Shop Drawings and samples.
2. Receive samples that are furnished at the site by Contractor and notify Engineer of availability of samples for examination.
3. Advise Engineer and Contractor of the commencement of any Work requiring a Shop Drawing or sample if the submittal has not been accepted by Engineer.

F. Review of Work, Rejection of Defective Work, Inspections and Tests -

1. Conduct on-site observations of the Work in progress to assist Engineer in determining that the Work is in general proceeding in accordance with the Contract Documents and the Progress Schedule.
2. Report to Engineer whenever RPR believes that any Work is unsatisfactory; faulty or defective; does not conform to the Contract Documents; has been damaged; does not meet the requirements of any observation, test or acceptance required to be made; and advise Engineer of Work that RPR believes should be corrected or rejected or should be uncovered for observation, or requires special testing or inspection for acceptance.
3. Verify that tests, equipment and systems startup and operating and maintenance training are conducted in the presence of appropriate Owner's personnel and that Contractor maintains adequate records thereof; and observe, record and report to Engineer appropriate details relative to the test procedures and startup.

G. Accompany visiting inspectors representing public or other agencies having jurisdiction over the Project, record the results of these inspections and report to Engineer.

H. Report to Engineer when clarifications and interpretations of the Contract Documents are needed and transmit to Contractor clarifications and interpretations as issued by Engineer.

I. Consider and evaluate Contractor's suggestions for modifications in Drawings or Specifications and report RPR's recommendations to Engineer. Transmit to Contractor decisions as issued by Engineer.

J. Maintain orderly files of correspondence, reports of meetings, Shop Drawings and Samples, reproductions of original Contract Documents, Work Directive Changes, Addenda, Change Orders, Field Orders, additional Drawings issued subsequent to the execution of the Contract, Engineer's clarifications and interpretations of the Contract Documents, progress reports, and other Project related documents.

K. Keep a daily project report form, recording Contractor hours on the job site, weather conditions, data relative to questions of Work Directive Changes, Change Orders or changed conditions, list of job site visitors, daily activities, decisions, observations in general, and specific observations in more detail as in the case of observing test procedures; and send copies to Engineer. The RPR is cautioned of the importance of not having information in a separate diary or log book that is additional to or conflicts with the daily report form.

L. Record names, addresses and telephone numbers of all Contractors, subcontractors, and major suppliers of materials and equipment.

M. Furnish Engineer periodic reports as required of progress of the Work and of Contractor's compliance with the Progress Schedule and Schedule of Shop Drawing and Sample submittals.

N. Consult with Engineer in advance of scheduled major tests, inspections or start of important phases of the Work.

O. Draft proposed Change Orders, Work Directive Changes and Field Orders, obtaining backup material from Contractor, and recommend to Engineer.

P. Report immediately to Engineer and Owner upon the occurrence of any accident.

Q. Review applications for payment with Contractor for compliance with the established procedure for their submission and forward with recommendations to Engineer, noting particularly the relationship of the payment requested on either unit or lump sum items of work to a Schedule of Values, Work completed and materials and equipment delivered at the site but not incorporated in the Work.

R. During the course of the Work, verify that certificates, operation and maintenance manuals and other data required to be assembled and furnished by Contractor are delivered in accordance with the submittal schedule and are applicable to the items actually installed and in accordance with the Contract Documents, and have these documents delivered to Engineer for review and forwarding to Owner prior to final payment for the Work.

S. Before Engineer issues a Certificate of Substantial Completion, submit to Contractor a list of observed items requiring completion or correction, including the estimated cost for completing each item.

T. Conduct final inspection in the company of Engineer, Owner and Contractor and prepare a final list of items to be completed or corrected, including the estimated cost for completing each item.

U. Observe that all items on final list have been completed or corrected and make recommendations to Engineer concerning project final acceptance.

1.03 LIMITATION OF AUTHORITY OF RPR

A. Shall not authorize any deviation from the Contract Documents or substitution of materials or equipment, unless authorized by Engineer.

B. Shall not exceed limitations of Engineer's authority as set forth in the Contract Documents.

C. Shall not undertake any of the responsibilities of Contractor, subcontractors or Contractor's superintendent.

D. Shall not advise on, issue directions relative to or assume control over any aspect of the means, methods, techniques, sequences or procedures of construction unless such advice or directions are specifically required by the Contract Documents.

E. Shall not advise on, issue directions regarding or assume control over safety precautions and programs in connection with the Work.

F. Shall not accept Shop Drawing or Sample Submittals from anyone other than Contractor.

G. Shall not authorize Owner to occupy the Project in whole or in part.

H. Shall not participate in specialized field or laboratory tests or inspections conducted by others except as specifically authorized by Engineer.

PART - II PRODUCTS - NOT USED

PART - III EXECUTION –NOT USED

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01450 - FIELD ENGINEERING

PART - I GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Contractor shall provide and pay for field engineering services for:

1. Survey work required in execution of work.
2. Civil, structural, or other professional engineering services specified or required to execute the Contractor's construction method.

B. The Contractor shall retain the services of a competent surveyor, registered in the State of Louisiana, to layout the work and maintain a survey during construction. The Contractor shall be solely responsible for proper location of the work.

C. Basic horizontal and vertical control points have been established or designated by the Engineer. These points shall be used as datum for the Work. All control points, including the permanent vertical control points provided by the Engineer, are to be verified and certified by a registered professional land surveyor prior to beginning any of the Work that would be dependent on these control points. The verification survey, additional survey, layout, and measurements shall be included as part of the Work.

D. The Contractor shall furnish all utility locating equipment, survey equipment, stakes and personnel, including competent, suitably qualified instrument men, rodmen, and chainmen as required for laying out the work and for measuring the work from boundary, baseline, and established benchmark reference points furnished by the Owner and Engineer.

E. The Contractor shall keep the Engineer informed, a reasonable time in advance, of the times and places which he wishes to do work so that horizontal and vertical control points may be established and any checking deemed necessary by the Engineer may be done with minimum inconvenience to the Engineer and minimum delay to the Contractor.

F. The method of field staking for the construction of the work shall be at the option of the Contractor.

G. With the Engineer's assistance, the Contractor shall stake off the improvements and check dimensions and refer any discrepancies to the Engineer for correction. Elevations shall be established by the Contractor and then approved by the Engineer before the work proceeds. The accuracy of any method of staking shall be the responsibility of the Contractor. All engineering for vertical and horizontal control shall be the responsibility of the Contractor.

H. The Contractor shall be held responsible for the preservation of all stakes and marks. If any stakes or marks are carelessly or willfully disturbed by the Contractor, the Contractor shall not proceed with any work until he has reestablished such points, marks, lines and elevations as may be necessary for the prosecution of the work.

SECTION 01450 - FIELD ENGINEERING

I. The Contractor shall remove and reconstruct work that is improperly located in accordance with these requirements.

1.02 SURVEY REFERENCE POINTS

A. Locate and protect control points prior to starting site work, and preserve all permanent reference points during construction.

B. Make no changes or relocations without prior written notice to the Engineer.

C. Report to the Engineer when any reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations.

D. Require surveyor to replace control points which may be lost or destroyed. Establish replacements based on original survey control.

1.03 PROJECT SURVEY REQUIREMENTS

A. Establish temporary bench marks as needed, referenced to data established by survey control points. Record locations, based on horizontal and vertical data, on Record Drawings.

B. Establish lines and levels, and locate and lay out, by instrumentation and similar appropriate means:

1. Site improvements, including utility slopes and invert elevations.
2. Batter boards for structures.
3. Controlling lines and levels required for mechanical and electrical trades.
4. Slope stakes for earthwork.
5. Blue top stakes for subgrade, subbase and paving.

C. From time to time, verify layouts by same methods.

D. Establish all lines and grades prior to construction of pipe work at 100 foot increments.

1.04 RECORDS

A. Maintain a complete, accurate log of all control and survey work as it progresses.

B. Cut sheets, where required for lines laid to grade and paid for by various increments of depth, will be prepared from surveys developed by the Contractor and submitted to the Engineer for review and approval.

C. At Contract closeout, submit a survey of installation of structures and pipelines at the same scale as the Engineer's drawings indicating elevations and stationing at 100 foot increments and at all valve and fitting locations when applicable.

D. The record information shall also include GPS location data on all isolation valve operators, fire hydrants, air release valves, sanitary sewer manholes, pump stations and other structures as directed by the Engineer. Data shall be presented in a tabular format, which shall include Servitude, Street or Road identification, Plan Station Number of the Appurtenance being located, a description of the appurtenance (valve operator, manhole, etc), Geographic Coordinates recorded in the field, and map coordinates measured in the field or converted from the GPS field data. Unless otherwise directed map coordinates shall be presented in US Feet State Plane Coordinates and the coordinate datum shall be NAD 83, South Zone or as otherwise shown on the Drawings.

1.05 SUBMITTALS

A. On request of the Engineer, submit documentation to verify accuracy of field engineering.

B. Submit Drawings showing locations of all pipes and structures constructed. This Drawing shall be included with the Record Drawings.

PART - II PRODUCTS – NOT USED

PART - III EXECUTION – NOT USED

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01460 - REGULATORY REQUIREMENTS

PART - I GENERAL

1.01 UNIT OF MEASURE

The standard units of measure shall be the inch-pound as defined by the U.S. National Bureau of Standards. Metric conversion shall be in accordance with ASTM E380.

1.02 PROJECT REQUIREMENTS

A. Product Manufacturing and/or Installation Standards

1. Application - When a document published by a standards organization is specified by reference, comply with requirements and recommendations stated in that document, except when requirements are modified by the Contract Documents, or applicable codes establish stricter standards.
2. Publication Date - The publication in effect on the date of issue of Contract Documents, except when a specific publication date is specified.
3. Abbreviations and acronyms used in Contract Documents to identify reference standards are listed in the Section of the Specifications entitled "Abbreviations."
4. All reference material utilized in the formation of these specifications can be obtained from the standards organization, local libraries, the LSU Engineering library, or from the Engineer at the costs of reproduction.

B. Archaeology and Historic Preservation - If archaeological or historic resources (e.g. human burial site, Indian pottery, projectile points, old china. etc.) are encountered during construction, immediately cease construction operations and contact the State Historic Preservation Office at: State of Louisiana, Dept. of Culture, Recreation and Tourism, Office of Historic Preservation, P.O. Box 44247, Baton Rouge, LA 70804, Phone: (225) 342-8160.

C. Soil Erosion Control - See the specification for Special Project Procedures. Detailed requirements such as fertilizer and seeding types, application rates, and seasons shall be subject to modification by the local soil and Water Conservation District.

D. Other

1. Merchantable timber must be harvested and commercially sold to satisfy requirements of the State of Louisiana Forestry Commission.
2. Siltation and sedimentation control shall be practices that satisfy requirements of the State of Louisiana Department of Wildlife and Fisheries and the State of Louisiana Department of Environmental Quality.

E. Health and Safety - The Contractor shall comply with the Department of Labor Safety and Health Regulations for construction, promulgated under the Occupational and Safety and Health Act of 1970 (PL 91-596) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL-91-54), including updated laws and acts.

F. Separation Between Sewer Lines and Water Lines - Where the separation between sanitary sewer and water lines is not clearly defined by dimensions on the drawings, a sewer shall not be located closer horizontally than ten feet to a water supply main or service line, except that where the bottom of the water pipe will be at least eighteen inches above the top of the sewer pipe, the horizontal spacing may be a minimum of six feet. Where gravity flow sewers cross above the water lines, the sewer pipe for a distance of ten feet each side of the crossing shall be ductile iron or PVC pipe, without any joint closer horizontally than ten feet to the crossing, or shall be fully encased in concrete. The thickness of the concrete including the pipe joints shall be not less than four inches. These provisions are to be in accordance with the regulations of the State Sanitary Code and Ten States Standards. Unless otherwise approved by the Engineer, the locations, lines and grades shown on the Drawings shall not be changed.

G. Open Wastewater Bypassing - Temporary open wastewater bypass discharges shall generally be prohibited. The Louisiana Department of Environmental Quality or other state agency as applicable and U.S.E.P.A. must approve open wastewater bypassing if the terms of the wastewater discharge permit allow bypassing. Bypassing will be allowed only when absolutely necessary and the approval of the Engineer, the State and U.S.E.P.A. is mandatory.

1.03 FINANCING BY GOVERNMENTAL AGENCIES

A. When projects are funded by Federal or State agencies, the regulations and rules of the funding agency shall be strictly followed.

B. Contractor shall secure from the Owner or the funding agency the regulation applicable to his work and organization including all labor requirements.

C. The Contractor shall be responsible to comply with all rules and regulations as outlined by the funding agency.

1.04 COMPLIANCE WITH REGULATIONS

A. The Contractor shall observe and comply with all Federal, State, and local laws, ordinances, codes, orders, and regulations that in any manner affect those engaged or employed on the work, the materials used in the work, or the conduct of the work. If any discrepancy or inconsistency should be discovered in this Contract in relation to any such law, ordinance, code, order, or regulation, the Contractor shall report the same in writing to the Engineer. Any particular law or regulation specified or referenced elsewhere in these Specifications shall not in any way limit the obligation of the Contractor to comply with all other provisions of Federal, State and local laws and regulations.

B. The Contractor shall be responsible for securing all permits and licenses required and shall pay all fees required to complete the Work at no additional cost to the Owner.

SECTION 01460 - REGULATORY REQUIREMENTS

PART - II PRODUCTS - NOT USED

PART - III EXECUTION - NOT USED

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01510 - TEMPORARY UTILITIES

PART - I GENERAL

1.01 REQUIREMENTS INCLUDED

Furnish, install and maintain temporary utilities required for field offices and construction and remove on completion of the Work.

1.02 REQUIREMENTS OF REGULATORY AGENCIES

A. Comply with National Electric Code.

B. Comply with Federal, State and local codes and regulations and with utility company requirements.

PART - II PRODUCTS

2.01 MATERIALS, GENERAL

Materials may be new or used, but must be adequate in capacity for the required usage, must not create unsafe conditions, and must not violate requirements of applicable codes and standards.

2.02 TEMPORARY ELECTRICITY AND LIGHTING

A. Arrange with utility company and Owner to provide service required for power and lighting, and pay all costs for service and for power used in the construction, testing and trial operation prior to final acceptance of the work by the Owner as stipulated by the Engineer.

B. Provide adequate artificial lighting for all areas of work when natural light is not adequate for work, and for areas accessible to the public.

2.03 TEMPORARY HEAT AND VENTILATION

A. Provide temporary heat and ventilation as required to maintain adequate environmental conditions to facilitate progress of the Work.

B. Provide adequate forced ventilation of enclosed areas for curing of installed materials, to disperse humidity, and to prevent hazardous accumulations of dust, fumes, vapors or gases.

C. Portable heaters shall be standard approved units complete with controls.

D. Pay all costs of installation, maintenance, operation and removal, and fuel consumed.

E. Provide connections to existing facilities or extend and supplement the existing facilities with temporary units as required to comply with the Contract Documents. Pay all costs of installation, maintenance, operation and removal.

2.04 TEMPORARY COMMUNICATIONS SERVICE

A. Communications services will not be required when no Owner/Engineer field office is required.

B. Arrange with local communication service provider, provide direct line telephone and internet service, including an external bell at the construction site for the use of personnel and employees.

C. Communication service shall be as described in the specification titled Field Office and Sheds.

2.05 TEMPORARY WATER

A. Contractor shall provide and pay for all water required for construction or consumptive purposes on this project. Water provided by the Owner shall be charged to Contractor at the prevailing commercial rates.

B. Water provided by the Owner shall be metered by the Owner. Contractor shall coordinate installation and removal of meter with the Owner. Contractor shall install and remove backflow preventer at each meter location meeting the requirements of AWWA C510, latest version.

C. The hours and duration of water usage shall be determined by the Owner.

2.06 TEMPORARY SANITARY FACILITIES

A. Provide sanitary facilities in compliance with laws and regulations.

B. Service, clean and maintain facilities and enclosures.

PART - III EXECUTION

3.01 GENERAL

A. Comply with applicable requirements specified in Division 2 - Site Work, Division 15 - Mechanical, and Division 16 - Electrical.

B. Maintain and operate systems to assure continuous service.

C. Modify and extend systems as work progress requires.

SECTION 01510 - TEMPORARY UTILITIES

3.02 REMOVAL

A. Completely remove temporary materials, equipment and buildings when their use is no longer required as determined by the Engineer.

B. Clean and repair damage caused by temporary installations or use of temporary facilities to pre-installation conditions or better.

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01580 – PROJECT IDENTIFICATION AND SIGNS

PART - I GENERAL

1.01 REQUIREMENTS INCLUDED

A. Furnish, install, and maintain the project identification signs.

B. Remove signs on completion of construction.

C. Allow no other signs to be displayed.

1.02 PROJECT IDENTIFICATION SIGN

A. Project identification sign shall be as shown in the Drawings, as provided with this specification or as otherwise instructed by the Engineer.

B. If no project identification sign is shown in the drawings, the sign shall have the following characteristics:

1. One painted sign, of not less than 64 square feet area, with white painted background and graphic content to include:

    a. Title of Project
    b. Name of Owner
    c. Names and titles of authorities as per directed by the Owner or funding agency.
    d. Names and title of:

        i. Program Manager (when applicable)
        ii. Engineer
        iii. Professional Consultants

    e. Prime Contractor
    f. Prime Contractor's Telephone Number
    g. Major Subcontractors
    h. Value of Project

2. Graphic design, style of lettering, and color shall be as approved by Engineer or dictated by the funding agency when applicable. Graphic design and lettering may be painted or adhesive backed cutouts.

C. Erect on the site at a lighted location of high public visibility, as approved by the Engineer and the Owner.

1.03 QUALITY ASSURANCE

A. Sign Painter: Professional, experienced in type of work required.

B. Finishes, Painting: Adequate to resist weathering.

SECTION 01580 – PROJECT IDENTIFICATION AND SIGNS

PART - II PART - II PRODUCTS

2.01 SIGN MATERIALS

A. Structure and Framing: May be new or used, wood or metal, in sound condition structurally adequate for probable wind loads at the installation location and suitable for specified finish.

B. Sign Surfaces: Exterior softwood plywood with medium density overlay, standard large sizes to minimize joints or as otherwise required. Thickness: As required by standards to span framing members, to provide even, smooth surface without waves or buckles.

C. Rough Hardware: Galvanized

D. Paint: Exterior quality, as specified in Division 09.

PART - III EXECUTION

3.01 PROJECT IDENTIFICATION SIGNS

A. Paint exposed surface of supports, framing and surface material as called for in Division 09.

B. Painted or adhesive backed cutout graphics and lettering in styles, sizes and colors selected.

3.02 MAINTENANCE

Maintain signs and supports in a neat, clean, visually appealing condition; repair damages to structures, framing or sign as necessary.

3.03 REMOVAL

Remove signs, framing, supports, and foundations after substantial completion and before final acceptance of project, unless otherwise required by the funding agency.

END OF SECTION

FRONT ELEVATION

PROJECT SIGN DETAIL
N.T.S.

TECHNICAL SPECIFICATIONS
DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01600 – MATERIAL AND EQUIPMENT

PART - I GENERAL

1.01 REQUIREMENTS INCLUDED

A. Material and equipment incorporated into the Work shall:

1. Conform to applicable specifications and standards.
2. Comply with size, make, type, and quality specified to the greatest extent possible, detailing all aspects and providing explicit reasons for parameters not in compliance and specifically approved in writing by the Engineer.
3. Manufactured and Fabricated Products:

   a. Design, fabricate, and assemble in accord with the best engineering and standard shop practice.
   b. Manufacture like parts of duplicate units to standard sizes and gauges, to be interchangeable.
   c. Two or more items of the same kind shall be produced, by the same manufacturer.
   d. Products shall be suitable for service conditions.
   e. Strict adherence of equipment capacities, sizes and dimensions shown or specified shall be required unless variations are specifically approved in writing.

4. Do not use material or equipment for any purpose other than that for which it is designed or is specified.

B. The term "Product" shall refer to material and/or equipment when used in these specifications or vice versa.

C. When material or equipment requires pre-qualification as described elsewhere in the Contract Documents, only those materials and equipment approved prior to the bid or by addendum will be incorporated into the project.

1.02 SUBSTITUTE MATERIAL AND EQUIPMENT AND APPROVAL

Review and acceptance of substitute materials shall be in accordance with the requirements detailed in the General Conditions.

1.03 MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION

A. When Contract Documents require that installation of the Work shall comply with manufacturer's printed instructions, obtain and distribute copies of such instructions to parties involved in the installation, including copies to the Engineer. One complete set of the installation instructions shall be available for use on the job site during and through completion of the Work.

B. Handle, install, connect, clean, condition and adjust products as required by the manufacturer's instructions and in conformity with specified requirements.

1. Do not proceed with the Work without clear instructions concerning the specific installation procedures.
2. Should the specified requirements conflict with the manufacturer's instructions, the manufacturer's instructions shall have priority unless changes are authorized in writing by the manufacturer.
3. Should job conditions conflict with the manufacturer's instructions, consult with the manufacturer for clarification.
4. Clarifications of installation instructions shall be issued only by the manufacturer, shall be in writing, and shall be distributed to all parties involved in the installation as stated above and prior to alteration of the installation procedures.

C. Do not omit any preparatory step or installation procedure unless specifically modified or exempted by the manufacturer.

1.04 SERVICES OF MANUFACTURER'S REPRESENTATIVE

A. The Contractor shall provide as outlined below the services of a qualified factory service representative from each company manufacturing or supplying equipment. All equipment shall include the costs of these services, when required by the Contract Documents. A service representative shall be a full-time factory-trained service employee with a minimum of two (2) years field service experience. Manufacturer's sales representatives or sales agents, subcontractors to manufacturers, or similar personnel will not qualify. The service rendered by the service representatives shall be at the work site for an eight (8) hour work day for each piece of equipment. The number of trips and days required for each piece of equipment stated below is as follows:

1. Phase I - Installation

   The factory service representative shall direct the contractor in the proper unloading, setting, installation, erection, storage and connection to adjacent units for their respective equipment. These services shall be for a period of not less than one day. Some equipment may require additional time for the installation of major units of equipment. In this case a longer period may be mutually agreed to by the Contractor and Manufacturer at no additional cost to the Owner. These services during the installation phase may be omitted if the installation of the equipment is not complicated as determined by the Engineer and is not required in the manufacturer’s installation instructions. Permission for deletion of these services shall be made in writing to the Engineer prior to the delivery of the equipment with the appropriate reasons why these services are not needed for this equipment. Only after written approval has been granted by the Engineer will these services be voided. In any case, the manufacturer is responsible for the correct installation of the equipment in accordance with the manufacturer's recommended practices.

2. Phase II - Testing

a. After the equipment has been properly installed by the Contractor and readied for operation, each unit of equipment together with piping, power, and controls shall be tested by a factory service representative for its intended use as outlined in the Contract Documents. These services shall be separate from the installation services and shall be a one (1) day minimum visit to inspect and test the unit to verify that the installation is in accordance with the recommended practice of the manufacturer.
b. Any calibrations, adjustments, or coordination of controls with other equipment shall be made at this time. The services of a factory service representative will be required on a consecutive day basis until the equipment has been properly tested to perform in accordance with the Contract Documents. If the equipment is not tested as required, the cost for additional visits will be at no additional cost to the Owner or Engineer.
c. In the presence of the Owner's representative, the Resident Project Representative and/or Engineer, the operation, testing, and adjustments shall be performed to demonstrate the equipment operates as intended.
d. After the site visit during this phase, the manufacturer or the supplier shall certify in a written report (in triplicate) to the Engineer of the results of the inspection, operation and condition of the equipment. This report shall include a detailed description of tests performed and the actual performance of the equipment. Any results which would require precautions to be taken to ensure proper maintenance of the equipment shall be included in the report. Finally, the report shall include a certification that the equipment conforms to the requirements of the Contract Documents and is ready for permanent operation. Furthermore, the certification shall include a comment stating nothing in the installation or testing operations will void the manufacturer's warranty. All manufacturers are required to provide the services outlined in this phase without exception. A copy of the certification report shall also be provided for inclusion in the Operation and Maintenance manual for the equipment.

3. Phase III - Start-Up, Operation and Training

a. Complete copies of the Operation and Maintenance manuals that have been reviewed and accepted by the Engineer shall be submitted prior to startup, operation and training.
b. Once all equipment has been satisfactorily tested and the facility is substantially complete, the Contractor shall coordinate the concurrent start-up of all units of equipment. This coordination shall include the simultaneous attendance of the Owner's representative, the Engineer, and the factory service representative of each unit of equipment.
c. The factory service representative will provide for a minimum of one (1) day instruction and training for the Owner's representative in the proper operation, adjustment and maintenance of the equipment. At this item the service representative shall provide operation and maintenance manuals to the Engineer unless provided for otherwise.

B. Manufacturer's Operating and Maintenance Manuals shall be delivered to the Engineer in accordance with the requirements of the Section in Division 01 entitled "Operating and Maintenance Data."

1.05 TRANSPORTATION AND HANDLING

A. Arrange deliveries of Products as required by the currently approved construction schedule, coordinating each delivery to avoid conflict with other work and conditions at the site.

1. Deliver products in an undamaged condition, in the manufacturer's original containers or packaging and with identifying labels intact and legible.
2. Prior to accepting delivery, inspect shipments to assure compliance with approved submittals, and that the products have been properly protected and are undamaged.

B. Provide equipment and personnel to handle products preventing soiling or damage to the products or their protective packaging.

1.06 STORAGE AND PROTECTION

A. Store Products in accordance with manufacturer's instructions, with seals and labels intact and legible.

1. Store products subject to damage by the elements in weathertight enclosures.
2. Maintain temperature and humidity within the ranges required by manufacturer's instructions.
3. Store fabricated products above the ground on blocking or skids to prevent soiling, staining or corrosion. Cover products that are subject to deterioration with impervious sheet coverings and provide adequate ventilation to avoid condensation.
4. Store loose granular materials in a well-drained area on solid surfaces to prevent mixing with foreign matter.

B. All materials and equipment to be incorporated in the Work shall be handled and stored in a manner to prevent warping, twisting, bending, breaking, chipping, rusting, and other injury, theft or damage.

C. Cement and lime shall be stored under a roof and off the ground and shall be kept completely dry at all times. All miscellaneous steel, structural steel and reinforcing steel shall be stored off the ground, kept free of accumulations of dirt and grease, and in areas free of standing water to minimize rusting. Precast concrete sections shall be handled and stored in a manner to prevent staining, chipping or cracking. Brick, block and similar masonry products shall be handled and stored in a manner to reduce staining, breaking, chipping, cracking, and spalling.

D. All materials which, in the opinion of the Engineer, have become so damaged as to be unfit for the use intended, including aesthetics, shall be promptly removed from the site of the work.

E. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections and exercise or rotate moving parts of stored products as required by the manufacturer to assure that products are maintained under specified conditions and free from damage or deterioration.

F. Provide substantial coverings as necessary to protect installed products from damage caused by traffic and subsequent construction operations. Remove the protective covering when no longer needed.

G. The Contractor shall be responsible for all material, equipment, and supplies sold and delivered to the Owner under this Contract until final inspection of the Work and acceptance thereof by the Owner. In the event any such material, equipment, and supplies are lost, stolen, damaged, or destroyed prior to final inspection and acceptance they shall be replaced by the Contractor at no additional cost to the Owner.

H. Should the Contractor fail to take proper action to properly store and handle equipment supplied under this Contract, the Owner retains the right to notify the Contractor in writing of the deficiencies, to correct all deficiencies and deduct the costs associated with these corrections from the Contractor's Contract. These costs may be comprised of expenditures for labor, equipment usage, administration, clerical, engineering and all other costs associated with making the necessary corrections.

1.07 OFF-SITE STORAGE AND PROTECTION

Offsite storage shall be in accordance with the provisions detailed elsewhere in the Specifications.

1.08 PRODUCT TESTING

All work installed in accordance with the Contract Documents, shall have post installation tests performed to check the system conformance to the specified operation. The Contractor shall file with the Engineer a written report detailing the field operation of the product. Reports will be completed by the Contractor and the Resident Project Representative.

1.09 SPECIAL TOOLS

Manufacturers of equipment and machinery shall furnish any special tools (including grease guns or other lubricating devices) required for normal adjustment, operations and maintenance, together with instructions for their use. The Contractor shall preserve and deliver to the Owner these tools and instructions in workable condition no later than Substantial Completion of the Work.

1.10 WARRANTY

Submit a warranty from the equipment manufacturer as specified in the Division 01 Section entitled "Warranties and Bonds.

SECTION 01600 – MATERIAL AND EQUIPMENT

1.11 SPARE PARTS

Spare parts for certain equipment have been specified in the pertinent sections of the Specifications. The Contractor shall collect and store all spare parts in an area meeting the storage requirements stated herein that are accessible by the Engineer for periodic inspection of the spare parts. In addition, the Contractor shall furnish to the Engineer an inventory listing all spare parts, the equipment they are associated with, the name and address of the supplier, and the delivered cost of each item. Copies of actual invoices for each item shall be furnished with the inventory to substantiate the delivered cost.

1.12 GREASE, OIL AND FUEL

A. All grease, oil, and fuel required for testing of equipment shall be furnished with the respective equipment. The Owner shall be furnished with a year's supply of required lubricants including grease and oil of the type recommended by the manufacturer of each item of equipment supplied.

B. The Contractor shall be responsible for changing the oil in all drives and intermediate drives of each mechanical equipment after initial break-in of the equipment, which in no event shall be any longer than three weeks of operation.

PART - II PRODUCTS - NOT USED

PART - III EXECUTION - NOT USED

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01705 – MOBILIZATION

PART - I GENERAL

1.01 DEFINITION

A. Mobilization shall include the obtaining of all permits, insurance, and bonds; moving all equipment, personnel and support facilities onto the site, including furnishing and erecting plants as necessary, temporary building(s), and other construction facilities; all as required for the proper performance and completion of the Work. Mobilization shall include but not be limited to the following principal items:

1. Audio-Video Survey.
2. Moving all Contractor's plant and equipment on to the site that is required for first month operation.
3. Installing temporary construction power and wiring.
4. Establishing fire protection system.
5. Developing construction water supply.
6. Providing field office trailers for the Contractor and the Engineer (when required by the Work), complete with all specified furnishings and utility services including telephones and sanitary facilities.
7. Providing portable on-site sanitary facilities and potable water facilities for support of the labor force and items of the Work .
8. Arranging for and erection of Contractor's work and storage yard.
9. Submittal of all required subcontractor insurance certificates and bonds.
10. Obtaining all required permits.
11. Posting all OSHA required notices and establishment of safety programs.
12. Providing for the Contractor's English speaking superintendent to be at the jobsite full time.
13. Providing a detailed schedule acceptable to the Owner for project use as specified.
14. Installing a project sign (when required by the work).

1.02 PAYMENT FOR MOBILIZATION

A. Requirements other than those listed below are included in the Section of the Specifications titled "Measurement and Payment."

B. The Contractor's attention is directed to the condition that no payment for mobilization, or any part thereof will be approved for payment under the contract until all mobilization items listed above have been completed as specified.

C. If the project is a unit price contract and a line item is designated "mobilization", all costs incurred for the above work shall be placed under that item. If no item is listed for "mobilization", the costs for the above described work shall be placed in other items, and in this case, no direct payment will be made for mobilization.

D. For lump sum projects, the costs for this work shall be included in the overall costs of the project and shown as a separate item in the Schedule of Values.

SECTION 01705 – MOBILIZATION

PART - II PRODUCTS - NOT USED

PART - III EXECUTION – NOT USED

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01720 - TRAFFIC REGULATION

PART - I GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Contractor shall be responsible for providing safe and expeditious movement of traffic through or around construction zones. A construction zone is defined as the immediate areas of actual construction and all abutting areas which are used by the Contractor and which interfere with the driving or walking public.

B. Remove temporary equipment and facilities when no longer required and restore grounds to original and/or to specified conditions.

1.02 TRAFFIC CONTROL

A. The necessary precautions shall include, but not be limited to, such items as proper construction warning signs, signals, lighting devices, markings, barricades, channelization, and hand signaling devices. The Contractor shall be responsible for installation and maintenance of all devices and requirements for the duration of the construction period. Contractor to check traffic control devices on a daily basis as a minimum when beginning and ending the work day, and on weekends at a minimum of once per day.

B. Any additional traffic control devices which may be required at time of construction by the Engineer and/or Owner shall be provided by the Contractor at no additional cost to the Owner.

C. The Contractor shall provide at least five (5) working days notification to the Engineer of the necessity to close any portion of a roadway carrying vehicles or pedestrians so that the final approval of such closing can be obtained from the roadway owner at least 48 hours in advance. With any such closing adequate provision shall be made for the safe and expeditious movement of traffic and pedestrians.

D. The Contractor shall also be responsible for notifying Police, Fire and Ambulance Departments whenever roads are impassable.

E. The Contractor shall be responsible for removal, relocation, or replacement of any traffic control device in the construction area that exists as part of the normal traffic control scheme prior to construction. Any such actions shall be performed by the Contractor under the supervision, and in accordance with the Specifications, of the Owner, unless otherwise specified. Construction signing and activities shall not block existing traffic control signing, unless construction signing supersedes such signing.

F. All traffic control devices not applying to an appropriate situation shall be covered or removed. No traffic control device conduit or inductive loops shall be disturbed without prior notification. Contractor shall take all precautions to avoid damage to traffic boxes, conduits, loops and supply lines. Should any of the above need to be relocated, the Contractor shall coordinate with roadway owner.

SECTION 01720 - TRAFFIC REGULATION

G. The Contractor shall immediately notify the Engineer of any vehicular or pedestrian safety or deficiency problems incurred as a result of the construction of the project.

H. Vehicular access to commercial and residential driveways shall be maintained except when necessary construction precludes such access. When such conditions arise that ingress or egress to the property is to be temporarily terminated, the Contractor shall notify the affected property owner at least 24 hours in advance of such construction.

I. The Contractor shall also cooperate with the various parties involved in the delivery of mail and the collection and removal of trash and garbage to maintain existing schedules of these services.

J. Traffic directors shall be trained flaggers of at least average intelligence, good physical condition, including sight and hearing, having mental alertness, a courteous but firm manner, neat appearance, and a sense of responsibility for the safety of the public. Traffic directors shall wear an orange or fluorescent orange garment such as a shirt, jacket, or vest. This garment shall be reflectorized for nighttime operations. When controlling traffic, traffic directors shall be equipped with a sign and a 24" x 24" red flag. At night, flagmen shall use a red light. They shall follow the procedures stipulated for flaggers in the Louisiana Manual on Uniform Traffic Control Devices.

K. Flagging operations are most likely required, but not limited to, the following traffic control situations:

1. When one lane is alternately used for both directions of travel;
2. When the roadway is closed for a short period of time to allow equipment movements, etc.;
3. When workers are close to a travel lane without a positive barrier;
4. When traffic speeds must be reduced and traffic control devices alone will not regulate traffic speed;
5. When public relations and publicity functions need to be handled at the worksite, such as explaining the situation, alerting motorists to changing conditions, and passing out handouts;
6. When installing and removing traffic control devices;
7. Other situations where variable conditions require responsive traffic control.

L. Construction signing, detours, and traffic control devices shall be in accordance with roadway owner's regulations and with the Louisiana Manual of Uniform Traffic Control Devices.

PART - II PRODUCTS - NOT USED

PART - III EXECUTION - NOT USED

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01746 -MODIFICATIONS TO EXISTING STRUCTURES, PIPING AND EQUIPMENT

PART - I GENERAL

1.01 SCOPE OF WORK

Furnish all labor, materials, equipment, and incidentals required to modify, alter and/or convert existing structures as shown or specified and as required for the installation of new mechanical equipment, pumping units, piping, and appurtenances. Work shall be performed within the requirements of the Division 01 Sections titled Special Project Procedures and Progress Schedules. Existing pumping units, piping, and equipment shall be removed and dismantled as necessary for the performance of structural alterations in accordance with the requirements herein specified.

PART - II PRODUCTS - NOT USED

PART - III EXECUTION

3.01 GENERAL

A. The Contractor shall dismantle and remove all existing pumping units, equipment, piping, electrical conduit and wiring, electrical panels, and other appurtenances required for the completion of the work. Where called for or required, he shall cut existing pipelines for the purpose of making connections thereto.

B. Anchor bolts for equipment and structural steel removed shall be cut off one inch below the concrete surface. Surface shall be finished as specified in Division 3.

C. No existing structure, equipment, or appurtenance shall be shifted, cut, removed, or otherwise altered except with the express approval of and to the extent approved by the Engineer.

D. When removing materials or portions of existing structures and when making openings in walls and partitions, the Contractor shall take all precautions and use all necessary barriers and other protective devices so as not to damage the structures beyond the limits necessary for the new work and not to damage the structures or contents by falling or flying debris.

E. Materials and equipment removed in the course of making alterations and additions shall remain the property of the Owner, except that items not salvageable, as determined in writing by the Owner shall become the property of the Contractor.

1. Operating equipment to be salvaged for the Owner shall be thoroughly cleaned and then lubricated and greased for protection during prolonged storage as specified in other sections and then transported to the site designated by the Owner.
2. Materials and equipment determined to be non-salvageable shall be transported to a place of disposal selected by the Contractor that is off the project site. Should the place of disposal not be on property owned by the Contractor, written evidence that the disposal site's property owner is agreeable with the disposal conditions, such as a letter signed by the property owner, bill of materials delivered to a salvage yard or other commercial disposal site, etc, shall be submitted to the Engineer.

F. All work of altering existing structures shall be done at such time and in such manner as will comply with the approved progress schedule. So far as possible before any part of the Work is started, all tools, equipment, and materials shall be assembled and made ready so that the work can be completed without excessive disruption of the normal function of the facility being modified.

G. All workmanship and new materials involved in constructing the alterations shall conform to the Specifications for the classes of work insofar as such specifications are applicable.

H. All cutting of existing masonry or other material to provide suitable bonding to new work shall be done in a manner to meet the requirements of the respective Section of these Specifications covering the new work. When not covered, the work shall be carried on in the normally accepted standard of construction and as approved by the Engineer.

I. Where holes in existing masonry are required to be sealed, unless otherwise herein specified, they shall be sealed with a non-shrink cement mortar or concrete. The sides of the openings shall be provided with keyed and/or roughened joints to furnish a good bond and make the seal watertight. All loose or unsound material adjacent to the opening shall be removed, and if necessary, replaced with new material. The method of placing the mortar seal shall provide a suitable means of releasing entrapped air.

J. Surfaces of seals visible in the completed work shall be made to match as nearly as possible the adjacent surfaces.

K. Non-shrink grout shall be used for setting wall castings, sleeves, doweling anchors into existing concrete and elsewhere as shown. Grout used for leveling pump bases shall be suitable for providing a uniform support of the base to prevent vibration problems when the pumps are placed into operation.

L. Where necessary or required for the purpose of making connections, the Contractor shall cut existing pipelines in a manner to provide an approved joint. Where required, he shall weld bends, flanges, or provide couplings, all as required. Where the pipe will be subject to thrust forces, the joint shall incorporate appropriate joint restraint devices or, when joint restraint devices cannot be used, properly sized concrete thrust blocks.

M. The Contractor shall provide flumes, hoses, piping, etc., to divert or provide suitable plugs, bulkheads, or other means to hold back the flow of wastewater, water, or other liquids, all as required in the performance of the Work under this Contract.

3.02 WALL PENETRATIONS

Unless otherwise shown on the Drawings or specified herein, penetrations through concrete walls for pipes or conduits shall be via an appropriately sized wall sleeve. Where the sleeve is to restrain thrust, the sleeve shall be a ductile iron wall pipe with a thrust collar that is approximately 1/4-inch thick by 2-inch wide and welded completely around the periphery of the wall pipe. Wall sleeves shall be Schedule 40, PVC or galvanized steel pipe. If a PVC sleeve is used, a bonding surface shall be created on the outside of the sleeve by painting with PVC joint cement and then, while the cement is still wet, rolled in mason's sand and then allow the cement to cure. If the carrier pipe does not connect directly to a wall pipe via a mechanical joint or flange, the annular space between the sleeve and the carrier pipe shall be made using a modular sealing strip such as the Link-Seal as manufactured by Thunderline Corporation, Wayne, Michigan, or approved equal. The use of such sealing strips shall not relieve the Contractor of his responsibility of providing a guaranteed water tight seal. Wall penetrations will be permitted only when shown on the Drawings or with the expressed approval of the Engineer. Wall seals exposed to sewage or sewage gasses shall be rated for corrosive service.

3.03 CLEANING AND REPAIRING EXISTING STRUCTURES

A. After dewatering and before commencing work on each structure, the Contractor shall remove and dispose of, away from the site and at a properly permitted disposal site, any sand, sludge, and other solids remaining in such structure.

B. When so noted on the Drawings, the interior of wet wells that are to be rehabilitated shall be pressure washed with a device that produces a pressure high enough to remove all loose concrete and aggregate from the surface of the existing structure.

C. Upon completion of the pressure washing process, the interior of the wet well shall be thoroughly inspected and any loose or unstable material shall be removed via chipping hammer or hammer and chisel to provide solid stable concrete on which the rehabilitation materials are to be installed.

D. Pock marks or other indentions in the interior surface of the wet well shall be grouted to fill the pock marks and indentions to the same surface level as was originally cast producing a uniform, dense surface.

E. Cracks, holes or other areas where active leaks are observed shall be chipped out to a minimum depth of one-half inch and shall be packed with a hydraulic non-shrink sealing grout to close the leak path. Leaks at joints between precast concrete segments may be packed with okum or similar rope type sealant leaving space at the surface of the adjacent

concrete to apply one-half inch grout depth in the joint. Additional grouting shall be placed as necessary to successfully seal the leaks to provide a uniform smooth dry surface that will allow coating material to properly bond to the repaired substrate.

F. The entire wet well interior shall be sand blasted to produce an anchor profile to accept the coatings

G. Coatings as defined in Division 09 shall be placed on the interior of the repaired wet well structure, including any new concrete that is placed on the structure. The initial coat of the coating system shall to be tested by tapping lightly the coated surface to locate areas where the coating is not properly bonded. The improperly bonded coating shall be removed and the substrate shall be re-prepared by additional sand blasting. The recoating of the repaired areas shall make sure that the proper coating thicknesses are maintained and that there is proper bond to the surface of previously placed coating material. This process shall be continued until the entire inner surface of the wet well has a stable, well bonded first coat, then subsequent coats can be applied to complete the coating work.

3.04 The use of explosives will not be permitted to complete any work under this Contract. Care shall be taken not to damage any part of existing buildings or foundations or outside structures.

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01748 -UTILITIES COORDINATION

PART - I GENERAL

1.01 UTILITIES

Utilities for the purpose of these specifications shall be considered as including, but not limited to: pipelines, conduits, cables, distribution lines, transmission lines and appurtenances of Public Utilities and those of Special Utility Districts, Cities or Towns, businesses or individuals solely for their own use or for use of their tenants; and storm drains, sanitary sewers, street lighting, traffic signal and fire alarm systems, except those owned or under the direct control of the Owner.

1.02 UNDERGROUND INSTALLATIONS

Existing underground pipelines and utilities are indicated on the Drawings only to the extent such information was made available to or discovered by Engineer in preparing the Drawings. There is no guarantee as to the accuracy or completeness of such information, and all responsibility for the accuracy and completeness thereof is expressly disclaimed by the Owner and the Engineer.

1.03 UTILITIES LOCATED IN OWNER'S RIGHT-OF-WAY

A. Unless otherwise provided or excepted herein, the removal, adjusting, relocation, or replacement of utility structures or facilities within the Owner's right-of-way which may be necessary for construction of the work being done, in accordance with these Contract Documents, shall be at the expense of the owners of the utilities.

B. While it is the utility owner's responsibility to perform any work and bear any expense involved in relocations and adjustments within Owner's right-of-way, it shall be the Contractor's responsibility to protect and maintain those utilities which, in the opinion of the Engineer, do not need to be disturbed in order to accomplish the work required by the Contract.

1.04 RELOCATIONS OF EXISTING GAS LINES, TELEPHONE LINES, ELECTRIC LINES, CABLE TV LINES, AND WATER LINES

The Contractor shall notify the proper authority of the utility involved when relocation of these lines is required. The Contractor shall coordinate all work by the utility so that the progress of construction will not be hampered.

PART - II PRODUCTS (NOT USED)

SECTION 01748 -UTILITIES COORDINATION

PART - III EXECUTION

3.01 GENERAL

The Contractor shall comply with the Louisiana Underground Utilities and Facilities Damage Prevention Law (LARS 40:1749.11 through 40:1749.26). The Contractor, when the Notice to Proceed is received, shall notify the owners of utilities in the area of the work, the approximate date upon which he will begin work, and shall submit a copy of the approved progress schedule of the proposed work. This shall be deemed sufficient notice if the project progresses according to the progress schedule submitted with the notification. If changes in the schedule of the work occur, the Contractor shall appraise both the owner of the utility affected, and the Engineer so that adjustments in the work schedule of the utility can be made. When appropriate, the Contractor shall notify utility owners in writing, with copies of letters to Owner and Engineer, of dates and times for periodic progress meetings and request their presence at these meetings. The Contractor shall be responsible for damages to the utility facility and construction delays resulting from failure to notify the utility and the Engineer of changes in procedure or location.

3.02 EXISTING UTILITIES AND IMPROVEMENTS

A. General - The Contractor shall protect all utilities and other improvements which may be impaired during construction operations. It shall be the Contractor's responsibility to ascertain the actual location of all existing utilities and other improvements indicated on the drawings that will be encountered in his construction operations, and to see that such utilities or other improvements are adequately protected from damage due to such operations. The Contractor shall take all possible precautions for the protection of unforeseen utility lines to provide for uninterrupted service and to provide such special protection as may be directed by the Engineer.

B. Utilities to be Moved - In case it shall be necessary to move the property of any public utility or franchise holder, such utility company or franchise holder will, upon proper application by the Contractor, be notified by the Engineer to move such property within a specified reasonable time, and the Contractor shall not interfere with said property until after the expiration of the time stipulated.

C. Owner's Right of Access - The right is reserved to the Owner and the owners of public utilities and franchises to enter at any time upon any public street, alley, right-of-way, or easement for the purpose of making changes in their property made necessary by the work of this contract.

D. Known Utilities - Existing utility lines that are shown on the drawings or the locations of which are made known to the Contractor prior to excavation and that are to be retained, and all utility lines that are constructed using excavation operations shall be protected from damage during excavation and backfilling and, if damaged, shall be immediately repaired by the Contractor at no additional expense to the Owner.

E. Unknown Utilities - In the event that the Contractor damages any existing utility lines that are not shown on the drawings or the locations of which are not made known to the

Contractor prior to excavation, a written report thereof shall be made immediately to the Engineer. If directed by the Engineer, repairs shall be made by the Contractor under the provisions for changes and extra work.

F. Utilities to be Removed - When utility lines that are to be removed are encountered within the area of operations, the Contractor shall notify the Engineer a sufficient time in advance for the necessary measures to be taken to prevent interruption of the service.

G. Approval of Repairs - All repairs to a damaged improvement shall be inspected and approved by an authorized representative of the improvement owner before being concealed by backfill or other work.

H. Relocation of Utilities - Where the proper completion of the work requires the temporary or permanent removal and/or relocation of an existing utility or other improvement which is shown on the drawings, the Contractor shall at his own expense, remove and without unnecessary delay, temporarily replace or relocate such utility or improvement in a manner satisfactory to the Engineer and the owner of the facility. In all cases of such temporary removal or relocation, restoration to former location shall be accomplished by the Contractor in a manner that will restore or replace the utility or improvement as nearly as possible to its former locations and to as good or better condition than found prior to removal.

I. Maintaining Service - All oil and gasoline pipelines, power and telephone or other communication cable ducts, gas and water main, irrigation lines, sewer lines, storm drain lines, poles, and overhead power and communication wires and cables encountered along the line of the work shall be maintained continuously in service during all operations under the contract, unless other arrangements satisfactory to the Engineer are made with the owner of said pipelines, duct, main, irrigation line, sewer, storm drain, pole, or wire or cable. The Contractor shall be responsible for and shall make good all damage due to his operations, and the provisions of this Section shall not be abated even in the event such damage occurs after backfilling or is not discovered until after completion of the backfilling.

3.03 SUBSURFACE OBSTRUCTIONS

A. It is intended that wherever existing utilities such as water, gas, telephone, electrical, drains, or other service lines must be crossed by a gas, force or water main or when other subsurface obstructions are encountered, deflection of the proposed pipe, either horizontal or vertical, within recommended limits and cover shall be used to satisfactorily clear the obstruction unless otherwise indicated on the Drawings. However, when in the opinion of the Owner or Engineer this procedure is not feasible, he may direct the use of fittings for a utility crossing or to route the proposed pipe around an obstruction.

B. The Contractor shall field determine the depth and location of existing utilities before pipeline trench and associated excavations are begun. Utility locations indicated on the plans were obtained from the records available, but have not been field verified, nor have depths been measured or observed. The Contractor shall submit descriptions, depths and locations of subsurface obstructions to the Engineer for review.

C. In excavation, backfilling and in laying pipe, care shall be taken not to remove, disturb, or injure existing pipes, conduits, or structures. If necessary, the Contractor at his own expense shall sling, shore-up, and maintain such structures in operation.

D. The Contractor shall obtain the permission of and give sufficient notice to the proper authorities of their intentions to remove or disturb any pipe, conduit, etc., and shall abide by their regulations governing such work.

E. In the event that properly located subsurface structures are broken or damaged in the prosecution of the work, the Contractor shall immediately notify the proper authorities, and at the option of said authority, either repair the damage at once or pay the proper charges for repairing said damage at no additional expense to the Owner. Repairs shall be made to the satisfaction of the Engineer. The Contractor shall be responsible for any damage to persons or property caused by such breaks or due to his own neglect in reporting and/or repairing such damages.

F. The Owner or Engineer will not be liable for any claims made by the Contractor based on underground obstructions being different than that indicated on the Plans. The contractor shall uncover subsurface obstructions in advance of construction so that the method of avoiding same may be determined before the work reaches the obstruction.

3.04 CONFLICTS WITH OTHER UTILITIES

A. At various locations along the project, the proposed pipeline closely parallels or crosses existing gas lines, buried telephone cables or ducts or other utilities.

B. It shall be the Contractor's responsibility to give the appropriate utility company sufficient advance notice so that their representatives may verify the utility location on the jobsite when trenching operations begin. The Contractor shall coordinate and cooperate with these utilities to insure that no damages occur which would cause interruption of their service.

C. All temporary support, or minor adjustment which does not require replacement or direct by-pass connections to existing services (such as all direct-buried telephone cables or two-inch and smaller gas lines) will be the responsibility of the Contractor.

D. Where, in the opinion of the Engineer, it may be necessary to relocate gas mains or telephone ducts (defined here as gas lines larger than 2 1/2 inches and telephone cables with ductwork) to allow construction of the new force main, or where major relocation of small services requires replacement or performing connections to the existing lines, all such relocation work is the responsibility of and must be performed by the respective utility companies. The Contractor shall immediately notify the proper utility company and the Engineer in writing of the occurrence and location of such required relocations.

E. The Owner will not be responsible for any delay or inconvenience to the Contractor resulting from the existence, removal or adjustment of any public utility. Additional costs incurred as a result thereof shall be the expense of the Contractor, and considered as included in the contract unit prices bid for the various pay items.

F. Relocation or realignment of storm drains or sewer lines which may interfere with the construction of the new pipe line shall be the responsibility of the contractor. Where there is not specific unit price for such work provided in the Proposal Form, the cost of the work shall be included in the unit price bid for the new pipe line.

G. Where storm drains or sewer lines are removed by the Contractor to facilitate pipe line construction, and replaced in their original positions, there shall be no direct payment made and all related costs shall be included in the unit price bid for the new pipe line involved.

3.05 POLE RELOCATION AND PROTECTION

A. The Contractor shall take notice of a number of power, telephone and traffic signal support poles along the length of the project; several are in proximity to, or direct conflict with, the alignment of the proposed new pipe lines. The relocation of all poles on the plans noted as to be relocated shall be the responsibility of and must be performed by the respective utility companies. The Contractor shall immediately notify the proper utility company and the Engineer in writing of the occurrences and location of such required relocations.

B. For all poles without such notations, it is intended that they shall be supported with mud jacks or by other means of bracing as required to maintain them in a stable condition. The temporary support and subsequent stability of these poles will be the Contractor's responsibility.

3.06 EXPLORATORY EXCAVATION

A. Exploratory excavation shall be performed in advance of the work for the purpose of accurately locating underground utilities or structures that may interfere with installation of the Work both horizontally and vertically. Exploratory excavations shall be performed in accordance with the definition included in the Measurement and Payment section. Once the purpose of the excavation has been met, the excavation shall be backfilled immediately in accordance with the Division 02 requirements for backfilling pipes and in a manner satisfactory to the Engineer.

B. Exploratory excavation for the purpose of locating underground pipelines or structures shall be excavated prior to development of laying schedules for all pipe sizes of 16 inches and larger. Underground utilities’ and structures' locations shall be referenced to the project baseline by station and offset distance, left or right and measured perpendicular to the baseline, along with the elevation of the top and cross-sectional dimensions of the utility or structure.

C. This procedure shall be completed for the entire project and all underground utilities and structures shall be located as described above in conformance with the requirements of the field engineering provision detailed in Division 01 of these Specifications. The data collected shall be used to develop a pipe laying schedule that accurately depicts the location of underground utilities and structures and details both horizontal and vertical deflections and adjustments of the proposed pipe required to eliminate conflicts. This

laying schedule shall be submitted to the Engineer for approval prior to fabrication of concrete drainage or prestressed concrete cylinder pipe or prior to ordering fittings for other pipe materials.

3.07 PROTECTION OF EXISTING UTILITIES

A. The attention of the Contractor is drawn to the fact that during excavation, the possibility exists of the Contractor encountering various water, gas, telephone, electrical, or other utility lines not shown on the Drawings. The Contractor shall exercise extreme care before and during excavation to locate and flag these lines so as to avoid damage to the existing lines. Should damage occur to a properly located existing line, the Contractor shall repair or pay for the cost of the line at no additional cost to the Owner.

B. The Contractor shall assume full responsibility for the protection of all utilities, public and private, including poles, services to buildings, gas pipes, water pipes, hydrants, sewers, drains, and electric and telephone cables, whether or not they are shown on the Drawings. The Contractor shall carefully support and protect all such utilities from injury of any kind. Any damage resulting from the Contractor's operation shall be repaired by him at no additional expense to the Owner.

C. The protection and preservation of utility facilities which are located within the right-of-way, but outside the normal limits of construction, as determined by the Engineer, shall be the responsibility of the Contractor. The Contractor shall be responsible for all damage to utilities which are due to his negligence.

D. The Contractor shall bear full responsibility for obtaining locations of all underground structures and utilities (including existing water services, drain lines, and sewers) as is required by state law referenced above. Services to buildings shall be maintained, and all costs or charges resulting from damage thereto shall be paid by the Contractor at no additional cost to the Owner.

E. If, in the opinion of the Engineer, permanent relocation of the Owner’s utility is required, he may direct the Contractor, in writing, to perform the work. Work so ordered will be paid for at the Contract unit prices, if applicable, or as extra work as detailed in the General Conditions. If relocation of a privately owned utility is required, the Contractor will notify the Utility to perform the work as expeditiously as possible. The Contractor shall fully cooperate with the Owner and Utility and shall have no claim for delay due to such relocation.

F. The Contractor shall notify public and private utility companies in writing at least two, but not more than five full days (excluding Saturdays, Sundays, and legal holidays) before excavating near their utilities.

G. The Owner will not be responsible for any delay or inconvenience to the Contractor in carrying out the work resulting from the existence, removal or adjustment of any public utility. Additional costs incurred as a result thereof shall be at no additional expense to the Owner.

SECTION 01748 -UTILITIES COORDINATION

3.08 UTILITIES TO BE ADJUSTED

The owners of utility facilities that require relocation, removal, adjustment or replacement should, if possible and feasible, perform this work prior to the commencement of the Contractor's work. Where utility work must be done in conjunction with the Contractor's work on the project or in conjunction with the work of other utilities, arrangements for when, how and where the operation is to proceed shall be worked out among the parties concerned. If disputes arise, the Engineer shall decide the course of action to be taken.

3.09 UTILITIES CONFLICTING WITH OPERATIONS

Those utility facilities which do not conflict with the improvement, but which are obstructions to the operations required for installation or which present unusual difficulty due to their close proximity to the area of the operations, should be located with certainty by the owners of the utility prior to the arrival of the Contractor's operation which would be hindered by the utility facility. The Contractor is required to preserve the utility facility in place without damage and shall be responsible for damages sustained, if the utility owner has located the facility by exposing it to the view of the Contractor or has otherwise shown the Contractor, with certainty, the location of the facility. Any other arrangements that the Contractor may make with a utility owner as a substitute for the requirements of this Section shall require the approval of the Engineer, in writing.

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 02 - SITEWORK

SECTION 02200 – CONSTRUCTION LAYOUT

PART - I GENERAL

1.01 SCOPE OF WORK

The work consists of performing all survey work necessary to properly layout the proposed project to the lines, grades and elevations shown on the plans or as directed by the Engineer. All work shall be approved by the Project Engineer or his authorized representative prior to construction.

1.02 SURVEY WORK

A. The Contractor shall employ sufficient qualified engineering/survey personnel experienced in layout and construction to correctly establish and keep complete and comprehensive field book records of all lines and grades and cross-sections necessary from initial layout to final acceptance. All layout work shall be certified by a registered Professional Land Surveyor by sealing and signing the field books. The Contractor will be liable for the accuracy of the initial layout and all subsequent alignment and elevations and shall rebuild, repair or make good any portion of the work found to be incorrectly positioned, either horizontally or vertically at any time before final acceptance at no additional expense to the Owner. The Contractor shall notify the Project Engineer immediately of any apparent errors in the plans.

B. Numbered notebooks for recording all lines and grades and cross-sections shall be provided by the Contractor and shall be properly indexed and cross-referenced by the Contractor before submitting to the Engineer with the final estimate. The numbered notebooks shall become the property of the Owner.

C. The Engineer may, at his option, make either spot or complete checks on all work. However, these checks will not relieve the Contractor of his responsibility for constructing the work in the positions and to the elevations shown on the plans or approved revisions hereto. Calculations and any additional measurements for determination of quantities will be made by the Engineer.

D. No changes in the lump sum contract amount for construction layout will be made for minor additions or deletions to the scope of work.

1.03 CONSTRUCTION LAYOUT REQUIREMENT

A. Prior to beginning any construction on the project, all horizontal and vertical control points shall be confirmed for accuracy by a licensed surveyor hired by the Contractor.

B. A minimum number of “hardshots” on existing project features shall be taken to confirm control point accuracy with existing terrain features. The “hardshots” shall be determined by the Design Engineer and Contractor. Data shall be shown on construction drawings for layout clarification.

SECTION 02200 – CONSTRUCTION LAYOUT

C. After accuracy of the horizontal and vertical control points has been completed and the field books have been reviewed and accepted by the Engineer, the Contractor will be authorized to commence with layout of specific points to which the Work will be constructed. Specific points shall include but not be limited to centerlines, building or structure corners, batter boards, slope stakes, etc.

1.04 SUBMITTAL

Contractor shall submit to Project Engineer all data stamped by a licensed surveyor certifying control points and existing terrain accuracy.

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 02 - SITEWORK

SECTION 02300 - EXCAVATION, BACKFILLING AND COMPACTION

PART - I GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall furnish all labor, materials, equipment, and incidentals necessary to perform all excavation, backfill, grading, and excavation protection required to complete the roadway, structure and piping work shown on the Drawings and specified herein.

B. The work shall include, but not necessarily be limited to excavation, embankment construction, filling and grading under and around precast and cast in place structures to attain the subgrades and grades indicated on the Drawings, trenching operations to install pipe, manholes, vaults, electrical duct conduit, pump station wet wells and valve pits, and other structures, including all backfilling, grading, disposal of surplus and unsuitable materials, and all related work such as sheeting, bracing and water handling.

1.02 QUALITY ASSURANCE

A. The Contractor shall perform excavation work in compliance with applicable requirement codes and standards of governing authorities having jurisdiction.

B. The Owner will engage and pay for soil testing and inspection services for quality control testing during earthwork operations as provided in the Contract Documents.

1.03 PROJECT CONDITIONS

A. The Contractor shall examine the site and review the available test borings or undertake his own soil borings prior to submitting his bid, taking into consideration all conditions that may affect his work. The Owner and Engineer will not assume responsibility for variations of subsoil quality or conditions at locations other than places shown and at the time the investigation was made. Boring log data are available for review or purchase at the office of the Engineer.

B. Existing Utilities: Locate existing underground utilities in the areas of work as detailed in Division 01. If utilities are to remain in place, provide adequate means of protection during earthwork operations.

C. The location of all pipes, ducts, or underground structures shown on the Drawings are not warranted to be exact, nor is it warranted that all underground pipes, ducts, or structures are shown on the Drawings. The Contractor shall contact LA ONE-CALL or the appropriate utility company for location of their underground service a minimum of 48 hours prior to beginning construction in each area.

D. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner or make the site available to the utility owner for his work crews to make the necessary repairs at no additional cost to the Owner.

E. Demolish and completely remove from site existing underground utilities indicated on the Drawings to be removed.

F. Examine the areas and conditions under which excavating, filling, and grading are to be performed. Do not proceed with the work until unsatisfactory conditions have been corrected.

G. Examine existing grade of walks, pavements, and steps prior to commencement of work and report to Engineer if elevations of existing subgrade vary from elevations shown on the Drawings.

H. If it is determined that existing utilities are to be relocated by owner of those utilities, the Contractor shall be responsible for that coordination. The Contractor shall notify the utility owner in sufficient time as to avoid any delays to the Contractor's schedule. The Contractor is solely responsible for this coordination, and no additional compensation or extension of time will be allowed as a result of or the cause of inaction by the Contractor. Should the utility owner cause a delay, no additional compensation will be paid to the Contractor, but additional contract time will be granted to the Contractor in accordance with the requirements stated in the General Conditions and Supplemental Conditions. Division 01 requirements for determination of critical path and available float time will be used in the calculation of time extension upon presentation of documentation that the utility owner was contacted sufficiently in advance of the progress schedule and the utility owner did not respond in an appropriate time to allow continuation of the Work.

1.04 PROTECTION

A. Slope sides of excavations shall comply with OSHA regulations and any applicable local codes and ordinances. Shore and brace where sloping of trench walls are not possible because of space restrictions or stability of the in-situ trench wall. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.

B. Sheeting and Bracing in Excavations:

1. In connection with construction of below grade structures and piping, the Contractor shall construct, brace, and maintain cofferdams consisting of temporary sheeting and bracing as required to support the sides of excavations, to prevent any movement which could in any way diminish the width of the excavation below that necessary for proper construction, and to protect adjacent structures, existing yard piping and/or foundation material from disturbance, undermining, or other damage. Care shall be taken to prevent voids outside of the sheeting, but if voids are formed they shall be immediately filled and tamped. Temporary sheeting and bracing shall be removed in a manner that will not disturb or damage the Work or adjacent above or below ground infrastructure.
2. Trench sheeting for pipes is not to be withdrawn when driven below mid-diameter of any pipe, and no wood sheeting shall be cut off at a level lower than one (1) foot above the top of any pipe unless otherwise directed by the Engineer. If during the progress

of the work the Engineer decides that additional wood sheeting should be left in place, he may direct the Contractor in writing and the Contractor shall be reimbursed in accordance with the Contract Documents. If steel sheeting is used for trench sheeting, removal shall be as specified above, unless written approval is given for an alternate method of removal.

3. All sheeting and bracing not left in place shall be carefully removed in such a manner as not to endanger the construction or other structures, existing utilities, existing piping, or personnel and property. Unless otherwise approved or indicated on the Drawings or in the Specifications, all sheeting and bracing may be carefully removed after completion of the substructure. Care shall be taken not to disturb or otherwise injure any finished masonry. All voids left or caused by withdrawal of sheeting shall be immediately refilled with sand by ramming with tools especially adapted to that purpose, by hydraulic compaction or otherwise as may be directed.
4. The right of the Engineer to order sheeting and bracing left in place shall not be construed as creating any obligation on his part to issue such orders. The Engineer's failure to exercise his right to do so shall not relieve the Contractor from liability for damages to persons or property occurring from or on the work occasioned by negligence or other cause, growing out of a failure on the part of the Contractor to leave in place sufficient sheeting and bracing to prevent any caving or moving of the ground.
5. The Contractor may construct the cofferdams and sheeting outside the neat lines of the foundation for pipes and manholes, unless indicated otherwise, to the extent he deems it desirable for his method of operation. Sheeting shall be plumb and securely braced and tied in position. Sheeting, bracing, and cofferdams shall be adequate to withstand all pressures to which the existing or new structure will be subjected. Pumping, bracing, and other work within the cofferdam shall be done in a manner to avoid disturbing any completed construction or personnel injury. Any movement or bulging, which may occur, shall be corrected by the Contractor so as to provide the necessary clearances and dimensions.
6. The Contractor is fully responsible for any sheeting, bracing and cofferdams that are required to perform any of the work under the contract.
7. As part of his submittal of schedules and other data indicating his planning of the Work, the Contractor shall provide drawings of the planned supporting system, not for review by the Engineer, but for informational purposes only, and use by the Engineer in tracking the progress of the Work. Such drawings shall be of sufficient detail to adequately disclose the method of operation that the Contractor plans to use for each of the various stages of construction. The Work shall not be started until such drawings are received.
8. Establish requirements for trench shoring and bracing to comply with OSHA regulations and any applicable local codes and ordinances.
9. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Carry down shoring and bracing as excavation progresses.
10. As an alternate to sheeting, the Contractor may be authorized to utilize a mechanical trench box, the size and construction of which shall be submitted to the Engineer for review. The Engineer will review the site conditions and the need for protection of utilities and structures adjacent to the excavation and, then, determine the acceptability

of the use of the proposed mechanical trench box. Should the Engineer determine that use of the proposed mechanical trench box does not provide the required protection to adjacent utilities and structures, the Engineer may judge that alterations to the procedure are warranted or may judge that the trench be stabilized with sheeting. In either case, the judgment of the Engineer shall be final and, whichever method of trench stabilization is judged appropriate by the Engineer shall be implemented at no additional cost to the Owner.

C. Dewatering, Drainage and Flotation:

1. The Contractor shall furnish all materials and equipment and perform all work required to install and maintain the drainage systems he proposes for handling groundwater and surface water encountered during construction of structures, pipelines, and compacted fills.
2. The Contractor shall construct and place all pipelines, concrete work, structural fill, bedding, and base course, in-the-dry. In addition, the Contractor shall make the final 24-inches of excavation for this work in-the-dry, and not until the water level is a minimum of twelve (12) inches below proposed bottom of excavation. For the purposes of this specification, "in-the-dry" is defined as saturated, surface dry soil with a small amount of groundwater seepage, which can be controlled as specified below, but does not have the presence of any source of free-flowing ground water at the level of the excavation.
3. The Contractor shall, at all times during construction, provide and maintain proper equipment and facilities to promptly remove and dispose of all water entering excavations and keep such excavations dry so as to obtain a satisfactory undisturbed subgrade foundation condition. This procedure shall be continued until the fill, structure, or pipes to be built thereon have been completed to such extent that they will not be floated or otherwise damaged when allowing water levels to return to natural elevations.
4. Dewatering shall at all times be conducted in such a manner as to preserve the natural undisturbed bearing capacity of the subgrade soils at proposed bottom of excavation.
5. Wellpoints may be required for predrainage of the soils prior to final excavation for some of the deeper below ground structures or piping, and for maintaining the lowered groundwater level, until construction has been completed to such an extent that the structure, pipeline, or fill will not be floated or otherwise damaged. Wellpoints shall be surrounded by suitable filter sand and no fines shall be removed by pumping. Pumping from wellpoints shall be continuous and standby pumps shall be provided.
6. If requested by the Engineer, the Contractor's proposed method of dewatering shall include a minimum of two (2) 4-inch, Schedule 40, operating groundwater observation wells at each structure to be used to determine the water level during construction of the structure. Locations of the observation wells shall be at structures and along pipelines as approved by the Engineer prior to their installation.
7. Prior to excavation, the Contractor shall submit his proposed method of dewatering and maintaining dry conditions to the Engineer. The Contractor shall be responsible for the satisfactory performance of the system. The Contractor shall be responsible for correcting any disturbance of the natural bearing capacity of the supporting soils

or damage to structures caused by an inadequate dewatering system or by interruption of the continuous operation of the system as specified.

8. As part of the submittal of his dewatering system, the Contractor may be required to demonstrate the adequacy of the proposed system and wellpoint filter sand by means of a test installation. Discharge water shall be clear, with no visible soil particles in a one-quart sample.
9. During backfilling and construction, water levels shall be measured in observation wells located as directed by the Engineer.
10. Continuous pumping will be required as long as water levels are required to be below construction elevations.
11. While dewatering for new construction in the vicinity of existing structures, depletion of the groundwater level underneath these existing structures may cause settlement. To avoid this settlement, the groundwater level under these structures shall be maintained by appropriate methods of construction.

D. Protection of Persons and Property:

1. Barricade open excavations occurring as part of this work and post with warning lights in accordance with local requirements. Operate warning lights as recommended by authorities having jurisdiction.
2. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

PART - II PRODUCTS

2.01 SOIL MATERIALS

A. Definitions:

1. Select Materials - Select fill shall conform to Louisiana DOTD designation TR 423 Classes A-1-a, A-1-b, A-3, A-2-4, A-2-6, A-4 or A-6 having a maximum liquid limit of 35 and a maximum plasticity index of 15. This material is referred to as "selected soils" in the DOTD Specifications. Based on an approved geotechnical engineering report, particularly A-6 soils, a higher plasticity index of up to 25 will be considered. These materials can be used for backfill in over-excavated areas, for backfill from 12 inches above the top of the pipe to the top of the subgrade and as structural fill/backfill.
2. Bedding Materials - Bedding materials shall conform to Louisiana DOTD Specifications 1003.08. These materials shall be used for placement under the pipes in the trench and as a bedding material as defined on the Drawings and shall have a minimum thickness of 6 inches. These materials shall also be used for backfill in over-excavated trench areas and may be used for backfill from above the top of the pipe to the top of subgrade and as structural fill/backfill.
3. Stabilization Materials - Stabilization material shall be a blended, manufactured aggregate conforming to the requirements for concrete aggregate as stated in ASTM

C33 except for gradation which shall be between sizes 57 and 78 (inclusive) as specified in ASTM D448.

4. Granular Material - Granular material shall conform to Louisiana DOTD Specifications 1003.07. This material shall be used for backfilling around the pipes from the bedding material up to at least 12 inches above the top of the pipes or to subgrade and in confined areas around structures; these materials may also be used as structural fill/backfill.
5. Coarse Granular Material - Where required on the Drawings, Coarse Granular Material shall be a clean coarse sand or fine gravel with 100 percent of the material passing the 1/2-inch sieve and less than 5 percent passing the NO. 200 sieve.
6. Usable Excavated Soils - Usable excavated soils, referred to as "usable soils" in Louisiana DOTD Specifications, shall conform to classes A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-3, A-4, A-5, A-6, A-7-5, and/or A-7-6, except that soils in classes A-5, A-6, A-7-5 and A-7-6 which are considered unusable by the Engineer and any soil with a plasticity index exceeding 60 will not be accepted in accordance with paragraph 203.06 in the Louisiana DOTD Specifications. These materials can be used for backfill from 12 inches above the top of the pipe up to the surface in unimproved areas.
7. Soil classifications used herein are to be in accordance with the AASHTO table for "Classification of Soils and Soil-Aggregate Mixtures (with Suggested Subgroups)" as shown in Louisiana DOTD designation TR423.

B. General:

1. Materials for use as fill and backfill shall be as described above. The Contractor shall notify the Engineer of the source of each material and shall furnish to the Engineer for testing and approval, a representative sample of each material weighing approximately 50 pounds, at least ten (10) calendar days prior to the date of anticipated use of such material.
2. Additional materials shall be furnished as required from off-site sources and hauled to the site.
3. Disposal of unsuitable material shall be as specified in this Section.

C. Structural Fill:

1. Structural fill meet the requirements of Select Material or Granular Material as identified herein shall be used below spread footing foundations, slab-on-grade floors, and other structures and as backfill within three feet of the below grade portions of structures, When stabilization material is to be placed and compacted over the structural fill material the structural fill shall extend three feet below the bottom of the stabilization material.
2. Material falling within the above specification, encountered during the excavation, may be stored in segregated stockpiles for reuse. All material, which in the opinion of the Engineer is not suitable for reuse, shall be spoiled as specified herein for disposal of unsuitable materials.

D. Common Fill:

1. Placement of common fill shall include the work to construct general embankment below structural or other specialized fill, embankment, backfill of trenches in unimproved areas. Material for common fill may be any of the above listed materials, except as modified below.
2. Common fill, which is to be a base fill for structural fill or roadway embankment, shall be constructed of material classified as select material or better, except that material classified as A-6, material having a plasticity index greater than 15, or material exhibiting expansion properties as indicated by an expansion index (EI) greater than 50, when determined in accordance with ASTM D4829, shall not be acceptable.

PART - III EXECUTION

3.01 EXCAVATION

A. General: Excavation consists of removal and disposal of material encountered when establishing required grade elevations and in accordance with the Drawings.

B. Excavation Classification:

1. The following classifications of excavation will be made when unclassified excavation is encountered in the work. Do not perform such work until material to be excavated has been cross-sectioned and classified by Engineer or specialized geotechnical consultant.
2. Authorized earth excavation includes removal and disposal of soil, pavements and other obstructions visible on ground surface, underground structures and utilities, and other materials encountered that are not classified or unauthorized excavation.
3. Unauthorized excavation consists of removal of material beyond the limits needed to establish required grade and subgrade elevations without specific direction of Engineer. Unauthorized excavation, as well as remedial work directed by the Engineer, shall be at no additional expense to the Owner. Backfill and compact unauthorized excavations as specified for authorized excavations, except that bedding material as specified above shall be used for backfill under pipes, footings, foundations bases, or retaining walls unless otherwise directed by the Engineer. If acceptable to the Engineer or specialized geotechnical consultant and soil conditions allow the extra loading, the Engineer may approve the use of lean concrete fill, reinforced or unreinforced as required by the site conditions and as required by the Engineer.

C. Excavation for Structures:

1. Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10 feet, and extending a sufficient distance from footings and foundations to permit placing and removal of concrete framework, installation of services, other construction, and for inspection, or as shown on the Drawings.

2. When excavating for footings and foundations, take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive any required stabilization material or concrete.
3. In the event that excavations subsequent to the placement of the fill are performed by the Contractor to install piping, conduit, or other appurtenances, any fill placed above the level of the planned excavation shall be fully compacted in accordance with the requirements of this specification prior to beginning the excavation.

D. Additional Structural Excavation:

1. When excavation has reached required subgrade elevations, notify the Engineer who will contact a specialized geotechnical consultant and make an inspection of conditions.
2. If unsuitable, unsatisfactory bearing materials are encountered at the required subgrade elevation, carry excavation deeper and replace the excavated material as directed by the Engineer.

E. Removal of unsuitable material and its replacement as directed beyond the authorized limits will be paid on the basis of contract conditions relative to changes in the Work as provided in the General Conditions.

3.02 FILL PLACEMENT

A. General:

1. Material placed in fill areas for constructing embankments, under and around structures, and within the pipe trench limits shall be deposited within the lines and to the grades shown on the Drawings or as directed by the Engineer, making due allowance for settlement of the material. Fill shall be placed only on properly prepared surfaces which have been inspected and approved by the Engineer. If sufficient fill material is not available from excavation on site, the Contractor shall provide borrows as may be required.
2. Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow strip, or break-up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface.
3. Fill shall be brought up in substantially level lifts throughout the site, starting in the deepest portion of the fill. The entire surface of the work shall be maintained free from ruts, and in such condition that construction equipment can readily travel over any section. Fill shall not be placed against concrete structures until they have attained sufficient strength.
4. Fill shall be dumped and spread in layers by a bulldozer or other approved method. During the process of dumping and spreading, all roots, debris, and other objectionable material shall be removed from the subgrade and fill material, and the Contractor shall

assign a sufficient number of men to this work to insure satisfactory compliance with these requirements.

5. If the compacted surface of any layer of material is determined to be too smooth to bond properly with the succeeding layer, it shall be loosened by harrowing or by another approved method before the succeeding layer is placed.
6. All fill materials shall be placed and compacted at a moisture content which is within five percent of the optimum moisture content as determined by either ASTM D1557 or D4253, as appropriate for the material. The Contractor shall dewater excavated areas and is required to perform the work in such manner as to preserve the undisturbed state of the in-situ soils.

B. Thickness Requirements:

1. Structural Fill: Structural fill shall be placed in layers such that the compacted thickness of each layer is no greater than six inches.
2. Pipe Bedding and Granular Material: Pipe bedding and granular material shall be placed in layers such that the compacted thickness of each layer is no greater than six inches.
3. Stabilization Material: Stabilization material shall be placed in layers such that the compacted thickness of each layer is no greater than six inches.
4. Common fill which is to be a base fill for structural fill or roadway embankment, shall be placed in layers which do not exceed eight inches in thickness after compaction. All other common fill shall be placed in layers which do not exceed twelve inches in compacted thickness.

3.03 COMPACTION

A. General:

1. Contractor shall control soil compaction during construction and obtain the minimum required percentage of the total maximum dry densities as specified herein. The Contractor shall maintain the backfill for a period of one (1) year after final acceptance and shall restore any backfill that fails and repair any pavement or other structures which may be damaged as a result of backfill failure. It shall be the Contractor's responsibility to notify the Engineer in writing that compaction tests of the nuclear gauge, sand-cone, or other method as required can be performed.
2. The frequency for density tests will be a minimum of one (1) test per lift per 1,000 linear feet under pavements, within street and highway rights-of-way, and under building slabs and one (1) randomly selected test per 2,500 linear feet for open areas (testing of each lift in open areas is not required). If the density tests indicate that the Work does not meet specified density requirements, the Engineer may require additional density tests to determine the extent of the deficient Work. The Contractor will not be allowed an extension of contract time as a result of any density testing or correction of work that does not meet the specified density requirements.
3. It is the Contractor's responsibility to provide equipment and labor as needed to achieve the required compaction as specified herein. Should the rates of compaction

fall below the values specified herein, the Engineer has the right to instruct the Contractor to alter his work to assure that the required backfill quality is consistently achieved.

4. Any decision by the Engineer to forgo such instructions shall in no way relieve the Contractor of his responsibility to provide fill of the specified quality.

B. Moisture Control: Condition subgrade or layer material correcting moisture content:

1. When the material is too dry to be compacted efficiently, the Contractor shall uniformly apply water to surface of subgrade or layer of soil material and thoroughly mix the soil to achieve a moisture content near the optimum level to facilitate compaction.
2. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
3. Soil material that has been removed because it is too wet to permit compaction but is otherwise satisfactory may be stockpiled or spread and allowed to dry. The Contractor may assist the drying process by disc harrowing or pulverizing to reduce the moisture content to a satisfactory value.

C. Percentage of Maximum Density Requirements:

1. Compact soil to not less than the following percentages of maximum dry density as determined in accordance with AASHTO T-180 (ASTM D1557) or seventy-five percent (75%) relative density as calculated from the maximum and minimum index densities as determined by ASTMD4253 and D4254, respectively, as applicable.
2. Structures and 3-feet-0-inches around Perimeter of Building: Compact top 36-inches of subgrade and each layer of backfill or fill material to a minimum of ninety-five percent (95%) of the maximum dry density.
3. Building Slabs: Compact top 12-inches of subgrade and each layer of backfill or fill material to a minimum of ninety-five percent (95%) of the maximum dry density.
4. Compaction of Backfill near Highways or Streets: Where the trench limit falls under the roadway pavement or within two (2) feet of the edge of pavement, requiring granular backfill and in other areas designated on the plans where future roadways are to be constructed, backfill for the balance of the trench above a point one (1) foot above the top of the pipe shall be placed in layers of not more than 6-inch compacted thickness and compacted with mechanical tampers or by any satisfactory method or methods that will obtain the density hereinafter specified. The density of the compacted material in each layer of backfill shall not be less than ninety-five percent of the maximum dry density.
5. Walkways: Compact top 6-inches of subgrade to a minimum of ninety-five percent (95%) of the maximum dry density.
6. Pavements and Steps: Compact top 24-inches of subgrade to a minimum of ninety-five percent (95%) of the maximum dry density.
7. Bedding Material: Shall be compacted to a minimum of ninety-two percent (92%) of the maximum dry density.

8. Compaction of all other Backfill: Where a trench is in open ground and the backfill is not influenced by the loading conditions as described in the other listed backfilling requirements, the balance of the trench above a point one (1) foot above the top of the pipe shall be filled and compacted in layers of not more than 12 inches to obtain a minimum density of the measured in-situ condition prior to excavation. If the Contractor has to dry the excavated soil to a moisture content below the insitu moisture content in order to achieve the required rate of compaction, he shall do so at no additional expense to the Owner. The final surface shall be left in a condition equal to that originally found at the start of the work.

D. Structural fill and base course in open areas shall be placed in layers not to exceed the thicknesses previously specified. Each layer shall be compacted to the minimum dry density as stated herein. Incidental compaction due to traffic by construction equipment will not be credited toward the required minimum compaction as required for any material.

E. All other fill shall be placed and compacted in a manner similar to that described above for structural fill, except that dike or levee fill required below water level in peat excavation areas, may be placed as one lift, in-the-wet, to an elevation one (1) foot above the water level at the time of filling.

F. Areas adjacent to structures and other confined areas inaccessible to roller type equipment shall be compacted with approved hand guided mechanical compaction equipment. The Contractor shall also conform to additional backfilling requirements at structures as specified in these specifications. Compaction of the fill by such means shall be to the same degree of compaction as obtained by roller type equipment and the Engineer may make the necessary tests to determine the amount of compactive effort necessary to obtain compaction. Unless such tests indicate that modifications may be made, the fill compacted by mechanical compactors shall be placed in 6-inch layers and thoroughly tamped over the entire surface. Compaction equipment is subject to approval by the Engineer.

3.04 PIPE EXCAVATION AND BACKFILLING

A. Excavation for all trenches required for the installation of pipes and electrical ducts shall be made to the depths indicated on the Drawings and in such manner and to such widths as will give suitable room for laying the pipe or installing the ducts within the trenches, for bracing and supporting and for pumping and drainage facilities. The bottom of the excavations shall be firm and dry, and in all respects acceptable to the Engineer.

B. Where pipes or ducts are to be laid in bedding or encased in concrete, the trench may be excavated by machinery to or just below the designated subgrade provided that the material remaining in the bottom of the trench is no more than slightly disturbed.

C. Where the pipes or ducts are to be laid directly on the trench bottom, the lower part of the trenches shall be excavated to grade by machinery. The excavation work shall be performed so that the resulting excavated surface will be a flat bottomed trench, true to grade, so that pipe or duct can be evenly supported on undisturbed material. Bell holes

shall be hand excavated as required to assure that the pipe and backfill overburden is supported on the entire length of the barrel of each piece of pipe.

D. Backfilling over pipes shall begin as soon as practicable after the pipe has been laid, jointed, and inspected and the trench filled with suitable compacted bedding material up to a level even with six-tenths of the outside diameter of the pipe or as otherwise required on the Drawings. Care shall be taken during placement and compaction of the bedding material by "shovel slicing" to assure that the haunch areas on each side of the pipe are uniformly supported by well compacted bedding material.

E. Backfilling over ducts shall begin not less than three days after placing concrete encasement.

F. All backfilling shall be prosecuted expeditiously and as detailed on the Drawings.

G. Any space remaining between the pipe and sides of the trench shall be packed full with bedding material by hand shoveling and thoroughly compacted with a tamper as fast as placed in lifts no greater than 6-inches in thickness, up to a level even with six-tenths of the outside diameter of the pipe.

H. The backfilling shall be carried up evenly on both sides of the pipe with at least one man tamping for each man shoveling material into the trench.

I. Granular material shall then be placed and compacted from the top of the bedding material to a minimum depth of one (1) foot above the top of the pipe.

J. The remainder of the trench above the compacted granular material as just described above shall be filled and thoroughly compacted to the required density by rolling, ramming, or puddling, as is appropriate for the nature of the backfill material, to prevent subsequent settling.

3.05 BACKFILLING AROUND STRUCTURES

A. Fill shall be placed in layers having a maximum thickness of eight (8) inches in loose state and shall be compacted sufficiently to prevent settlement. If compaction is by rolling or ramming, material shall be at or near the material's optimum compaction moisture as previously required. Where material can be suitably compacted by flooding, the Contractor may use this method.

B. Backfilling shall be carried up evenly on all walls of an individual structure simultaneously. A longitudinal variation of two (2) feet and a horizontal variation of three (3) inches in elevation will be the maximum allowable. No backfill shall be allowed against walls until the walls and their supporting slabs, if applicable, have attained sufficient strength. Backfilling shall be subjected to approval of the Engineer.

C. In locations where pipes pass through building walls, the Contractor shall take the following precautions to consolidate the backfilling up to an elevation of at least one (1) foot above the top of the pipes:

1. Place structural fill in such areas for a distance of not less than three (3) feet either side of the center line of the pipe in level layers not exceeding 6-inches in thickness.
2. Wet each layer to the extent directed by the Engineer and thoroughly compact each layer with a power tamper to the satisfaction of the Engineer.

D. The final finished surface of filled areas shall be graded to smooth true lines, strictly conforming to grades indicated on the grading plan, and no soft spots or uncompacted areas will be allowed in the Work.

E. Temporary bracing shall be provided as required during construction of all structures to protect partially completed structures against all construction loads, hydraulic pressure, and earth pressure. The bracing shall be capable of resisting all loads applied to the walls as a result of backfilling.

3.06 GRADING

A. General: Uniformly grade areas within limits of grading under this Section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades as are required or shown on the Drawings.

B. Grading Outside Building Lines: Grade areas adjacent to building lines, as shown on the Drawings, to drain away from structures and to prevent ponding. Finish surface free from irregular surface changes, and as follows:

1. Lawn or Unpaved Areas: Finish areas to within not more than 0.10 feet above or below the required elevation.
2. Walks: Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than 0.01 feet above or below the required subgrade.

C. Grading Surface of Fill Under Building Slabs: Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 1/2-inch when tested with a 10-foot straightedge.

D. Compaction: After grading, compact subgrade surfaces to the depth and percentage of maximum dry density for each area classification.

E. Grading shall be performed at such places as are indicated on the Drawings, to the lines, grades, and elevations shown or as directed by the Engineer and shall be made in such a manner that the requirements for formation of embankments can be followed. All unacceptable material encountered, of whatever nature within the limits indicated, shall be removed and disposed of in accordance with this specification. During the process of excavation, the grade shall be maintained in such condition that it will be well drained at

all times. When directed, temporary drains and drainage ditches shall be installed to intercept or divert surface water that may affect the prosecution or condition of the work.

F. If at the time of excavation it is not possible to place any material in its proper section of the permanent structure, it shall be stockpiled in approved areas for later use. No extras will be considered for the stockpiling or double handling of excavated material.

G. The right is reserved to make adjustments or revisions in lines or grades if found necessary as the work progresses, due to discrepancies on the Drawings or in order to obtain satisfactory construction.

H. All fill slopes shall be uniformly dressed to the slope, cross section and alignment shown on the Drawings, or as directed by the Engineer.

I. In cuts, all unstable material on the back slopes shall be barred loose or otherwise removed to line or finished grade of slope. All cut and fill slopes shall be uniformly dressed to the slope, cross section and alignment shown on the Drawings or as directed by the Engineer.

J. No grading is to be done in areas where there are existing pipelines that may be uncovered or damaged until such lines, which must be maintained, are relocated, or where lines are to be abandoned, all required valves are closed and drains plugged at manholes.

3.07 DISPOSAL OF UNSUITABLE AND SURPLUS MATERIAL

A. Unsuitable and surplus excavated materials, unless specified otherwise below, and pavement shall become the property of the Contractor to be removed and disposed of by the Contractor off the project site.

B. Usable, excavated material may be used for fill or backfill if it meets the specifications and is approved by the Engineer. Excavated material so approved may be neatly stockpiled at the site where designated by the Engineer provided there is an area available that will not interfere with the Owner's access nor inconvenience traffic or adjoining property owners.

C. Surplus suitable excavated material shall be used to fill depressions as the Engineer may direct.

D. In instances where the Owner can use surplus excavated materials and so desires to retain possession of the material, the Contractor will be directed in the Special Provisions to transport the material to a specific soil storage area and either stockpile or spread the material. Broken pavement shall not be hauled to the Owner's storage area.

3.08 SPECIAL FOUNDATIONS

A. The Contractor shall furnish and install a special foundation for gravity sewer pipe and manholes or other pipes (i.e., force mains, water mains, etc.) as shown on the Drawings.

B. All gravity sewer lines and laterals shall be installed on the special bedding foundation and the prices for laying gravity sewer lines shall include this cost. This bedding shall be as previously specified and placed in the trench to the proposed elevation prior to any pipe laying. This bedding shall not be used under any circumstances as a drain for groundwater. The Contractor shall take all precautions necessary to maintain the bedding in a compacted state and to prevent washing, erosion or loosening of the pipe bedding.

3.09 MAINTENANCE

A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep areas free of trash and debris and repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.

B. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape and compact to required density prior to further construction.

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 02 - SITEWORK

SECTION 02513 - WATER SYSTEMS

PART - I GENERAL

1.01 SCOPE OF WORK -

A. Furnish all labor, materials, equipment and incidentals necessary to completely furnish, install, test, and clean water system piping, joints, fittings, valves, services and appurtenances shown on the drawings and as specified herein.

B. The Work included under this section shall be for all buried potable water piping systems. For the purposes of this specification buried piping shall be all pipe and fittings which are installed beneath the finished ground surface and is encapsulated in a soil or granular trench bedding. Buried pipe shall be considered to begin at the first joint of a fitting or pipe that lies beneath the finished ground surface.

C. Mechanical joint restraint systems which use set screw or lug type devices or which rely predominately on longitudinal shear forces imposed in or on the wall of the polyethylene pipe to secure the pipe to a standard mechanical joint shall not be considered as an acceptable joint restraint system for HDPE pipe.

1.02 REFERENCE STANDARDS: - The latest revision of the following publications apply to this project

A. American Railroad Engineering Association Manual for Railroad Engineering.

B. American National Standards Institute. - ANSI B16.1, American National Standard for Cast Iron Flanged Fittings and Flanges.

C. American Society for Testing and Materials

1. ASTM D1248, Standard Specification for Polyethylene Plastic Molding and Extrusion Materials.
2. ASTM D1784, Standard Specification for Rigid Poly (Vinyl Chloride) Compounds and Chlorinated Poly (Vinyl Chloride) Compounds.
3. ASTM D2241, Standard Specification for Poly (Vinyl Chloride) (CPVC) Plastic Pipe (SDR-PR).
4. ASTM D2564, Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems.
5. ASTM D2855, Standard Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings.
6. ASTM F656, Specification for Primers for Use in Solvent Cement Joints of Poly(Vinyl Chloride) (PVC) Plastic Pipe and Fittings.
7. ASTM F1674, Standard Test Method for Joint Restraint Products for Use with PVC Pipe.

D. American Water Works Association

1. AWWA C104, Standard for Cement-Mortar Lining for Ductile Iron and Gray-Iron Pipe and Fittings for Water (ANSI A21.4).
2. AWWA C105, Standard for Polyethylene Encasement for Ductile-Iron Piping for Water and Other Liquids (ANSI 21.05)
3. AWWA C110, Standard for Gray-Iron and Ductile Iron Fittings 3" through 48", for Water and Other Liquids (ANSI A21.10).
4. AWWA C115, Standard for Flanged Ductile-Iron Pipe With Ductile-Iron or Gray-Iron Threaded Flanges (ANSI A21.15).
5. AWWA C151, Standard for Ductile Iron Pipe, Centrifugally Cast, for Water or Other Liquids (ANSI A21.51).
6. AWWA C153, Standard for Ductile-Iron Compact Fittings 3" through 16" for Water and Other Liquids (ANSI A21.53).
7. AWWA C200, Standard for Steel Water Pipe, 6 In. and Larger.
8. AWWA C205, Standard for Cement-Mortar Protective Lining and Coating for Steel Water Pipe, 4 In. and Larger.
9. AWWA C206, Standard for Field Welding of Steel Water Pipe.
10. AWWA C207, Standard for Steel Pipe Flanges for Waterworks Service, Sizes 4 In. Through 144 In.
11. AWWA C208, Dimensions for Fabricated Steel Water Pipe Fittings.
12. AWWA C215, Extruded Polyolefin Coatings for the Exterior of Steel Water Pipelines.
13. AWWA C216, Heat-Shrinkable Cross-Linked Polyolefin Coatings for the Exterior of Special Sections, Connections, and Fittings for Steel Water Pipelines.
14. AWWA C500, Standard for Metal Seated Gate Valves for Water Supply Service.
15. AWWA C502, Standard for Dry-Barrel Fire Hydrants.
16. AWWA C504, Standard for Rubber-seated Butterfly Valves.
17. AWWA C509, Standard for Resilient-Seated Gate Valves for Water Supply Service.
18. AWWA C600, Standard for Installation of Ductile-Iron Water Mains and Their Appurtenances.
19. AWWA C605, Standard for Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water.
20. AWWA C651, Standard for Disinfecting Water Mains.
21. AWWA C700, Standard for Cold-Water Meters - Displacement Type, Bronze Main Case.
22. AWWA C800, Standard for Underground Service Line Valves and Fittings.
23. AWWA C900, Standard for Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 60 In.
24. AWWA C901, Standard for Polyethylene (PE) Pressure Pipe and Tubing, ½" through 3", for Water.
25. AWWA C906, Standard for Polyethylene (PE) Pressure Pipe and Fittings, 4 In. Through 63 In., for Water Distribution.
26. AWWA C907, Standard for Polyvinyl Chloride (PVC) Pressure Fittings, for Water, 4 In. Through 12 In.

E. National Fire Protection Association - NFPA No. 194, Standard for Screw Threads and Gasket for Fire Hose Couplings.

F. National Sanitation Foundation

1. NSF Standard No. 14 for Plastic Piping Components and Related Materials.
2. NSF Standard No. 61 for Drinking Water Systems Components - Health Effects.

G. Louisiana Standard Specification for Roads and Bridges.

1.03 RELATED WORK DESCRIBED ELSEWHERE

A. Perform excavating, trenching, and backfilling for all exterior piping in accordance with pertinent provisions of Division 02 of these specifications. Refer to Division 03 of these specifications for additional requirements relating to piping system concrete supports.

B. Non-buried piping is specified in Division 15 of these specifications.

1.04 QUALITY ASSURANCE

A. Standards - Contractor shall comply with standards specified in this Section, and all other applicable sections of these Specifications.

B. All piping system components, including but not limited to pipe, fittings, gasket materials, lubricants, or other components in contact with the water shall be certified to be in compliance with the requirements of NSF 61.

C. Plastic piping and all components coming into contact with potable water shall meet the requirements of NSF 14.

D. Qualifications of Installers - Contractor shall use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.05 SUBMITTALS

A. Submittals shall be provided in accordance with the requirements for Shop Drawings stated in Division 01.

B. Drawings Required on Contract Work - Before ordering any water piping or appurtenances, furnish copies of fully dimensioned drawings of the proposed work as required in Division 01 for review and approval by the Engineer.

C. Mill Certificates - Mill certificates shall be furnished upon request of the Engineer.

1.06 PRODUCT HANDLING

A. Protection - Use all means necessary to protect the materials of this Section before, during, and after installation and to protect the work and materials of all other trades.

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B. Protection of Utilities - Protect existing utilities as specified under the General Conditions section of the Contract Documents and Division 01 of these Specifications.

C. Delivery and Storage - All materials shall be delivered to the job site in their original containers with all labels intact and legible at time of use, and shall be stored in strict accordance with the manufacturer's recommendations as approved by the Engineer.

D. Replacements - In the event of damage, immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the Owner.

E. Care of Pipe Coatings - Pipe shall be handled so that the coating shall not be damaged. Repair of any damage shall be made at no additional cost to the Owner, and shall be made in a manner satisfactory to the Engineer.

PART - II PRODUCTS

2.01 Ductile Iron Pipe and Fittings

A. Pipe - Pipe shall be manufactured and tested in accordance with ANSI/AWWA C150/A21.50, latest revision. Pipe shall be of domestic manufacture and, unless otherwise indicated on the Drawings, pipe class shall be Class 51.

B. Ductile Iron Fittings - Fittings shall be ductile-iron and shall conform to either ANSI/AWWA C110/A21.10 or ANSI/AWWA C153/A21.53. Fittings shall be suitable for use under design pipe pressure ratings.

C. Coating and Lining - All pipe and fittings shall be cement mortar lined and seal coated inside in accordance with ANSI/AWWA C104/A21.4. Buried ductile iron pipe and fittings shall be factory coated with the standard asphaltic coating as detailed in AWWA C151 and shall also be protected by installing polyethylene encasement as defined by AWWA C105.

D. Joints - Unless otherwise indicated on the Drawings, buried joints shall be mechanical or "push-on" joints as follows:

1. Mechanical and "Push On" Joints - Mechanical and "Push-On" joints shall meet ANSI / AWWA C111/A21.11, latest revision. Bolts and nuts for mechanical joints shall be "US ALLOY" as manufactured by U.S. Pipe and Foundry Company, equivalent Corten type or equal. Each bolt shall be supplied with a sacrificial zinc anode cap.
2. Flanged Joints – Flanged joints shall be used only on pipe in above ground or subterranean vaults to connect to flanged valves. Flanges shall be drilled and faced to the American 125 pounds standard template, and in accordance with ANSI B16.1, unless otherwise noted on the Drawings. Flanges shall have plain face with smooth finish. Gaskets shall be full face and shall be cut in a neat and workmanlike manner and bolts tightened uniformly to distribute the bolt stress evenly and bring the pipe into alignment. The flanges shall be joined utilizing Type 316 stainless steel machine bolts with heavy hexagon heads and nuts conforming to ANSI B18.21.

3. Restrained Joints - Restrained joints shall be of the type that mechanically prevents the pipe or fitting joint from separating under normally expected operating conditions. Restrained joints shall be either a premium restrained jointing system as designed by each ductile iron pipe manufacturer or specially designed mechanical joint restraint systems.
4. Premium restrained joints shall be the standard restrained jointing system as developed and manufactured by the ductile iron pipe manufacturer. The joint restraining mechanism shall incorporate joint restraining mechanisms that have been designed for the operating pressures and flow velocities for the piping system to be constructed under this contract. Field joints shall be constructed of mechanically attached devices, which do not require field welding. Acceptable premium restrained jointing systems are Flex-Ring (Pipe diameters of 4 inches through 12 inches) or Lok-Ring (Pipe diameters 14 inches and larger) as manufactured by American Ductile Iron Pipe Company, TR Flex (Pipe diameters of 4 inches through 36 inches) as manufactured Unites States Pipe & Foundry Company, or approved equal.
5. Mechanical joint restraint systems shall be of the type that is specially designed to prevent separation of a standard mechanical joint, while still allowing flexibility and deflection of the joint. Mechanical joint restraint systems shall be constructed of ductile iron and shall not impede the deflection of the mechanical joint after assembly. Mechanical joint restraint devices shall be Mega-Lug Series 1000 as manufactured by EBAA Iron Sales, Inc. or approved equal. Mechanical joint restraint systems shall use tee bolts/nuts and zinc anodes as specified for non-restrained mechanical joints for assembly of the joint.

2.02 STEEL PIPE AND FITTINGS

A. Pipe and Fittings - Steel pipe and fittings shall be allowed only in special applications and only when approved in writing by the Engineer. Steel pipe shall be manufactured in full accordance with ANSI/AWWA C200, latest revision. Fittings shall be fabricated from steel pipe of the same metallurgy as the pipe being provided on the project and shall be in conformance with ANSI/AWWA C208.

B. In addition to the submittal data required previously in this Section, submittal data for steel piping systems shall include an analysis of requirements for cathodic protection of buried steel pipe. Cathodic protection systems for buried steel pipe shall be supplied and installed with the steel piping system at no additional cost to the Owner. Cathodic protection systems shall not be installed in servitude areas, unless such installation is approved by the Owner in writing.

1. Sacrificial anode cathodic protection systems are acceptable, provided that suitably sized anode beds can be installed within property owned in fee title by the Owner.
2. When buried steel piping systems are to be placed in areas adjacent to other piping systems that are protected by a cathodic protection system, the proposed piping system shall be protected by an induced voltage system. The submittal data for induced voltage cathodic protection systems that are proposed in areas where existing piping systems are protected by cathodic protection systems shall include evidence of

coordination with the operators of the other piping systems to assure compatibility of operation of both cathodic protection systems.

3. Monitoring services to ascertain the condition and effectiveness of cathodic protection systems shall be supplied as part of the cost of steel piping systems. Monitoring services shall be provided for a period of not less than five years after final acceptance of the project. The frequency of inspections shall be no less than one inspection per year, including no less than six inspections with an initial inspection just prior to final acceptance and a final inspection at the end of the five year period.

C. Coating and Lining - Unless otherwise indicated on the Contract Drawings or Specifications, pipe and fittings shall be supplied with cement mortar lining in full accordance with ANSI/AWWA C205, latest revision. The exterior of pipe shall be coated with an extruded polyolefin coating system in accordance with ANSI/AWWA C215 and specials, fittings and joints shall be coated with heat shrinkable cross-linked polyolefin coating in accordance with ANSI/AWWA C216.

D. Joints - Joints shall be welded or of the flange type where required to connect to valves or other appurtenances. Field welding of joints shall be performed in full accordance with ANSI/AWWA C206, latest revision. Flanges shall be in accordance with ANSI/AWWA C207 of the class suitable for the operating pressure of the system in which the steel pipe will be installed, except that flanges shall be of at least Class D and shall be either threaded or of the welding neck type. Flanged joints shall be made with full-face gaskets and low carbon steel bolts and nuts as described for ductile-iron flanged joints in Division 15.

2.03 SEAMLESS PIPE AND FITTINGS

A. Seamless Iron Pipe - Pipe supplied under this specification shall be sized four inches and smaller. All pipe shall conform to ASTM A53, Type S Grade A. Pipe shall be Schedule 40 unless otherwise specified or indicated on the Drawings, except that all pipe used for gaseous or liquid dry chlorine shall be Schedule 80 minimum.

B. Iron Fittings - Fittings shall conform to ASTM A-153, latest revision and be equal to Crane standard malleable galvanized iron fittings or approved equal. Fittings shall be the same weight as the pipe unless otherwise specified or indicated on the Drawings.

C. Joints - Joints for buried pipe shall be of the threaded type. Joints for above ground pipe may be either threaded or flanged.

D. Where required on the drawings, pipe and fittings shall be hot dip galvanized. The galvanized coating shall be as required for the pipe as stated in ASTM A53.

2.04 POLYVINYL CHLORIDE (PVC)

A. Pipe and Fittings - PVC pressure pipe and fittings shall be manufactured from PVC compounds having a minimum cell classification of 12454B as defined in ASTM D1784. All PVC piping shall meet the following requirements:

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1. Small Pipes (1/2" through 3 1/2") - DR 26 - Plastic pipe designated as DR 26 shall be manufactured in accordance with ASTM D2241 with iron pipe size (IPS) outside diameters (OD). The pipe shall be standard sizes ½-inch through 3 ½-inches with a pressure rating of 160 psi.
2. Large pipe sizes 4" through 60" conforming with the outside diameter (OD) of ductile-iron pipe shall be manufactured in accordance with the requirements of AWWA C900. Plastic pipe designated as C900 shall be made of rigid polyvinyl chloride (PVC). Standard laying lengths shall be 20 feet. Unless noted otherwise pipe wall thickness as identified by DR shall be DR18 for pipe sizes 4” through 24” and DR 25 for pipe sizes larger than 24”.

B. Fittings shall be injection molded PVC, fabricated PVC or ductile-iron with mechanical joint ends.

1. Injection molded PVC fittings for pipe sizes 1/2" through 3 1/2" shall be manufactured in accordance with ASTM D2466. Fittings shall have socket ends designed for solvent cementing.
2. Injection molded or fabricated PVC fittings for nominal pipe sizes 4” in diameter and larger shall be in accordance with the requirements of AWWA C900. PCV fittings shall be capable of accepting joint restraint devices.
3. Ductile-iron mechanical joint fittings used for nominal pipe sizes 4-inches in diameter and larger shall be mechanical joint fittings as specified previously for ductile-iron pipe.

C. Joints -

1. Small Pipes (1/2" through 3 1/2") - Joints shall be designed for solvent cementing, except at valves or fittings, where threaded unions shall be required. Joint surface primer for solvent cement joints shall conform to ASTM F656, latest revision. Solvent cement shall conform to ASTM D2564, latest revision. Where threaded joints are used, the joint shall be made using male NPT by socket couplings on the PVC pipe and shall be threaded into a metal female fitting, valve or other appurtenance. Joints made with male metal threaded components into plastic female couplings shall not be allowed.
2. Large Pipes (4" and Larger) - Joints shall be bell and spigot type with elastomeric gaskets. Joints shall meet all requirements of ASTM D3139 and F477.
3. Gaskets and lubricants intended for use with PVC pipe and appurtenances shall be made from materials that are compatible with the plastic material and with each other when used together, but that will not support the growth of bacteria and will not adversely affect the potable quality of the water that is to be transported.
4. Flanged joints shall not be used on buried pipe.
5. Use of joint restraining devices is preferred over use of thrust blocking. Restraint devices shall be Factory Mutual (FM) or Underwriters Laboratory (UL) third party certified and shall comply with ASTM F1674. Restraint devices shall be as manufactured by EBAA Iron, Uni-Flange, or approved equal. An integral PVC pipe

restraint system such as Certa-Lock as manufactured by Certain Teed Corporation is considered equal to the above defined mechanical restraining devices.

2.05 POLYETHYLENE PIPE AND FITTINGS

A. Pipe and Fittings -

1. Small Pipes (1/2" through 3 1/2") - Small diameter polyethylene pipe shall be manufactured in accordance with AWWA C901 for outside diameter controlled pipe. CTS polyethylene tubing shall not be allowed. Pipe shall be manufactured from high-density polyethylene compound having a cell classification of PE334434C as defined by ASTM D3350. Pipe dimension ratio (DR) shall be selected, based on the pressure requirements of the system into which the pipe is to be installed, except that the DR shall not be greater than 21. Fittings shall be butt fusion type and shall be manufactured in accordance with ASTM D3261 of the same class material as the pipe.
2. Large Pipes (4" - 63") - Pipe and fittings shall be manufactured in accordance with AWWA C906 and shall be Ductile Iron Pipe Size (DIPS) outside diameter. Unless otherwise indicated on the Drawings, pipe and fittings shall be manufactured from PE 3408 polyethylene compound or better. The pressure class (PC) of the pipe shall be selected to conform to the working and test pressures of the system into which the pipe will be installed, except that the minimum allowable PC shall be 80.
3. Polyethylene pipe for installation by the horizontal direct drilling method shall have a maximum DR of 11.

B. Joints -

1. Pipe and fittings shall be joined by thermal butt fusion according to the manufacturer's recommended procedures. Fusion joining of unequal DR's will not be permitted. Transition between pipes with unequal DR's shall be accomplished by mechanical couplings capable of identical pressure ratings or machined polyethylene nipples. Polyethylene nipples shall be fabricated from the thicker wall polyethylene, machining an internal taper to match the thinner companion pipe wall.
2. Polyethylene pipe and fittings shall be connected to other pipe materials, valves or other appurtenances by means of a fused-on Harvey Adapter for use with fittings, sleeves, valves, etc. supplied with standard mechanical joints. Harvey adapter couplings shall be supplied with an integral stainless steel internal stiffener.

2.06 PLASTIC SERVICE PIPE

A. Polyethylene Pipe - Polyethylene service pipe shall conform to the requirements as stated previously for polyethylene pipe sizes 1/2" through 3 1/2".

B. Service Pipe Connections: When the water main is constructed of HDPE pipe, the service pipe shall be connected to the main by means of a heat butt fused joint fittings. Connection of HDPE pipe to other type water main materials shall only be by compression type couplings with inserts or flared couplings. Hot flared or hose connections are not

considered equal and shall not be permitted. The service pipe shall be continuous, with no joints or couplings, from water main to meter and from meter to building connection.

2.07 VALVES

A. General - All valves and appurtenances shown or listed on the Drawings shall be installed as indicated or detailed on said Drawings or as directed by the Engineer, and shall be as specified in this section of the Specifications.

1. Installation and Storage - The valves and appurtenances shall be installed in accordance with the installation manual furnished by the valve manufacturer. Extreme care shall be used in the handling, storage and installation of these valves to prevent damage or distortion of the valves and to insure proper performance.
2. Spare Parts and Tools - Repair or service parts for one of each type and size of valve used in this Work shall be furnished and stored as directed by the Engineer. The equipment shall include, in general the following items: special tools required for maintenance or operation of valves, gaskets, rings, seals, lubricants, bolts, washers, operation manuals, drawings, etc., required to maintain valves in proper operating service.
3. Burried valves shall have mechanical joint ends.
4. Flanged valves shall be used only in above ground or subterranean vaults. All flanged valves shall be drilled and faced to the Class 125 standard template, and in accordance with ANSI B16.1, unless otherwise noted on the Drawings. Bolts, nuts and gaskets for flanged joints shall be as specified for ductile-iron pipe.

B. Valves shall open left (counter-clockwise) and shall be supplied with operators as indicated on the Drawings and specified herein.

1. Exposed manually actuated valves shall have handwheel operators unless otherwise indicated on the Drawings. Handwheel operators shall be designed to hold the valve in any intermediate position between fully open and fully closed without creeping or fluttering.
2. Buried valves shall have standard AWWA 2-inch square cast iron operating nuts. Operating nut shall be extended to finished grade and shall be supported in the valve box with a centering plate. Each valve shall be supplied with a roadway type cast-iron valve box and valve wrench.
3. Where indicated on the Drawings, valves shall be provided with extension stems and either cast iron floor boxes or floor stands. Floor stands shall be cast iron, medium duty, with indicators. Extension stems shall be cold rolled steel complete with necessary steady bearings and couplings required to complete the installation indicated. Ratio of total stem length to radius shall not exceed 150.
4. All handwheels shall have the direction of opening cast on them.
5. Gate valves installed in buried vertical pipelines or in the horizontal position shall be provided with bevel gears and enclosed gear cases. Gearing shall be in accordance with the valve manufacturer's recommendations as required to permit easy operation of the valve by one man. Valve boxes and standard AWWA 2" operating nuts in

accordance with the requirements for standard, vertically installed valves shall be fitted onto the gear operator.

6. Buried valves shall be supplied with mechanical joint end connections. Valves shall be as manufactured by Mueller, American Cast Iron Pipe Co., United States Pipe & Foundry, or approved equal.

C. Valve for Hot-Tap Tie-in

1. All valves for hot tap tie-ins shall be full port valves.
2. Valves shall have flanged or mechanical joint ends as shown on the Drawings.
3. Valves for hot tap tie-ins shall be Mueller resilient wedge gate valves or approved equal.

D. Gate Valves Smaller than 3 Inches - Valves shall be 150-pound wedge disc, non-rising stem brass gate valves with threaded ends. Valves shall be Crane No. 437, or equal. Valves shall be supplied with handwheel operator.

E. Gate Valve 3" and Larger

1. All gate valves 3" and larger shall conform in all respects to AWWA C509, Resilient Seat Gate Valves, latest revision. (Note: AWWA C509 does not cover 14" and 18" valve sizes. Valves of these sizes, although not covered specifically by AWWA C509, are to be constructed to the standard requirements for 16" and 20" valves.)
2. Valves shall be constructed of ductile iron shall have a fusion bonded epoxy coating to protect all inner and outer surfaces conforming to the requirements of AWWA C550. All surfaces of each valve body assembly shall be clean, dry and free from grease before coating. All unmachined surfaces of the valve body assembly shall be wire brushed to clean metal prior to coating.
3. All valves shall be of the non-rising stem type, with iron body full bronze mounted.
4. Gate valves shall be of such design as to maintain the full area of the pipe through the valve when open.
5. Gate valves shall be used for blow-offs where shown on the Drawings.
6. In accordance with AWWA C509, valves 3" through 12" shall be pressure rated at 200 psi and larger valves shall be pressure rated at 150 psi. All exterior bolts shall be type 316L stainless steel.

F. Plug Valves

1. Valves shall be non-lubricated, eccentric type with resilient faced plug, with screwed, flanged or mechanical joint ends as shown on the Drawings. Port areas shall be at least 80% of the full pipe area. Valve body shall be of semi-steel unless otherwise noted on the Drawings. Body seats shall be 90% nickel or resin material. Stem bearings shall be of corrosion resistant material. Bearings shall be sealed or capable of being repacked without removing bonnet from valve. All nuts, bolts, springs, and washers shall be zinc plated. Flanged valves shall be faced and drilled to ANSI Class

125 standard. The valves shall be as manufactured by DeZurik, Val-Matic or approved equal.

2. Plug valves shall be provided with means of operation as indicated on the Drawings and as specified herein.
3. Valves, which are 3 inches and smaller and are installed in other than buried or submerged locations, shall be lever-operated. Lever operators shall be either permanently or semi-permanently attached to each valve.
4. Valves larger than 3 inches that are installed in easily accessible locations, but not in buried or submerged locations, shall be hand-wheel operated unless otherwise indicated or specified.
5. Buried valves shall have 2-inch square operating nuts extended to within 12 inches of finished grade. Each valve shall be supplied with a roadway type valve box and valve wrench.
6. Submerged valves shall be operated by floor stands where indicated or specified. Where gearing is required for proper operation of submerged valves, the gearing shall be located in enclosed gear cases installed on the floor stand. Gearing shall be in accordance with the valve manufacturer's recommendations as required to permit easy operation of the valve by one man without excessively large handwheel or cranks. Handwheels shall not exceed 30 inches in diameter. Submerged plug valves that are not indicated or specified to be operated from floor stands shall have extension stems, floor boxes, and 2-inch square operating nuts.
7. Extension stems, stem guides, operating levers, and other miscellaneous items required for a complete installation shall be provided in accordance with the requirements and recommendations of the valve manufacturer. Two tee handle, valve operating wrenches shall be provided.
8. Gearing shall be provided where indicated, specified or recommended by the valve manufacturer. All gearing shall be provided in enclosed gear cases.
9. Buried plug valves shall be provided with adjustable cast iron valve boxes in accordance with requirements previously specified for valve boxes in connection with gate valves.
10. All plug valves 4 inches and larger shall be provided with gear actuators.

G. Ball Valves

1. Ball Valves 6 Inches and Larger - Ball valves shall conform to AWWA C507, latest revision, Class 150, and shall be supplied with ANSI Class 125 flanged joints. The valve body shall be of single-piece construction and shall be ductile-iron with stainless steel trim. The valve seat and all seats shall be TFEE-LOK, or equal.
2. Valves shall be of absolutely leaktight construction, and of the double seal design as manufactured by Henry Pratt Co., Jamesbury Corporation, or approved equal.
3. Valves shall be supplied with operators as indicated on the Contract Drawings and specified above for plug valves.
4. Ball Valves Smaller than 2 Inches - All ball valves smaller than 2 inches shall be of all bronze construction, with TFE seals and seat. Valves shall have screwed end connections, and shall be lever operated, unless otherwise specified or shown on the

Contract Drawings. Valves shall be Jamesbury Corporation "Clincher," Marpac equivalent or equal.

5. Plastic Ball Valves - Plastic ball valves shall be utilized on chemical feed and chlorine gas lines, and shall be of PVC construction with Teflon seat and Viton O-ring seals. The shaft couplings shall be cadmium-plated steel. Valves less than 3 inches shall be supplied with true union or flanged end connections. Valves 3 inches and greater shall be supplied with Schedule 80 flanges faced and drilled to ANSI Class 125 pattern. Valves shall be as manufactured by Chemtrol, or equal.
6. Ball Check Valves for Air Service - Ball check valves shall be rated for maximum operating pressure of 200 psi, shall be suitable for air line service and shall operate equally effective in either the horizontal or vertical position.
7. Ball check valves shall be of a design to insure free movement of ball and the ball shall be supported in such a manner as to provide full flow with minimum turbulence and chatter. Only inches of head pressure shall be required to seal and open the ball check valves. Ball check valves provided shall be constructed of materials and shall be furnished with threaded joints which are compatible for connection to the air line piping provided.

H. Check Valves

1. Liquid Service Valves 4 Inches and Larger - Check valves 4 inches and larger shall be manufactured in accordance with AWWA C508 and shall be iron body, horizontal swing check valves with outside lever and weight, unless otherwise indicated. Seats, seat rings, pins, bushings, shaft and hinges shall be constructed of bronze. Unless otherwise specified or indicated on the Contract Drawings, check valves shall be supplied with ANSI Class 125 flanges.
2. Valves 12-inches and smaller shall be designed for 175 pound working pressure and larger valves shall be designed for 150 pound working pressure, and shall be as manufactured by Clow, Mueller, or equal.
3. Liquid Service Valves Less than 4 Inches - Check valves less than 4 inches shall be of all bronze construction, and shall be supplied with threaded end connections. The valves shall be designed for a 150 pound working pressure and shall be of the swing check type as manufactured by Crane, Kennedy, or equal.
4. Air Service Valves - Check valves to be installed on air lines shall be of wafer type construction, with aluminum internals and silicone seal members. Valves shall be provided with cast iron body, and shall be designed to install between ANSI Class 125 flanges.
5. Valves for air service shall be rated for continuous duty at 300˚F, 35 PSIG, and shall be as manufactured by Hoffman Air and Filtration Division of Clarkson Industries, or equal.
6. Flexible Sleeve Check Valves - Flexible sleeve type check valves shall be furnished with cast iron body and flanges conforming to ANSI B16.1, Class 125. Sleeve material shall be neoprene with nylon fabric reinforcement. Valves shall be series 33 by Red Valve or equal.
7. Double Door Check Valves - Valves shall be compact design, with fully tapped and threaded lugs by Valve and Primer Corporation or equal. Doors shall be spring loaded,

normally closed, by means of one or more heavy-duty stainless steel torsion springs. Seating shall be resilient and water tight. The sealing element shall be Buna-N molded to the body. Body shall be of cast iron construction; doors shall be cast steel. Springs and shafts shall be T316 stainless steel.

I. Pinch Valves - Pinch valves shall be utilized only where specifically indicated on the Contract Drawings, and shall be a Series 75 valve as manufactured by Red Valve Company, Inc. The valves shall meet or exceed ANSI B16.10, and shall be provided with a handwheel operator. The valve sleeve shall be Buna-N Rubber, and the valve body shall be cast iron.

J. Yard Hydrants - Yard hydrants shall be 1 1/2" - 4' depth of bury, non-freezing type, with aluminum housing, similar to Series 1440-N, as manufactured by Josam Manufacturing Company, an equivalent model by Zurn, or equal.

K. Liquid Pressure Reducing or Pressure Sustaining Valves

1. Pressure or sustaining reducing valves less than 3 inches shall be shall have NPT screwed end connections and valves 3 inches and larger shall have ANSI Class 125 flanged ends.
2. All pressure reducing or pressure sustaining valves shall be installed above ground or in a subterranean vault as shown on the Drawings.
3. Valve bodies shall be ASTM A536 ductile iron. The main internal components shall be made of stainless steel, bronze and epoxy coated steel. Control trim shall be made of stainless steel, brass and bronze accessories. Control tubing and fittings shall be type 316 stainless steel. Elastomers shall be synthetic rubber and coating shall be fusion bonded epoxy.
4. Valves shall be capable of reducing or sustaining pressure on water lines by field adjustments to approximately 5 pounds greater than the shut-off pressure of the pump or the maximum expected operating pressure in the system that the valve will serve. Range of reduced pressure differential adjustment shall be 10 to 100 psi.
5. Pressure reducing or sustaining valves shall be as manufactured by Bermad Inc. or approved equal.

L. Air Release Valve - Air release valve shall be designed to release small pockets of trapped air as line fills under pressure. Valve shall be designed to open against internal pressure. Valve shall have cast iron body, stainless steel float, Buna-N seat, and Delrin and bronze linkage. All other internal parts shall be stainless steel or bronze. Air release valves, size as indicated on the Drawings, shall be as manufactured by Valve and Primer Company, or equal. The air valve shall be equal to the APCO Series 200A air release valve, as manufactured by Valve and Primer Co..

SECTION 02513 - WATER SYSTEMS

2.08 FIRE HYDRANTS

A. Fire hydrants shall be cast iron body, fully bronze mounted, suitable for working pressure of 150 psi and shall meet all requirements of the latest AWWA C502. Each hydrant shall be given a 300 psi hydrostatic test in the shop.

B. Hydrants shall be Mueller Co. Improved AWWA type or equal.

C. The waterways of hydrants shall be as free as possible of obstructions, sharp turns, corners, or other cause for resistance. The base of the hydrant shall have a mechanical joint connection.

D. The hydrants shall have a 6-inch mechanical joint connection to street main with auxiliary gate valve, two 4-1/2 inch pumper nozzles together with caps fastened securely to each hydrant with steel chain and threaded to fit nozzles. The bottom valve of the hydrant shall not be less than 5-1/4 inches in diameter and shall have a 7-inch minimum I.D. riser barrel. Threads for steamer connections shall match existing hydrants and shall be opened by turning in a counter-clockwise direction.

E. The hydrant main valve shall be of the compression type, closing with pressure. The valve shall be faced with rubber, or other approved material.

F. Drain valves shall be automatic and positive acting. When the main valve is closed, drain valves shall automatically open, insuring rapid and complete drainage of the hydrant riser. They shall close automatically when the main valve is opened.

G. Hydrants shall have a safety "break-away" section located above ground line. The distance from the ground line of the hydrant to the top of the hydrant head shall not be less than 30 inches. Hydrants shall come with one shop coat of primer. After installation, skinned or scratched surfaces of hydrants shall be wire brushed and touched up with one coat of primer. Two coats of Sonneborn's Hydrant Enamel shall be applied in the field. Color shall be determined by the Owner with the first coat having lamp black added to distinguish it from the final coat.

H. Hydrants shall be placed with pumper nozzles facing street and shall be located as indicated on Plans. Each hydrant shall be placed on a concrete base and shall be secured against dislocation as shown on Plans. A minimum of 7 cubic feet of clean washed gravel shall be placed around each hydrant base. Backfill above gravel shall be thoroughly tamped. Care shall be taken so as to keep the drain holes clear.

2.09 WARNING/CAUTIONARY TAPE

Warning/cautionary tape will be required for all buried waterlines. The tape shall be constructed of an aluminum film inner layer, which has been printed on both sides with a blue background with white letters stating "Caution Buried Waterline". The aluminum film shall be sandwiched between layers of translucent Mylar which shall be thermally bonded to the aluminum inner layer.

SECTION 02513 - WATER SYSTEMS

PART - III EXECUTION

3.01 LAYING WATER PIPE

A. General:

1. All pipe shall be installed in strict accordance with manufacturer's recommendations, drawings and/or specifications and in the best commercial trade practice.
2. All pipe shall be carefully placed and supported at the proper lines and grades, and where possible shall be sloped to permit complete draining.
3. Any special tools required for laying, jointing, cutting, etc., shall be supplied and properly used. All pipe shall be thoroughly cleaned before laying and shall be kept clean until accepted in the completed work and when laid, shall conform accurately to the lines and grades given. At all times during pipe laying operations, the trench shall be kept free of water. Laying and jointing of ductile-iron, cast-iron and steel pressure pipelines shall conform to applicable sections of AWWA C600. Installation of PVC and HDPE pipe shall conform to the applicable sections of AWWA C605.
4. All pipe and fittings shall be delivered in sound condition. Care shall be taken to protect exterior coatings and linings during all phases of the work. Place no material of any kind inside of any piece of pipe or fitting during handling, storage or transit. Pipe and fittings shall be stored in a protected area. Use strap slings for lifting coated pipe and in no case shall pipe be dropped into trenches.
5. Any section of pipe with a damaged end or barrel shall be repaired as directed, if in the opinion of the Engineer a satisfactory repair can be made; otherwise, the damaged section shall be replaced with an undamaged section at no additional expense to the Owner.
6. All piping systems shall be constructed from the materials shown and to the lines, grades and dimensions shown. Where not shown, the pipe shall be adjusted to avoid interference with other features.
7. Bell-and-spigot pipe shall be laid with the bells pointing upstream to the direction of flow. All types of piping shall be laid and be fitted together so that, when completed, the pipe will have a smooth and uniform invert. The interior of each length of pipe laid shall be thoroughly swabbed to remove all foreign material before it is laid. Each pipe shall be inspected for defects before being lowered into the trench.
8. All piping for which no location dimensions are shown shall be installed in a neat and workmanlike manner in accordance with the best trade practice. It shall be the Contractor's responsibility to properly lay out all piping to clear obstructions such as equipment, larger sized pipes, etc.
9. Under no condition, shall the pipe be laid against the wall of a trench, unless direction to do so is specifically shown on the Drawings or is directed by the Engineer in writing. The minimum distance between the outside of the pipe's bell to the trench wall shall be 9 inches. Extra precaution shall be taken to prevent rocks or other large or sharp objects from lodging against the pipe during backfill.
10. When deflecting the pipe from a straight line, either in vertical or horizontal plan or when long radius curves are shown, the amount of deflection allowed shall not exceed

75 percent of the maximum allowable limit which is recommended by the pipe manufacturer.

11. Excavation, pipe bedding and backfill shall be as specified in Division 02, except that the pipe may be bedded in the excavated material provided that the excavated material meets the requirements for "Useable Excavated Soils" as defined in Division 02.
12. All laying operations shall be the responsibility of the Contractor to provide watertight pipe and pipe joints. If adjustment of the position of a length of pipe is required after it has been laid, it shall be removed and rejoined as for a new pipe.
13. Buried pressure piping systems shall be sloped uniformly between inverts shown on the Drawings, towards low point drains or blow-offs. Avoid intermediate low points in piping systems.
14. When work is suspended either for the night or for any other reason, open ends of the pipe shall be securely plugged to prevent the entrance of mud, water, or other obstructions.
15. Dead ends of pipe and unused branches of crosses, tees, valves, etc., shall be closed with a plug suitable to the type of pipe or appurtenance.
16. Proper and suitable tools and appliances for the safe and convenient handling and laying of pipe shall be used, and care shall be taken to prevent damage to pipe coating. If required by the size pipe being used, mechanical pullers (or spreaders) shall be used in conformance with the pipe manufacturer's instructions.
17. While suspended in the sling and before lowering in the trench, the pipe shall be swabbed clean and inspected for defects. Defective, damaged, or unsound pipe shall not be used.
18. Threads, where required, shall be neatly cut with sharp tools and the jointing procedure shall conform to best plumbing practice. Before jointing, all scale shall be removed from the pipe. After cutting, all pipe shall be reamed. All pipe shall be screwed together with an application of an approved joint compound applied to all threads, and after a joint has been screwed tight, it shall not be backed off unless the threads are re-cleaned and new compound applied.
19. Where sanitary sewer, storm sewer, or other subsurface utilities are encountered in trenching for water lines, it will be permitted to lay pipe above the obstruction if a minimum cover, which will allow for the installation of an air release valve, can be obtained while providing clearance between the bottom of the pipe and the top of the obstruction of at least 18-inches for sanitary sewers and storm drains and 6-inches for all other utilities. Otherwise, the obstruction will have to be by-passed or tunneled under. In any case, the requirements of the Louisiana State Health Code and the regulations of the Department of Health shall be strictly applied for control of the installation.
20. Where the proposed water main parallels a sanitary sewer or storm drain, the water main shall be installed with a minimum of 6 feet clearance between the water main and the other utility as required by the Louisiana State Health Code. All regulations of the Department of Health shall be strictly applied for control of the installation.
21. Where the bottom of the trench is rock, water bearing soil, or unstable material, the Resident Project Representative may direct that a foundation of granular material, a concrete cradle, or granular material on timber runners under the pipe bedding

material. The pipe shall be bedded as provided above, but in no case shall the bedding provide less than six inch (6") cushion below the barrel of the pipe.

B. Solvent Cement PVC Joints

1. Buried PVC pipe, which is to be joined by solvent cementing, shall be joined on the surface of the ground and then lowered into the trench, which has been prepared by excavating and installation of the lower 6-inches of the pipe bedding and foundation material, when required.
2. Solvent cemented joints shall be made in conformance with the requirements of ASTM D2855.
3. Joints of pipe and fittings shall be first prepared with primer.
4. Care shall be taken to use the proper viscosity grade of solvent cement for the size and schedule pipe being joined. Proper viscosity grades shall be as required by ASTM D2564.
5. Appropriate set time, in accordance with ASTM D2855, shall be allowed prior to installing the pipe. Prior to applying pressure to the pipe, allow for complete curing of the solvent cement joints as stated in ASTM D2855.

C. High Density Polyethylene (HDPE) Pipe Installation

1. Polyethylene pipe shall be jointed by the method of thermal butt-fusion as outlined in ASTM D2657. All butt-fusion joining of pipe and fittings shall be performed in accordance with proven procedures and techniques recommended by manufacturer. Thermal butt-fusion of the pipe shall be performed by an experienced technician, certified in the jointing of high-density polyethylene pipe in accordance with Title 49 CFR 192.285. Written certification of the personnel shall be submitted to the Engineer.
2. A minimum of two test joints shall be fused and cut from each pipe size and each DR prior to beginning joining the pipe system. The test joints shall be visually examined in accordance with Title 49 CFR 192.285. The Engineer reserves the right to request that 10 additional samples be cut from the pipe during the installation process at no additional cost to the Owner, to document the integrity of the fusion process. Should these check samples reveal deficiencies in the joining process, the Engineer may require that additional samples be cut from the previously installed pipe to determine extent of deficient joints in the completed installations. Any excavation, cutting rejoining or other work made necessary to check the quality of the joining process shall be performed at no additional cost to the Owner.
3. All finished butt-fusion welds shall be trimmed to match the inside diameter of joined pipe sections such that the maximum finished bead protrudes no more than 1/8 inch from the inside of the pipe wall at any given point.

SECTION 02513 - WATER SYSTEMS

3.02 BORING PIPE

A. General

Where pipe is to cross beneath railroads, Federal Highways, State Highways, and other selected paved travelways, either the direct bored or bored and jacked casing method of installation will be indicated on the Drawings, and the Contractor shall not be permitted to install by any other method, unless approved by the Engineer in writing. Where the agency that governs the crossing requires a permit for the crossing, the provisions of the permit will be the basis of control of the installation work. Subsurface operations, which are performed as part of the work to install the casing and the carrier pipe, resulting in damage to the tracks or pavement, shall be the responsibility of the Contractor. Any damage to the facility that is being crossed shall be repaired at no additional cost to the Owner.

B. Horizontal Directional Drilling shall be performed in accordance with the requirements stated elsewhere in Division 02.

C. Jacking and Boring Casing Pipe shall be performed in accordance with the requirements stated elsewhere in Division 02.

D. Bored Driveway Crossings

1. Pipe crossings under paved driveways shall be bored unless otherwise shown on the drawings. Bored driveway crossings shall be made with the minimum size bore hole, allowing passage of the pipe bell or coupling with a maximum of 1-inch annular space.
2. Joints shall not be allowed under driveways, unless the joint is mechanically restrained or is fused. Pipes meeting this requirement are double length segments (40-foot segment length) of the pipe specified for open cut installation, Certa-Lock as manufactured by Certain Teed Corporation, fusible AWWA C900 pipe, or HDPE.

3.03 INSTALLATION OF VALVES AND FITTINGS

A. Valves and fittings shall be placed in the location indicated on the Plans and as directed by the Engineer. Valves and boxes shall preferably be located out of any traffic area. In cases where conditions dictate placement of valves in street, alleys, or roadways, the valve boxes shall be furnished with a dome type base and shall be set on bricks to prevent the box bearing against the valve or piping.

B. All underground valves sized 12-inches and smaller shall be set vertically, unless shown otherwise on the Drawings. Buried valves sized larger than 12-inches shall be installed horizontally as detailed on the Drawings. Cast-iron valve boxes shall be set with covers flush with the surface of a concrete .maintenance pad as detailed on the Drawings.

C. Before being placed in the trenches, all valves, meters, fittings, etc., shall be carefully examined to see that they are in good working order and are clean.

SECTION 02513 - WATER SYSTEMS

3.04 INSTALLING FIRE HYDRANTS AND YARD HYDRANTS

Each fire and yard hydrant shall be installed vertically on a concrete base, and shall be secured against dislocation as detailed on the Drawings. Unless otherwise directed by the Engineer, hydrants shall be placed as shown on the Drawings and as follows:

A. Yard hydrants shall be located at high or low points and at the ends of lines in the approximate locations shown on the Drawings. Fire hydrants placed behind curbs shall be set so that no portion of the hydrant or nozzle caps is closer than six (6) nor more than twelve (12) inches from the vertical face of the curb. Hydrants shall not be placed within twenty (20) feet of the intersection of curb lines at street corners.

B. Vertical offsets or hydrant extensions shall be used as required in the hydrant lead so that the bury-line of the hydrant will be flush with the natural ground and the specified cover will be maintained on the main and the hydrant lead.

C. Hydrants shall be secured in place by means of a hydrant valve anchoring tee with hydrant anchoring connection pieces, concrete thrust blocks, or socket clamps and tie rods. Tie rods shall extend from the hydrant base to the tee fitting in main. Clamps shall be of either wrought iron or steel, and not less than two (2) inches wide and three-eighth (3/8) inches thick. Bolts used shall be not less than three-quarter (3/4) inches in diameter, material shall be wrought iron or steel. Wrought iron and steel shall be protected against corrosion by painting with tar, asphalt, or other suitable and approved material and shall be installed with suitably sized anode caps.

3.05 CONNECTING EXISTING PIPE LINES TO NEW WATER MAINS

Connections to existing 3" and smaller water mains shall be made with the required number and size of corporation cocks, goosenecks, and branch connection, which cost shall be included in the cost of the new water main. Connections to 4" and larger water mains will require that the connection be made with tapping valves and tees.

3.06 SERVICE TAPS, COUPLINGS AND STRAP CLAMPS

A. All service taps shall be threaded couplings with AWWA threads. The maximum allowable size of tap of each size of pipe shall be as shown in Table 02513-2.

TABLE 02513-2

MAXIMUM SIZE THREADED COUPLING PERMITTED IN DUCTILE IRON PIPE

Pipe Size	***Tap Size***	***Pipe Size***	***Tap Size***
2”	½”	8”	1 ¼”
3”	½”	10”	1 ½”
4”	¾”	12”	2”
6”	1”		

B. Where it is necessary to provide a service larger than the allowable ductile iron tap size, multiple taps shall be employed by staggering the taps around the pipe and spacing the taps at least twelve (12) inches apart and twelve (12) inches from the end of the pipe length, or service strap clamps shall be used.

C. Service strap clamps shall be galvanized malleable or ductile iron or bronze with rubber gasket. The maximum allowable size tapped outlet when made with a service clamp shall be as shown in Table 02513-3. Clamps shall be Smith-Blair, Mueller, Dresser, or equal.

TABLE 02513-3

MAXIMUM SIZE SERVICE CLAMP PERMITTED		
Pipe Size (Inches)	***Size for Ductile Iron Pipe***	***Size for Plastic and Galvanized Pipe***
2”	1”	¾”
2 ½”	1 ¼”	1”
3”	1 ½”	1 ½”
4”	2”	1 ½”
6”	2”	1 ½”
8”	3”	1 ½”
10”	3”	1 ½”
12”	4”	1 ½”

3.07 PIPE TESTING

A. Hydrostatic Testing for Pressure Lines

B. All pipelines shall be cleaned as specified herein prior to performance of pressure or leakage tests.

1. Leakage Test Requirements

a. After the pipe has been laid and backfilled as specified, all newly laid pipe, or any valved section thereof, shall be subjected to a pressure of 150 pounds per square inch, or 150% of the normal working pressure, whichever is greater, as directed by the engineer.
b. Leakage is defined as the quantity of water to be supplied into the newly laid pipe, or any valved section thereof, necessary to maintain the specified leakage test pressure after the pipe has been filled with water, the air expelled, raised to the proper test pressure and allowed to stabilize..
c. No pipe installation will be accepted until the leakage is equal to or less than the number of gallons per hour as determined by the formula:

$L = \frac{SD(P)^{1/2}}{133{,}200}$, for non-plastic pipes; and $L = \frac{ND(P)^{1/2}}{7{,}400}$, for plastic pipes.

In which L is the allowable leakage in gallons per hour; S is the length of pipe tested, in feet; N is the number of joints in the segment of pipe being tested; D is the nominal diameter of the pipe, in inches; and P is the test pressure during the leakage test, in pounds per square inch gauge.

d. All pipelines located below concrete slabs or foundations shall be pressure tested prior to the installation of concrete slabs or foundations.
e. A hydrostatic pressure and leak test form shall be completed on each segment of line tested.

2. A fill manifold shall be constructed so that water can be added to the pipe while simultaneously monitoring the pressure. Pressure shall be monitored with a recording pressure gage that uses paper strip, paper disk or digital recording medium. The connection between the pressurizing pump and the fill manifold shall have a cutoff valve with a quick connect/disconnect coupling to allow the pressurizing pump to be disconnected from the manifold when the pump is not being operated. The test shall be completed by pumping the pressure in the pipe to equal the pressure at the beginning of the test, recording the final volume of water pumped into the pipe to reach the initial pressure for final determination of the leakage during the test. A means of depressuring the pipe segment being tested shall be provided at the other end of the pipe from the location of the fill manifold. The recording of the pressure test shall show the initial pressurization of the pipe, intermediate repressurization events, final repressurization and depressurization. The record of the pressure test shall be provided to the Engineer or the Resident Project Representative immediately upon completion of the test.
3. Duration of Test - The duration of the test under pressure shall be four (4) hours.
4. Procedure - Each valved section shall be slowly filled with water, during which time the air shall be expelled. The specified test pressure, based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge, shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Engineer. The pump, pipe connections, and all necessary apparatus, including gauges, shall be furnished by the Contractor. The Contractor will make all taps into the pipe, and furnish all necessary assistance for conducting the tests.
5. Expelling Air Before Test - Before applying the specified test pressure, all air shall be expelled from the pipe. If air release valves, hydrants or blowoffs are not available at high places, the Contractor shall make the necessary taps at points of highest elevation before the test is made and insert plugs in these taps after the test has been completed. If high points are indicated on drawings, corp stops or air release valve isolation valves shall be installed at designated points.
6. Permissible Leakage – The goal is to have a systems installed so that there is no leakage. However, should any of pipe laid disclose leakage greater than that specified above, the Contractor shall, at no additional expense to the Owner, locate, repair, and replace the defective joints, pipe or fittings until the leakage is within the specified allowance.
7. Time for Making Test -

a. Ductile-iron pipe with cement mortar lining shall be filled with water a minimum of 24 hours prior to making any leakage tests. All other pipe may be subjected to hydrostatic pressure and inspected and tested for leakage at any convenient time after the trench has been partially backfilled. Note: The Contractor may omit backfilling the pipe joints while performing the leakage test; however, should any damage occur as a result of this procedure, such damage shall be repaired at no additional cost to the Owner.
b. Polyethylene pipes shall be filled and pumped to the test pressure and held at that pressure for at least 24 hours prior to performing the leakage test.
c. Where any section of a main is provided with concrete reaction blocking, the hydrostatic pressure test shall not be made until at least five (5) days have elapsed after the concrete reaction blocking was installed. If high early strength cement is used in the concrete reaction blocking, the hydrostatic pressure test shall not be made until at least two (2) days have elapsed.

C. Pressure Test

It is the intent of these specifications that the previously described leakage test also serve as the pressure test. Therefore, a separate pressure test is not required.

D. Alignment Test for Pressure Lines

1. Prior to backfilling of pressure lines, the joint alignment shall be inspected to assure the maximum deflection present in each joint does not exceed the limit as previously specified.
2. Pressure lines, which are a portion of a pump discharge system, shall be inspected to assure the line is installed at a constant or increasing grade so as to eliminate the possibility for air accumulation at an intermediate high point.
3. Any and all defects shall be corrected by the Contractor at no additional cost to the Owner and to the satisfaction of the Engineer prior to backfilling. This shall be completed before the work shall proceed and before acceptance of and/or payment therefore shall be made.

3.08 CLEANING AND STERILIZATION

A. General - All existing water lines shall be flushed and purged of all loose scale and debris prior to installing or connecting new lines. All air lines or gas lines shall be flushed and purged of all loose scale and debris prior to installing equipment. All yard piping, sewers, and force mains shall be flushed and cleaned of all loose materials and debris prior to acceptance.

B. Sterilization of Potable Water Lines - All water lines noted on the Drawings as potable water lines shall be sterilized prior to acceptance. Sterilization may be performed in conjunction with the leakage test provided that all water added to the pipe during the testing is protected from being contaminated and has been treated with the appropriate amounts of

disinfectant and that all equipment used to perform the leakage test has been properly sterilized prior to performing the test. Prior to sterilization, the lines shall be flushed as thoroughly as possible with the water pressure and outlets available. The sterilization procedure shall be performed before the line is placed in service by filling the pipe system with either a chlorine gas-water mixture or a calcium-hypochlorite-water mixture in accordance with one of the following methods:

C. The following procedure is a modification of the procedures described in AWWA C651.

1. The procedure as described herein may be used or one of the procedures described in AWWA C651 may be used; however, the end result shall be bacteriological tests meeting the requirements as defined in AWWA C651 and as required by the Louisiana State Health Code.
2. Chlorine gas-water mixture shall be applied by means of a solution feed chlorinating device.
3. Calcium hypochlorite shall be comparable to commercial products known as H.T.H., Perchloren, and Maxochlor. A solution consisting of 5% of powder to 95% of water by weight shall be prepared. The calcium hypochlorite and water mixture shall first be made into a paste and then thinned into a slurry. The hypochlorite slurry shall be injected or pumped into the newly laid line under the conditions specified herein.
4. The chlorinating agent shall be applied at the beginning the section adjacent to the feeder connection and shall be injected through a corporation cock, hydrant, or other connection insuring treatment of the entire pipeline. The water shall be fed slowly into new line with chlorine applied in amounts to produce a dosage of 50 ppm. Mains previously filled shall be treated to a concentrated dosage at intervals along the line. A residual of not less than 10 ppm shall be produced in all parts of the line at the end of a 24 hour long treatment period. During the chlorination process, all valves and accessories shall be operated.
5. After chlorination, the water shall be flushed from the line at its extremities until the replacement water tests are equal chemically and bacteriologically to those of the permanent source of supply. All chemical and bacteriological testing shall be done at no additional expense to the Owner at a certified laboratory or by the local health authority. In either case the testing shall meet the Louisiana State Health Code requirements.
6. Should the bacteriological tests not meet the Louisiana State Health Code requirements, the pipelines shall be flushed, re-disinfected and retested at no additional cost to the Owner until the requirements are met.
7. Valving of new water lines shall be as shown on the Plans. Testing and sterilizing of the new lines shall be done by utilizing existing and new valves and temporarily plugging the line, if necessary. Where no existing services occur on a short length of existing line, the Resident Project Representative may direct that this existing line be tested and sterilized in conjunction with the new line, at no additional cost to the Owner.

3.09 INTERRUPTION OF WATER SERVICE

SECTION 02513 - WATER SYSTEMS

A. The attention of the Contractor is directed to the fact that some of the alterations in the water system may require cutting into existing water mains. Water service can be interrupted under the following conditions and subject to all other provisions herein contained:

B. Where interruption of service will be along a main serving not more than fifty (50) customers, who will be affected by said interruption, and where the duration of said interruption is to be four (4) hours or less, interruption will be permitted, provided Contractor has notified the water system customers who will be affected by the interruption, Resident Project Representative and the Owner at least twenty-four (24) hours in advance of the contemplated interruption of service.

C. Where interruption of service will affect more than fifty (50) customers, affect the main business district, be of greater duration than four (4) hours, or a combination of the above conditions, interruption of service will be permitted only after both the Resident Project Representative and the Owner have approved such cases. All water system customers who will be affected by the interruption shall be notified 7-days prior to the interruption with a second notification at least 24-hours prior to the beginning of the interruption. Owner reserves the right to require the Contractor to perform such work between the hours of 11:30 p.m. and 6:00 a.m. Any overtime pay for the Contractor's personnel shall be included in his bid for the items of work involved.

3.10 NEW SERVICE ASSEMBLY WITH METER SETTING

A. New service assemblies with meter setting where called for on the Drawings or elsewhere in the Contract Documents, shall each include a meter box, service tap and clamps or fittings, curb stop, corporation stop, and the required connectors and service pipe. Water meters shall be furnished by the Contractor, except in the case where it is designated on the Drawings or in the Special Conditions that meters will be purchased by the Owner, and furnished to the Contractor, in which case the Contractor will set the meters. All connectors shall comply with AWWA Standard C800.

B. The service assembly and corresponding service pipe size shall conform to the requirements shown in Table 02513-4.

TABLE 02513-4

SERVICE ASSEMBLY	SERVICE PIPE SIZE
5/8” x ¾” small res. & comm. (up to 2 baths)	¾”
5/8” x ¾” large res. & comm. (more than 2 baths)	1”
¾” or 2 - 5/8” x ¾”	1 ½”
1” or 2 - ¾”	1 ½”
1 ¼” or 2 - ¾”	2”
1 ½” or 2 - 1”	2 ½”

2”	3”
3”	4”

C. Water Meters - Water meters shall be cold water rotating disc type with hermetically sealed and magnetically driven registers as manufactured by Sensus Technology or an approved equal. Meters shall be first line quality of the manufacturer. Meters shall be manufactured in accordance with AWWA C700, except as modified by these Specifications.

1. Main Case: The main case shall be high grade waterworks bronze with hinged single lid cover. Raised characters shall be cast on the main case to indicate the direction of flow, size and model number and the meter serial number shall be permanently stamped on the both the meter main case and the lid. The working pressure shall be 150 psi. Standard, Southern or non-frostproof bottoms shall be furnished unless noted otherwise on the Drawings or the Special Conditions. Non-ferrous strainers shall be provided, which fit tightly against the main case. Meters 1 ½" and larger shall be flanged.
2. Measuring Chamber: The measuring chamber shall be of 85-5-5-5 bronze alloy composition and stainless steel or monel trimmed. The moving unit shall be of hard rubber rotating disc type. The disc shall be preferably the three-piece and the chamber shall be the two-piece type employing a thrust roller and insert.
3. Register: The register shall be straight, reading in gallons. The register assembly shall be completely encased, hermetically sealed, and driven by permanent magnets.
4. Guarantee: Water meters shall be guaranteed for a period of at least 5-years from the data of project acceptance.

3.11 TRACERS FOR NON-METALLIC PIPE

A. A plastic bonded 12 gauge copper wire shall be installed along the top of the pipe. The wire shall be continuous along the entire length of the pipe and shall be grounded to gate valves, air release valves, fire hydrants, flush valves, and water meters. See Drawings for details.

B. Service pipe shall have the same wire laid along the top of the service pipe and project one foot into or along side each meter box.

3.12 WARNING/CAUTIONARY TAPE

The Contractor shall install a warning/cautionary tape over all water mains. The tape shall be placed over the pipe approximately 12" above the top of the pipe. The warning/cautionary tape shall be continuous along the pipeline. Splices shall be formed by overlapping adjacent ends of the tape and then securing with translucent, waterproof adhesive tape of the same width as the warning/cautionary tape.

3.13 ABANDONMENT OF EXISTING LINES

SECTION 02513 - WATER SYSTEMS

A. The Contractor shall abandon existing water lines in place as indicated on the Drawings. Abandonment of existing lines shall be coordinated with the Owner and Engineer to assure continuity of service. Contractor shall dig test pits at the designated disconnect points to verify piping configuration, sizes, material type, etc. in order to have available the necessary tools, equipment, materials and manpower to complete the work.

B. Prior to the abandonment of any line, all services shall be disconnected and transferred from the line to be abandoned to the new main line.

C. Abandoned line shall be disconnected from main line and all valves and other appurtenances removed.

D. The active main line from which abandoned line has been disconnected shall be closed with a mechanical joint plug or other repair method suitable for the type of pipe.

E. Ends of abandoned line shall also be plugged with suitable plug where applicable. When not applicable, non-shrink, epoxy grout plug shall be utilized to cap end of abandoned lines.

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 02 - SITEWORK

SECTION 02533- HORIZONTAL DIRECTIONAL DRILLING (HDD) FOR PRESSURE AND GRAVITY MAINS

PART - I GENERAL

1.01 SCOPE

A. This Construction method involves the controlled horizontal directional drilling (HDD) of a pilot bore-hole, reaming to enlarge the bore hole and final back reaming the bore-hole with concurrent enlargement and pull back of the specified sewer pipe to line and grade.

B. Pre-qualification of Horizontal Directional Drilling Contractors/Subcontractors

1. The Contractor shall submit a statement of qualifications showing qualifications of his HDD personnel, or his Subcontractor's personnel in the event that the HDD work will be performed under a subcontract agreement.
2. When the HDD work is to be performed to install gravity flow mains, the Contractor must show experience in performing successful, similar HDD installation of at least five projects on which gravity flow mains were placed on-line and grade using the HDD method. The supervising personnel (Superintendent or Foreman) that will be providing continual direction of the HDD operations shall have had at least one year of experience in successfully performing similar HDD installations. The Contractor shall provide contact information for a person knowledgeable in the installation and continuing operation of the sewers that were installed on each of the projects referenced in the Contractor's submittal information.
3. When the HDD work is to be performed to install pressure flow mains, the Contractor must show experience in performing successful, similar HDD installation of at least five projects on which pressure mains were placed on-line using the HDD method. The supervising personnel (Superintendent or Foreman) that will be providing direction of the HDD operations shall have had at least one year of experience in successfully performing similar HDD installations.

C. Contractor shall describe the carrier pipe and casing pipe, when required, proposed for each individual HDD installation, including details of the pipe jointing system. The pipe and casing selected must be complete with ASTM, AWWA or API designation as applicable. Acceptable carrier pipe materials for direct bore (no casing) include High Density Polyethylene pipe (HDPE) and fusable or restrained joint Polyvinyl Chloride pipe (PVC). When a direct bore process is shown on the Drawings, Contractor may choose to case the bore opening and then grout in place an acceptable carrier pipe at no additional payment.

1.02 REFERENCE STANDARDS

A. HDD Consortium; Horizontal Directional Drilling Good Practices Guidelines

B. American Railway Engineering Association (AREA) Manual for Railway Engineering.

C. American Association of State Highway and Transportation Officials (AASHTO).

D. Occupational Safety and Health Administration (OSHA).

E. National Electrical Code - (NFPA 70).

1.03 DEFINITIONS

A. Horizontal Directional Drilling (HDD) is a method of installing buried piping by controlled (guided within specified limits) horizontal drilling. The process in general is performed by first pushing a drill bit that is mounted on the end of segmented drill pipe. The process of pushing the drill bit creates an on line and/or grade pilot hole, which is then increased in size by back reaming to required diameter for pulling a carrier pipe into place without normally requiring installation of a casing pipe.

B. Pilot Hole is the initial controlled drilled, horizontal shaft used to guide the back reaming cutter to design size for installation of the carrier pipe.

C. Back Reaming is the process of attaching a cutter head to the drill pipe which is, then, rotated and pulled back through the pilot hole to enlarge the bore in one or more passes to the size for required for installation of the carrier pipe.

D. Pullback is the process of installing the carrier pipe by attaching a swivel head to the reaming cutter head to which the carrier pipe is then attached for the purpose of pulling the carrier pipe into place.

E. HDD Methodology shall be a written description, together with supporting documentation that defines the Contractor's plans and procedures for the proposed Horizontal Directional Drilling operations, surface equipment layout and area requirements.

F. Zone of Active Excavation shall be the area located within a radial distance about a surface point immediately above the face of the reamed hole or excavated access pit. The radial distance used to define a zone of active excavation shall be equal to the depth measured between the natural ground surface and the invert of the reamed hole or access pit (at each corner) directly below.

G. Critical Structure shall be defined as any pipeline, utility, building, structure, bridge, pier, or similar construction partially or entirely located within a zone of active excavation.

H. Equipment:

1. The size of the horizontal directional drilling equipment (rig) shall be determined by the Contractor as required for the depth, diameter and length of pipe that is to be placed.
2. The drill pipe shall be threaded end and of a wall thickness, diameter and strength as determined by the Contractor which is required to create the pilot hole, back ream the bore hole and pullback the pipe.

3. The strength and size of drill bits and reamers shall be determined by the Contractor, and shall be generally based on the depth and size of the carrier pipe, the soil type and other drilling conditions to be encountered.
4. The size of drilling fluid mixing tanks, holding tanks, and cleaning systems shall be determined as to size and number as needed for recirculation containment, collection and disposal of cuttings and drilling fluid.
5. Boretracking equipment methods and systems can generally be defined as either walk over or non-walkover. Specific equipment shall be determined by the Contractor for the purpose of measuring the actual accuracy of the bore to the specified line and grade as required for the specific installation conditions. This equipment shall be capable of monitoring the bore path during either development of the pilot hole or back reaming by taking periodic readings of the azimuth and inclination (when required for gravity flow mains) of the bore hole by means of a tracking probe located behind the drill bit or back reaming cutter.

I. Drilling fluids shall be used to augment the pilot hole drilling, back reaming and pullback processes. Drilling fluids shall be formulated as determined by the Contractor of a carrier fluid (usually water) and drilling fluid additives (normally bentonite and/or polymers).

1.04 SUBMITTALS

A. When submitting the Project Construction Schedule, sufficient time shall be included for initial review, correction, resubmission and final review of HDD details as described by this specification. The Engineer will review and return the submittals as expeditiously as possible but the amount of time required for review will vary depending on the complexity and quantity of data submitted. In no case will a submittal schedule be acceptable which allows less than 15 days for initial review of the HDD data by Engineer. Use of this time by the Engineer for review of the submittal data shall in no way be justification for delays or additional compensation to the Contractor. The Contractor shall be responsible for any errors, omissions or deviations from the Contract requirements. Review of submittals in no way relieves the Contractor from his obligation to furnish required items according to the Contract Documents.

B. Transmit each submittal to the Engineer with the required submittal form as detailed elsewhere in the Contract Documents.

C. Apply Contractor's review stamp, certifying that the items have been reviewed in detail and are correct and in accordance with the Contract Documents, except for any requested variance, which shall be noted on the submittal form. As a minimum, Contractor's Stamp shall include:

1. Contractor's name.
2. Job number.
3. Submittal number.

4. Certification statement that the Contractor has reviewed the submittal and it is in compliance with the Contract Documents.
5. Signature by Contractor's reviewing personnel.

D. The following submittals are required:

1. Horizontal Directional Drilling Methodology: A description of the proposed pipe installation shall be submitted for review. The description should be sufficient to convey the following:

   a. The proposed method to assure keeping of proper alignment (both horizontal and vertical as required for the particular installation type - HDD requiring both on-line and on-grade control or HDD requiring only on-line control) during the drilling process from entry to exit
   b. A preliminary drilling plan describing development of the pilot hole, back reaming and pullback procedures.
   c. Manufacturer, type and size of HDD drilling equipment proposed, including description of the type and size of any auxiliary systems proposed.
   d. Sequence and schedule of operations.
   e. Locations of access shafts, pits and work sites.
   f. Method of spoil transportation from the entry and exit pits. Cleaning equipment including surface storage and disposal methods proposed.
   g. Proposed drilling fluids, including expected quantities to be used, collected for disposal and anticipated amounts to be lost. Properties of the proposed drilling fluid shall be submitted, i.e. down hole pressures, viscosities, and flow rate. A plan to prevent undesired "frac outs" shall also be submitted.
   h. Capacity of all boring equipment, including specifications for drilling pipe, drill bits and back reaming equipment.
   i. Identify critical utility crossings and special precautions proposed when drilling within the zone of active excavation around the identified utilities. All utilities along and on either side of the proposed drill path shall to be located prior to construction as required by State Law and the Contract Documents.
   j. Specify type of tracking equipment, operating range and degree of accuracy during drilling of the pilot hole and back reaming operations.

2. Submit a brief description of quality control methods including:

   a. Method and frequency of survey control.
   b. Example of daily log for reporting all boring and installation operations.

3. When geotechnical investigations are conducted by the Contractor, submit results to the Engineer for record purposes.
4. The Contractor shall provide monitoring plans for assessing ground movement (settlement or heave) due to drilling operations as follows:

a. Instrumentation Monitoring Plan: Submit for review, prior to construction, a monitoring plan that includes a schedule of instrumentation design, layout of instrumentation points, equipment installation details, manufacturer's catalog literature, and monitoring report forms.
b. Surface Settlement Monitoring Plan: Submit a settlement monitoring plan for review prior to construction. The plan shall identify the location of settlement monitoring points, reference benchmarks, survey frequency and procedures, and reporting formats.

5. Structures Assessment: Pre-construction and post-construction assessment reports shall be provided for critical structures, namely those located within the zone of active excavation from the proposed bore centerline. Photographs or a video of existing/preconstruction damage to structures in the vicinity of the sewer alignment shall be included in the assessment reports.
6. The readings of all monitoring shall be submitted to the Engineer.
7. The daily log of boring/pipe installation operations as previously defined and work progress data as kept by the Contractor shall be submitted weekly.

E. DESIGN CRITERIA

1. Contractor is responsible for selection of the appropriate pipe and pipe joints to carry all construction loads in combination with overburden, earth and hydrostatic loads. Design of any pipe indicated in the Contract Documents considers in place loads only and does not take into account any construction loads. The Contractor shall determine the criteria for longitudinal loading on the pipe and joints and shall submit design criteria along with other required submittal data.
2. The carrier pipe shall be designed to withstand all construction and handling forces without damage or distortion. The connecting equipment shall be selected so that the pull loads are uniformly distributed circumferentially around the periphery of the pipe wall and will not damage or distort the pipe.
3. The loading criteria shall account for loads from handling and storing.
4. Criteria to be used at railroad crossings shall be Cooper E-80 locomotive loading distributions in accordance with AREA specifications for culverts. In the design, account for additive loadings due to multiple tracks.
5. Criteria to be used for truck loading shall be HS-20 vehicle loading distributions in accordance with AASHTO.

PART - II PRODUCTS

2.01 Contractor shall be responsible for selecting appropriate pipes and pipe joints to safely carry the loads imposed during construction. Pipe materials shall be selected by Contractor and reviewed by the Engineer. Acceptable materials for Sanitary Sewers installations are as follows:

A. Polyvinyl Chloride (PVC) and joints to be in accordance with the requirements for pipe mains as detailed elsewhere in the Contract Documents. PVC pipe shall be supplied with a joint restraining system such as a heat fused joining system or Certa-Lok C900/RJ as manufactured by CertainTeed Corporation, P.O. Box 860, Valley Forge, PA 19482 or approved equal. Pipe for pressure mains shall be manufactured with a ductile iron (DI) pipe equivalent diameter and pipe for gravity mains shall be manufactured with an iron pipe size (IPS) equivalent diameter unless otherwise stated in the Contract Documents.

B. Polyethylene (HDPE) with heat fused joints to be in accordance with the requirements for pipe mains as detailed elsewhere in the Contract Documents.

2.02 Pipe shall be round with a smooth, even outer surface, having joints that provide stable connections between pipes. Pipe ends shall be designed so that installation forces are evenly distributed around the entire pipe joint and such that point loads will not occur when the pipe is installed. Pipe used shall be capable of withstanding all forces that will be imposed by the process of installation, as well as the final in-place loading conditions. Protect the exposed ends of the pipe and joints against damage.

PART - III EXECUTION

3.01 CONSTRUCTION OPERATIONS CRITERIA

A. Use methods for HDD operations that will minimize ground settlement. Select methods, which will control flow of water and prevent loss of soil into the bore and provide stability in all operating conditions. The Contractor shall be responsible for damage due to settlement from any construction-induced activities.

B. Conduct all operations in accordance with applicable safety rules and regulations, OSHA standards and Contractor's safety plan. Use methods, which include due regard for safety of workmen, adjacent structures, utilities, and the public.

C. Maintain clean working conditions.

D. If crossing under railroad embankments, highways, or streets, perform the installation so as to avoid interference with the operation of the railroads, highways, or streets, except as approved by the owner of the facility.

E. Whenever there is a condition encountered which could endanger the borehole or adjacent structures, operate without intermission including 24-hour work-days, weekends and holidays, until the condition no longer exists.

3.02 GROUND WATER CONTROL

Provide ground water control measures in conformance with other requirements in the Contract Documents, when necessary to perform the work.

3.03 EQUIPMENT

A. Provide full directional guidance of the drilling operation during development of the pilot hole to the required line and grade.

B. Deviations between the recorded position of the drill string and the plan and profile drawings shall be documented and immediately brought to the attention of the Engineer.

C. Should the Contractor over bore during the back reaming operation, the annular space around the carrier pipe shall be grouted. Grouting material shall be submitted by the Contractor for the Engineer's approval prior to beginning grouting operations. Grouting shall be performed in such a manner that the carrier pipe will not be subjected to collapsing pressures, including drilling of pressure relief holes through the soil above to the outer periphery of the back reamed hole and along the centerline of the carrier pipe at a frequency of no less than 25-feet on center.

3.04 DIRECTIONAL DRILLING DATA

A. Maintain daily work logs for each shift describing construction events and observations. The Contractor's daily logs shall, as a minimum, contain the following information:

1. HDD equipment used to perform the work.
2. Contractor's personnel on site during HDD operations along with hours worked by each worker, including visiting supervisory personnel.
3. Total hours worked per shift during drilling operations.
4. Location of drill head and progress of drilling operation during shift.
5. Completed forms or computer print outs for checking line and grade of the drilling operation, showing achieved tolerance relative to design alignment.
6. Maximum pipe loads per pull back.

3.05 CONTROL OF LINE AND GRADE

A. Construction Control.

1. The Engineer will establish the baselines and benchmarks indicated on the Drawings. Contractor shall have a Registered Professional Land Surveyor check baselines and benchmarks and certify their accuracy prior to the beginning of the Work and report any errors or discrepancies to the Engineer.
2. Use the checked and certified baselines and benchmarks to establish and maintain construction control points, reference lines and grades for locating, boring, reaming in relationship to existing pipelines, utilities and structures. Control points are provided to assist the Contractor and, if deemed necessary, the Contractor should establish additional control points in order to perform the work accurately.
3. Establish construction control points sufficiently ahead of the work so as not to be affected by any ground movements caused by HDD operations.

B. Line and Grade.

1. Provide assurance that, should there be any settlement of the ground surface during construction affecting the accuracy of any temporary benchmark, the Contractor shall detect and report such movement and reestablish temporary benchmarks.
2. Check and record the survey control for the boring operations against an aboveground undisturbed reference as required to accurately guide and monitor the constructed length at 50 foot intervals\
3. Acceptance criteria for the sewer pipe (in the plan direction of flow) shall be a maximum deviation of 6 inches in downward vertical alignment for any 100-foot section from plan grade but no more than 12 inches (1 foot) down in a 400-foot section.
4. Deviations of grade (in the plan direction of flow) in the upward direction is allowed only for corrective means; however, a minimum absolute downward slope of 0.34% must be maintained unless otherwise approved by the Engineer.
5. Deviations in line shall be a maximum of 12 inches in any 100-foot section but no more than 24 inches in 500 linear feet. Horizontal offsets from plan line on gravity flow sewers must be corrected at manholes.
6. Pipe must not deviate into a 2-foot boundary located on either edge of a servitude or right-of-way nor should it conflict with any above or below ground obstructions.
7. Pipe installed outside tolerances and subsequently abandoned shall first be fully grouted.

3.06 MONITORING

A. Monitoring Line & Grade

1. The locating/tracking equipment shall be calibrated before commencement of any directional drilling operations. A copy of the calibration data shall be provided to the Engineer.
2. Monitoring of bore, reamer and pipe shall be accomplished by manual plotting based on location and depth readings provided by the locating/tracking system or by computer generated bore logs which map the bore path based on information provided by the locating/tracking system.
3. Readings or plot points shall be taken on every drill rod.
4. When performing HDD work for gravity flow sewers, record the exact position of the drill bit every 3 to 5 feet to ensure the alignment is within specified tolerances. Make immediate correction to alignment before allowable tolerances are exceeded.
5. When excavation is off line or grade, make ongoing alignment corrections to avoid major changes and keep within specified tolerances. A "belly" in the bore that will hold water or a section with a "reverse grade" are not acceptable conditions.
6. At the completion of the bore an as-built drawing showing both the actual installed horizontal and vertical alignments shall be provided within one week of completing the installation.

B. Instrumentation Monitoring for Gravity Flow Pipe Installation and Installation of Pressure Pipes larger than 36-inches in Diameter

1. Install and maintain an instrumentation system to monitor and detect movement of the ground surface and adjacent structures. Establish vertical control points at a distance from the construction areas that avoids disturbance due to ground settlement.
2. Installation of the instrumentation shall not preclude the Engineer, through an independent contractor or consultant, from installing instrumentation in, on, near, or adjacent to the construction work. Access shall be provided to the work for such independent installations. However, any decision by the Engineer not to install instrumentation or have instrumentation installed shall not absolve the Contractor from monitoring and protecting existing structures and infrastructure from being damaged by the HDD installation work.
3. Instruments shall be installed in accordance with the instrumentation manufacturer's recommendations.
4. The Contractor is responsible for all construction induced ground movement and the monitoring thereof.

C. Surface Settlement Monitoring for All HDD Pipe Installation on Roadway, Railroad and Utility/Pipeline Crossings

1. Establish monitoring points on all critical structures.
2. Record location of settlement monitoring points with respect to construction baselines and elevations. Record elevations on required pipe installations to an accuracy of 0.01-foot for each monitoring point location. Monitoring points should be established at locations and by methods that protect them from damage by construction operations, tampering, or other external influences.
3. Ground surface elevations shall be recorded on the centerline ahead of the construction operations at a minimum of 100-foot intervals or at least three locations per installed section of carrier pipe. For installation of pipes greater than 60-inch diameter, also record similar data at approximately 20 feet each side of the centerline. Settlement monitoring points must be clearly marked by studs or paint for ease of locating.
4. Railroads. Monitor ground settlement of track subbase at centerline of each track.
5. Utilities and Pipelines. Monitor ground settlement directly above and 10 feet either side of the utility or pipeline intersection.

D. Reading Frequency and Reporting. The Contractor shall submit records of readings from the various instruments and survey points.

1. Instrumentation monitoring results to be read at the frequency specified and, unless otherwise specified, monitoring shall be commenced prior to the zone of active excavation reaching that point. Monitoring shall be continued until the zone of active excavation has passed and until no further detectable movement occurs.
2. Surface settlement monitoring readings shall be taken:

a. Prior to the zone of active excavation reaching that point,
b. When the installation operation reaches the monitoring point (in plan), and
c. When the zone of active excavation has passed the monitoring point, monitoring shall be continued until no further movement is detected.

3. All monitoring readings shall be submitted promptly to the Engineer.
4. Immediately report to the Engineer any movement, cracking, or settlement that is detected.
5. Following substantial completion but prior to final completion, make a final survey of all monitoring points.

3.07 DISPOSAL OF EXCESS MATERIAL

Remove spoil as is required for removal of excess excavated material as detailed elsewhere in the Contract Documents.

3.08 ACCEPTANCE TESTING

Acceptance testing shall include leakage tests as required for pipes stated elsewhere in the Contract Documents.

3.09 SITE RESTORATION

All surfaces affected by the work shall be restored to their preconstruction conditions.

3.10 POST CONSTRUCTION EVALUATION

A. The Contractor shall provide a set of record drawings including both alignment and profile. Drawings should be constructed from actual field readings. Raw data should be available for submission at any time upon request. As part of the project records, the Contractor shall specify the tracking equipment used, including method of confirmatory procedure used to ensure the data was captured.

B. All fittings, valves, manholes, connections, etc. shall be located on the record drawings, including reference points as required elsewhere in the Contract Documents.

END OF SECTION

TECHNICAL SPECIFICATION
DIVISION 02 - SITEWORK

SECTION 02700 - PAVING AND SURFACING

PART - I GENERAL

1.01 This Section of the Specifications details requirements of work and materials to be used in connection with all hauling, rolling, compacting, and other operations pertaining thereto for the construction of various roadways, driveways, sidewalks, curbs, and gutters all in accordance with the items of work Specified and shown on the Plans and contained in the Proposal Form.

1.02 REFERENCED STANDARDS

All work in this Section shall be in accordance with "Louisiana Standard Specifications for Roads and Bridges", latest edition as revised or amended. This standard specification will hereinafter be referred to as "LA DOTD Standards". When the term department is used in this specification, it shall mean Engineer.

PART - II PRODUCTS

2.01 ASPHALTIC CONCRETE

A. Asphaltic Concrete Materials shall conform to the following Sections and Subsections of LA DOTD Standards:

1.	Asphalt Materials and Additives	1002.01 & 1002.02
2.	Aggregates	1003.01 & 1003.06
3.	Hydrated Lime	1018.03(a)
4.	Mix Releasing Agent	1018.25

B. All Asphaltic Concrete used for pavement in this Contract shall be as defined in Section 501 through 509 of LA DOTD Standards.

2.02 PORTLAND CEMENT CONCRETE PAVEMENT

A. Portland cement concrete and associated paving materials shall conform to the following Sections and Subsections of LA DOTD Standards:

1.	Portland Cement Concrete	901
2.	Portland Cement	1001.01
3.	Portland-Pozzolan Cement	1001.02
4.	Masonry Cement	1001.03
5.	Aggregates	1003.02
6.	Joint Materials	1005
7.	Reinforcing Steel and Wire Rope	1009
8.	Curing Materials and Admixtures	1011.01 & 1011.02
9.	Water	1018.01

B. All Portland Cement Concrete used for pavement in this Contract shall be pavement type B or C.

2.03 PORTLAND CEMENT CONCRETE CURBS AND GUTTERS

Portland Cement Concrete and associated materials for Curbs and Gutters shall conform to the Sections and Subsections of LA DOTD Standards as stated above for concrete pavement.

2.04 PORTLAND CEMENT CONCRETE, CONCRETE WALKS, DRIVES AND INCIDENTAL PAVING

Portland Cement Concrete and associated materials for Curbs and Gutters shall conform to the Sections and Subsections of LA DOTD Standards as stated above for concrete pavement.

2.05 BASE COURSE MATERIALS

A. Base Course Materials for the various types of base courses shall conform to the following Sections and Subsections of LA DOTD Standards:

1.	Asphaltic Concrete	502
2.	In-Place Cement Stabilized	303
3.	Hydraulic Cement	1001
4.	Asphalt Materials and Additives	1002
5.	Sand Clay Gravel	1003.01 and 1003.03(A)
6.	Stone	1003.03(d)
7.	Recycled Portland Cement Concrete	1003.03(e)
8.	Crushed Slag	1003.03(f)
9.	Water	1018.01

2.06 AGGREGATE SURFACE

A. Aggregate Surface Materials for the various types of Surface Courses shall conform to the following Sections and Subsections of LA DOTD Standards:

1.	Stone	1003.04(a)
2.	Sand Clay Gravel	1003.04(b)
3.	Recycled Portland Cement Concrete	1003.04(d)
4.	Crushed Slag	1003.04(f)

B. Unless otherwise approved in writing, the same type of material shall be used throughout the project.

2.07 LIME TREATMENT

Materials for lime treatment subbase shall conform to the following Sections and Subsections of LA DOTD Standards:

1.	Asphalt Material Additives	1002.02
2.	Water	1018.01
3.	Lime	1018.03

2.08 TEMPORARY PAVEMENT MARKINGS

Materials for Temporary Pavement Markings shall conform to the following Subsection of the Louisiana DOTD Standards:

1.	Temporary Tape	1015.08(a)
2.	Painted Stripe	1015.08(b)

2.09 RAISED PAVEMENT MARKERS

Materials for Raised Pavement Markers shall conform to the following Subsection of the LA DOTD Standards:

1.	Nonreflectorized Markers	1015.09(a)
2.	Reflectorized Markers	1015.09(b)
3.	Adhesive	1015.09(c)

2.10 THERMOPLASTIC PAVEMENT MARKINGS

Materials for Thermoplastic Pavement Markings shall conform to Subsections 1015.10 and 1015.13 of the LA DOTD Standards.

2.11 PREFORMED PLASTIC PAVEMENT MARKINGS

Materials for Performed Plastic Pavement Markings shall conform to Subsection 1015.11 of the LA DOTD Standards.

2.12 TRAFFIC PAINT

Materials for Traffic Paint shall conform to Subsections 1015.12 and 1015.13 of the LA DOTD Standards.

2.13 TOPSOIL SHOULDERS

Topsoil shoulders shall conform to Section 715 of the LA DOTD Standards.

PART - III EXECUTION

3.01 BASE AND SUBBASE COURSES

SECTION 02700 - PAVING AND SURFACING

A. This work consists of furnishing and placing a base course(s) on a prepared surface in accordance with these Specifications, in conformity with the lines, grades, thickness' and typical cross sections shown on the Drawings or as established by the Engineer. Unless approved in writing or specified otherwise, the same base course material shall be used throughout the project.

B. Base and subbase course construction shall conform to the following Sections of LA DOTD Standards:

1.	Class I Base Course	301
2.	Class II Base Course	302
3.	In-Place Cement Stabilized Base Course	303
4.	Lime Treatment	304
5.	Subgrade Layer	305
6.	Scarifying and Compacting Roadbed	306

C. All grade courses (roadbeds), base courses, and subbase courses requiring lime stabilization shall be in accordance with type "B" treatment a specified in Section 304. The Owner shall obtain the services of a qualified soils laboratory to recommend the percentage of lime to be incorporated in each type of course to be furnished by the Contractor. In no case shall the required percentage be less than three (3%) percent by weight.

3.02 ASPHALTIC PAVEMENTS

A. These Specifications are applicable to asphaltic concrete wearing, binder, and base course mixtures of the plant mix type.

B. This work consists of furnishing and constructing one or more courses of asphaltic concrete mixture applied hot to the prepared and approved foundation in conformance with lines, grades, thickness', and typical cross sections shown on the Plans or established by the Engineer within tolerances specified. The mixture shall consist of aggregates and asphalt with additives, combined in such proportions to meet the requirements as specified in the Sections below.

C. Asphaltic concrete wearing, binder, and base course mixtures shall conform to the following Sections of LA DOTD Standards:

1.	Asphaltic Concrete Mixtures	501
2.	Asphaltic Concrete Equipment and Processes	503
3.	Asphaltic Tack Coat	504
4.	Asphaltic Prime Coat	505
5.	Asphaltic Curing Membrane	506
6.	Asphaltic Surface Treatment	507
7.	Asphalt Treated Drainage Blanket	508

3.03 PORTLAND CEMENT CONCRETE PAVEMENT

SECTION 02700 - PAVING AND SURFACING

A. This work consists of constructing portland cement concrete pavements, with or without reinforcement as specified, on a prepared subgrade or base course in accordance with these Specifications in conformity with the lines, grades, thickness' and typical cross sections shown on the Plans or established by the Engineer.

B. Portland cement concrete pavement shall conform to Section 601 of LA DOTD Standards.

3.04 AGGREGATE SURFACE COURSES

A. This work consists of furnishing and constructing aggregate surface courses for roadways, shoulders, drives or other facilities in accordance with these Specifications, and in conformity with the lines, grades, thickness' and typical Sections shown on the Plans or established by the Engineer.

B. Aggregate surface courses shall conform to Section 401 of LA DOTD Standards.

3.05 CURBS AND GUTTERS

A. This work consists of furnishing and constructing curbs and gutters in accordance with these Specifications and in conformity with lines, grades, dimensions and typical sections shown on the Plans and established by the Engineer.

B. Curbs and gutters shall conform to Section 707 of LA DOTD Standards.

3.06 CONCRETE WALKS, DRIVES AND INCIDENTAL PAVING

A. This work consists of furnishing and constructing portland cement concrete walks, drives, and incidental paving slabs in accordance with these Specifications and in conformity with lines and grades shown on the Plans or established by the Engineer.

B. Concrete walks, drives, and incidental paving shall conform to Section 706 of LA DOTD Standards.

3.07 PAVEMENT PATCHING, WIDENING, AND JOINT REPAIR

A. This work consists of patching, widening, and joint repair of existing pavements in accordance with these Specifications and in conformity with the lines, grades, and typical cross sections shown on the Plans or as established by the Engineer.

B. Pavement patching, widening, and joint repair shall conform to Section 724 of LA DOTD Standards.

3.08 RAISED PAVEMENT MARKERS

A. This work consists of furnishing and placing reflectorized and nonreflectorized raised pavement markers at the locations shown on the plans or as directed, and in conformance with the plan details and these specifications.

B. Raised Pavement Markers shall be in accordance with Section 731 of the Louisiana DOTD Standards.

3.09 THERMOPLASTIC PAVEMENT MARKINGS

A. This work consists of furnishing and placing reflective pavement markings of hot applied thermoplastic at the locations shown on the plans or as directed, and in conformance with plan details and these specifications.

B. Thermoplastic Pavement Marking shall be in accordance with Section 732 of the Louisiana DOTD Standards.

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 02 - SITEWORK

SECTION 02905 - LAWNS AND GRASS

PART - I GENERAL

1.01 SCOPE OF WORK

A. Work to be performed under this section shall be either restoration or establishment of vegetative cover for aesthetic and erosion control purposes and, unless included as a separate pay item in the Bid Form, this work shall be considered incidental to other work in the contract, including but not limited to pipeline and utility construction. The Contractor shall make investigations of the project to determine types of existing vegetative cover that will require restoration and shall take all measures necessary to restore the vegetative cover in like kind to that which existed prior to the beginning of the Work.

B. Furnish all labor, materials, and equipment necessary to satisfactorily return all construction areas to their original conditions or better.

1.02 REFERENCED STANDARDS

All work in this Section shall be in accordance with "Louisiana Standard Specifications for Roads and Bridges", 1992 Edition as revised or amended by supplementation. This standard specification will hereinafter be referred to as "LA DOTD Standards". When the term department is used in this specification, it shall mean Engineer.

1.03 QUALITY ASSURANCE

Requirements: It is the intent of this specification that the Contractor is obliged to deliver a satisfactory stand of grass as specified. If necessary, the Contractor shall repeat any or all of the work, including grading, fertilizing, watering, and seeding or sodding until a satisfactory stand is obtained.

PART - II PRODUCTS

2.01 MATERIALS

A. Fertilizer: Fertilizer shall be in accordance with LA DOTD Specifications, latest revision.

B. Seeding:

1. The Contractor shall sow grass seed on all unpaved areas disturbed during construction which do not require sod. All seeding shall be completed in conformance with LA DOTD Standards. The grassed areas shall be mulched and fertilized in accordance with LA DOTD Standards.
2. The following grass species may be established by seeding procedures:

   a. Hulled Bermuda
   b. Pensacola Bahia
   c. Kentucky 31 Fescue

d. Crimson Clover

C. Sodding:

1. Sod shall be provided, placed and watered at locations shown on the Drawings in accordance with LA DOTD Standards. The Contractor shall furnish sod equal to and similar in type as that disturbed.
2. The following grass species shall be established by sodding procedures.

   a. Carpet
   b. Saint Augustine
   c. Centipede
   d. All other species not listed under Seeding.

3. The Drawings indicate areas to be sodded. Other areas within the limits of construction shall be seeded as required.
4. In addition to the above list, the following areas shall have vegetative cover restored by sodding procedures irrespective of the grass species.

   a. Slopes steeper than four (4) horizontal and one (1) vertical.
   b. Locations subject to concentrations of water flow or erosion including but not limited to roadway ditch bottoms and flume areas where storm water runoff is concentrated.
   c. Repair of eroded areas within areas previously seeded.

D. Topsoil: Topsoil stockpiled during excavation may be used. If additional topsoil is required to replace topsoil removed during construction, it shall be obtained offsite and provided by the Contractor. Topsoil shall be fertile, natural surface soil, capable of providing an adequate growing medium for all trees, plants, and grassing specified herein.

E. Water: It is the Contractor's responsibility to supply all water to the site, as required during seeding and sodding operations and through the maintenance period and until the work is accepted.

PART - III EXECUTION

3.01 INSTALLATION

A. Finish Grading: Areas to be seeded or sodded shall be finished graded, raked and debris removed as described elsewhere in Division 02. Soft spots and uneven grades shall be eliminated.

B. Time of Seeding and Sodding: When the trench backfill has stabilized sufficiently or when final grading has been completed, the Contractor shall commence work on lawns and grassed areas, including fine grading as required and in accordance with the following:

SECTION 02905 - LAWNS AND GRASS

1. Seed for specific grass species shall be placed in accordance with Table 1 of Section 717 of the LA DOTD Specifications.
2. Sod may be placed during the period of January through October 20, but no sod shall be placed during the period October 21 through December 31.

C. Watering: When necessary, additional water shall be applied to seeded and sodded areas, including those locations where trees, shrubs and other vegetative plantings have been replanted or replaced in accordance with Division 02 requirements, to supplement natural rainfallfa. Water shall be applied with approved sprinkling equipment that will spread the water evenly and in a manner that will not cause erosion of the soil surface. Application of water shall be suspended during period when temperatures are expected to drop below thirty-five degrees Fahrenheit and shall be resumed when the weather moderates.

3.02 REPAIRS TO LAWN AREAS DISTURBED BY CONTRACTOR'S OPERATIONS

Areas damaged by placement of excavated material where existing grass is still living and more than fifty percent (50%) of the existing grass, is left in place shall be repaired by filling depressions and scars created by equipment tires, tracks, or scarification teeth with topsoil, application of fertilizer over the entire area at the rates prescribed, and reseeding as earlier specified.

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 03 – CONCRETE

SECTION 03200 – CONCRETE REINFORCEMENT

PART - I GENERAL

1.01 SCOPE OF WORK

Furnish all labor, materials, equipment and incidentals required and install all concrete reinforcement as shown on the Drawings and specified herein.

1.02 SUBMITTALS

A. Submittals shall be in accordance with the requirements stated in Division 01.

B. The following shall be submitted for review prior to the fabrication of reinforcement.

1. Placing drawings for steel reinforcement.
2. Bar bending details.

C. A certified copy of the mill test on each heat number of reinforcing steel used for fabrication showing physical and chemical analysis shall be submitted to the Engineer at the time of shipment.

1.03 PRODUCT DELIVERY AND HANDLING

A. Reinforcing shall be substantially free from mill scale, rust, dirt, grease, or other foreign matter.

B. Reinforcement shall be shipped and stored with bars of the same size and shape fastened in bundles with durable tags, marked in a legible manner with waterproof markings showing the same designations as shown on the submitted placing drawings.

C. Reinforcing steel shall be stored off the ground and shall be protected from moisture and kept free from dirt, oil, or other injurious contaminants.

D. Coated reinforcing steel shall be stored on padded wooden or steel cribbing. Coatings damaged by fabrication, handling or installation shall be repaired to conform to the applicable coating specification.

PART - II PRODUCTS

2.01 MATERIALS

A. Materials shall be new, be of domestic manufacture and shall conform to the following material specifications.

1. Steel reinforcement in concrete shall conform to ACI 318 unless otherwise specified herein.

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2. Deformed concrete reinforcing bars: ASTM A 615, Grade 60 or ASTM A 615 Grade 60 supplementary requirement S1 deformed bars as required.
3. Concrete reinforcing bars required on the Drawings to be welded: ASTM A 706.
4. Spiral reinforcement for columns: ASTM A 82 or ASTM A 615, Grade 60.
5. Welded steel wire fabric: ASTM A 185.
6. Welded deformed steel wire fabric: ASTM A 497.
7. Welded plain bar mats: ASTM A 704, Grade 60.
8. Fabricated deformed steel bar mats: ASTM A 184 and ASTM A 615, Grade 60 deformed bars.
9. Galvanized reinforcing bars: ASTM A 767 and ASTM A 615, Grade 60.
10. Plastic protected bar supports: CRSI Bar Support Specifications, Class 1 - Maximum Protection.
11. Stainless steel protected bar supports: CRSI Bar Support Specifications, Class 2 - Moderate Protection.
12. Precast concrete block bar supports: CRSI Bar Support Specifications, precast Blocks with Wires.
13. Tie wires for reinforcement: 16-gauge or heavier, black annealed wire.
14. Ferrous supports and ties for galvanized reinforcing steel shall be zinc coated.

B. The following alternate materials are allowed:

1. ASTM A 616 (Rail-steel), Grade 60 deformed bars for ASTM A 615 (Billet-steel), Grade 60 deformed bars.
2. ASTM A 617 (Axle-steel) Grade 60 deformed bars for ASTM A 615 (Billet-steel), Grade 60 deformed bars.
3. Selected heats of ASTM A 615, Grade 60 including supplementary requirement S1 deformed bars with a carbon equivalency (C.E.) of 0.55 or less for ASTM A 706.

C. Mechanical reinforcing steel butt splices shall be compression-tension positive connecting taper threaded type employing a hexagonal coupler, set screw coupler or molten steel filler medium type couplers. They shall meet all ACI 318-Latest Edition Building Code requirements. Set screw type connectors shall use self torquing, shear head bolts. Bar ends for threaded splices shall be taper threaded with coupler manufacturer's bar threader to ensure proper taper and thread engagement. Bars for set screw and molten steel filler medium type couplers shall meet ERICO standards for deformation height and shall be square cut to fit the required dimension into the couple. Approved connectors are Lenton Standard Couplers (taper thread) or Lock B-Series rebar splices as manufactured by Erico Products, Inc., 31700 Solon Road, Solon, Ohio 44139, (800) 248-2677, Cadweld Mechanical Rebar Splice as manufactured by Erico Products, Inc., or preapproved equal

1. Unless otherwise noted on the drawings, mechanical tension splices shall be designed to produce a splice strength of not less than 150 percent of the ASTM specified minimum yield strength of the reinforcing.

2. Compression type mechanical splices shall provide concentric bearing from one bar to the other bar and shall be capable of developing the ultimate strength of the reinforcement in compression.

2.02 FABRICATION OF REINFORCEMENT

A. Fabrication tolerances shall be in accordance with the CRSI, Code of Standard Practice-Fabrication.

B. Bars shall be cold bent.

C. Bars shall be bent around a revolving collar having a diameter of not less than that recommended by the CRSI, Code of Standard Practice-Detailing. Hooks shall conform to the same Code.

D. Bars that are to be butt spliced, placed through limited diameter holes in metal or have a threaded end shall have the applicable end(s) saw-cut.

PART - III EXECUTION

3.01 INSTALLATION

A. Surface condition, bending, spacing, and tolerances of placement of reinforcement shall conform to the CRSI, Code of Standard Practice-Field Erection.

B. Except as otherwise indicated on the Drawings, the minimum concrete cover of reinforcement shall be as follows:

1. Concrete cast against and permanently exposed to earth; 3-in.
2. Concrete surfaces in contact with soil, water, sewage, sludge or exposed to the weather; 2-in.
3. Concrete surfaces not in contact with soil, water, sewage, sludge or exposed to the weather:

   a. Beams, girders, columns: principal reinforcement, ties, stirrups or spirals - 1-1/2-inches
   b. Walls and bottom steel of slabs - 1-inch
   c. Shells and top steel of slabs - 3/4-inch

C. Reinforcement which is to be exposed for a considerable length of time after being placed shall be painted with a heavy coat of neat cement slurry, if required by the Engineer.

D. No reinforcing bars shall be welded either during fabrication or erection unless specifically called for on the Drawings, specified herein, or approved in writing by the Engineer. All bars that have been welded, including tack welds, without such approval shall be immediately removed from the work. When welding of reinforcement is

approved or called for, it shall conform to the AWS Structural welding Code-Reinforcing Steel, AWS 01.4.

3.02 REINFORCEMENT AROUND OPENINGS

A. Place an equivalent area of steel to that interrupted by an opening, pipe penetration, electrical conduit group or duct penetration around the opening or penetration.

B. The bars shall have sufficient length to develop bond at each end beyond the opening or penetration.

3.03 SPLICING OF REINFORCEMENT

A. Except as otherwise indicated on the Drawings, compression embedment and lap splices shall be 30 diameters, but not less than 12 inches. The lap splice length for column vertical bars shall be based on the smaller bar size.

B. Except as otherwise indicated on the Drawings, tension lap splices shall be in accordance with ACI 318 Latest Edition. Class A splices shall be used when fifty percent (50%) or less of the bars are spliced within the required lap length, otherwise Class B splices shall be used.

C. Splices in reinforcement for tension tie members and hangers shall be welded to develop, in tension, at least one-hundred-twenty-five percent (125%) of the specified yield strength of the bar. Splices in adjacent bars shall be offset the distance of a Class B splice. Splicing of bars in tension tie members and hangers shall be avoided whenever possible.

D. Compression type mechanical connectors may be used for No. 9 or larger reinforcing bars in compression if approved in writing by the Engineer. The splice shall include concentric bearing from one bar to the other bar and shall be capable of developing one hundred twenty five percent (125%) of specified yield strength. Splices in adjacent bars shall be offset at least 30 bar diameters.

E. Splices in welded wire fabric shall be lapped not less than 1-1/2 courses or 12-inches. The spliced fabrics shall be tied together with wire ties at least 24-inches on center.

3.04 PROCEDURES TO REPLACE AND/OR REPAIR EXISTING REINFORCEMENT

A. Clean the walls and/or slabs of the structure via hydroblast and sandblasting to remove any corroded, damaged or loose material.

B. Inspect the condition of the existing reinforcing steel in slabs and walls where the existing steel is corroded or damaged. During the inspection remove any loose or unsound material by chipping or other mechanical means.

C. Install temporary supports for a wet well top or other free spanning slab so that the weight of the slab and equipment are supported during the work to replace damaged reinforcing steel. Supports shall be designed so that they will remain in place until the entire reinforcing steel repair/replacement is completed

D. Remove any reinforcing steel that has corrosion damage to the extent that it is no longer serviceable as determined by the Engineer, chipping or jack hammering concrete from around the ends of the acceptable portions of the existing reinforcing steel so that new steel bars can be lap spliced with a minimum splice length of 150 percent of the standard tension splice required by ACI 318 or 60 bar diameters, whichever is shorter. Mechanical tension splices will be allowed in lieu of the specified lap splice as long as the mechanical splice will develop a minimum of 150 percent of the reinforcing bar's yield strength.

E. Clean the remaining steel to accept the spliced reinforcement and install drilled and epoxy grouted dowel bars of the same size as the bars to which the dowel will be connected as need to splice reinforcement at the intersection of the top slab and wall,

F. Provide and install standard 90 degree corner bends when necessary to restore continuity of the top slab reinforcement with the vertical wall reinforcement. Unsound areas of the vertical wall shall be removed to the extent that the vertical leg of the bend can be spliced to undamaged, sound vertical reinforcement by chipping away sound concrete to the extent needed to expose the existing reinforcement

G. Install number 3 bar dowels with standard 180 degree hooks into the top slab at 5-foot center-to-center spacing in both length and width directions of the slab to support the top slab reinforcement.

H. Place epoxy grout when necessary to bed the new reinforcement against the existing concrete in the top slab or wall and other work as necessary to restore the structural integrity of slabs and walls.

3.05 ACCESSORIES

A. The Contractor is solely responsible for determining, providing and installing accessories such as chairs, chair bars, and the like in sufficient quantities and strength to adequately support the reinforcement and prevent its displacement during the erection of the steel and the placement of concrete and to provide spacings of bars with adequate cover as shown on the Drawings or specified herein.

B. Precast concrete blocks with wires shall be used where the reinforcing steel is being supported over soil.

C. Stainless steel protected bar supports shall be used to firmly hold vertical reinforcement in position.

D. Alternate methods of supporting top steel in slabs, such as steel channels supported on the bottom steel or vertical reinforcing steel fastened to the bottom and top mats, may be used if accepted by the Engineer.

3.06 INSPECTION

A. The Engineer shall be given ample prior notice of the availability of set reinforcement for his review.

B. In no case shall any reinforcing steel be covered with concrete until the amount and position of the reinforcement has been observed by the Engineer or the RPR and permission is given to proceed with placement of the concrete.

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 03 - CONCRETE

SECTION 03300 – CAST-IN-PLACE CONCRETE

PART - I GENERAL

1.01 SCOPE OF WORK

Furnish all labor, materials, equipment and incidentals required to place all cast-in-place concrete, reinforcing steel, forms, waterstops and miscellaneous related items, including sleeves, reglets, anchor bolts, inserts and embedded items, as shown on the Drawings and as specified.

1.02 DESCRIPTION

A. Concrete shall be composed of Portland cement, fine aggregate, coarse aggregate, water and admixtures as specified and shall be ready-mixed concrete produced by a plant acceptable to the Engineer. All constituents, including admixtures, shall be batched at the central batch plant.

B. Reinforced concrete shall comply with American Concrete Institute (ACI) Standard 318 (Building Code Requirements for Structural Concrete).

C. All testing and inspection services required shall be provided by the Owner. The cost of such work, except as specifically stated otherwise, shall be paid for by the Owner. Methods of testing shall comply in detail with the latest applicable ASTM Standards.

D. Samples of constituents and of concrete as placed will be subjected to laboratory tests. All materials incorporated in the Work shall conform to accepted samples.

E. Under special circumstances, the Engineer may allow minor deviations from the material requirements specified, provided that the resulting concrete quality is not adversely affected or that a suitable adjustment in cement content is made to compensate for such deviations

1.03 SUBMITTALS

A. Submittal data shall be formatted and in the quantities stated in Division 01.

B. The Contractor shall submit to the Engineer for acceptance shop drawings showing placement of all joints of plywood forms, and rustications in accordance with the requirements stated in Division 01.

C. The Contractor shall submit to the Engineer for approval a proposed design mix for each concrete strength and type required by these specifications. Information to be submitted for each type and strength shall include the following items:

1. Sources of concrete mix design components including coarse aggregate, fine aggregate, cement, water, admixtures, and pozzolans where included.
2. Concrete mix design

a. Constituent quantities per cubic yard.
b. Water content: gallons/100 pounds cementitious materials.
c. Cement: type, manufacturer, and chemical analysis.
d. Mix design slump.
e. Design slump for mixes using a water reducing admixture.
f. Average laboratory cylinder strength test results at 28-days for concrete mix design (include standard deviation). Provide results of seven and 14 day tests if available.

3. Laboratory sieve analysis and mechanical properties for coarse and fine aggregates.
4. Admixture types and - chemical compositions. (Include certification of compliance with ASTM reference standards and confirmation of any supplementary requirements included in these Specifications.)

D. An additional mix design for each type and strength of concrete to be placed by pumping shall be submitted to the Engineer for approval.

E. Failure to include any item of information noted herein for a given concrete strength or type shall be cause for rejection of the submittal and resubmittal to the Engineer once documentation of all requirements have been provided.

F. Concrete mix designs including fly ash will not be acceptable, however factory blended pozzolans are acceptable.

1.04 INSTALLATION SCHEDULE

A. Concrete for structures shall have minimum compressive strength at twenty-eight (28) days of 4,000 psi.

B. Concrete fill and duct encasement shall have a minimum compressive strength at twenty-eight (28) days of 2,500 psi.

1.05 QUALITY ASSURANCE

A. The actual acceptance of aggregates and development of mix proportions to produce concrete complying with the specific requirements stated herein shall be determined by means of prior laboratory tests made with the constituents to be used on the Work.

B. Well in advance of placing concrete, the Contractor shall discuss with the Engineer the proposed source of materials and concrete mixture that he proposes to use. He shall furnish samples of aggregate and cement for testing, deliver them to the laboratory designated by the Engineer, and permit ample time for the laboratory to develop a proposed design mix or to modify the design of the mix within the limits of these Specifications. Standard mix designs developed by the ready mix concrete supplier will be acceptable as long as the ready mix supplier provide all of the documentation for the mix design as stated herein.

SECTION 03300 – CAST-IN-PLACE CONCRETE

C. If, during the progress of the work, it is impossible to secure concrete of the required workability and strength with the materials being furnished, the Engineer may order such changes in proportions or materials, or both, as may be necessary to secure the desired properties. Any changes so ordered shall be made by the Contractor.

D. If, during the progress of the work, the Contractor desires to use materials other than those originally accepted or if the materials from the sources originally accepted change in characteristics, the Contractor shall make new acceptance tests of aggregates and establish new mix designs. Such testing and design shall be accomplished with the assistance of a testing laboratory acceptable to the Engineer.

E. The following limiting strengths, water contents and cement factors shall apply.

Table 03300-1

Minimum Compressive Strength, f'_c (psi at 28 days)	Maximum Water Content* (gals./100 lbs.)	Net Minimum Cement Factor** (100 lbs./c.y.)
2500	7.4	4.30
3000	6.2	5.64
4000	5.9	5.64
4000 @ 7 days	4.5	6.58

* Maximum: decrease if possible. This represents total water in mix at time of mixing, including free water on aggregates and water in admixture solutions.

** Minimum: increase as necessary to meet other requirements. These cement factors apply to "controlled" concrete subject to specific inspection.

1. Minimum cement content shall be as shown in Table 03300-1. The Contractor shall increase cement content as required to meet strength requirements.
2. When high early-strength Portland cement is permitted, the same strength requirements shall apply except that the indicated strengths shall be attained at seven days instead of 28 days.
3. Maximum water/cement ratio for 4,000 psi concrete utilizing water reducing admixture shall be 90 percent of the value shown above for mixes.

F. Consistency of the concrete as measured by the ASTM C143, shall be as shown in Table 03300-2.

Table 03300-2

Portion of Structure	Design Slump (inches)	Recommended Range (inches)
Pavement and slabs on ground	2	1-3
Plain footings, gravity walls, slabs and beams	2-3	1-4
Heavy reinforced foundation walls and footings	3-4	2-5

Concrete shall be of a consistency which can be readily worked into the corners and angles of the forms and around the reinforcement, inserts, and wall castings without permitting materials to segregate or free water to collect on the surface. Consideration shall be given to the proposed methods of placing and compacting in establishing the consistency of the concrete.

G. Entrained air as measured by ASTM C231 shall be as indicated in Table 03300-3.

Table 03300-3

Concrete Placement	Total Air Measured at Discharge from Truck (%)
Finished slabs	3.0 maximum
All other	3.5 - 5.0
Sewer Pump Sta. Top Slab	Design optimal air entrainment along with other properties to provide maximum sulfate resistance.

If the air entraining agent proposed for use in the mix requires testing methods other than ASTM C231 to accurately determine air content, make special note of this requirement in the admixture submittal required under Article 1.04.

1.06 ACCEPTANCE TESTS

A. The actual proportioning of cement, aggregates, and water necessary to produce concrete complying with the requirements of Table 03300-1, shall be determined by tests made with representative samples of the materials to be used for the Work. Tests shall be made by a testing laboratory selected by the Owner and approved by the Engineer. Testing shall comply with ASTM C39.

B. Cement shall be tested to certify compliance with the requirements of this Specification. Methods of testing shall comply with the appropriate Specifications, but the place, time,

frequency, and method of sampling will be determined by the Engineer in accordance with the particular need.

C. Samples of fine and coarse aggregates shall be furnished for examination and testing at least three weeks before the Contractor proposes to use them in the work.

D. Water content of the concrete shall be based on a curve showing the relation between water content and seven and 28-day compressive strengths of concrete made using the proposed materials. The curves shall be determined by four or more points, each representing an average value of at least three test specimens at each age, and shall have a range of values sufficient to yield the desired data, including all the compressive strengths called for on the Drawings, without extrapolation. The water content of the concrete to be used, as determined from the curve, shall correspond to the following test strengths of the laboratory trial mixtures:

Table 03300-4

Design strength	Min. Lab. Strength 7 Days*	28 Days**
2500 psi	2000 psi	2900 psi
3000 psi	2500 psi	3400 psi
4000 psi	3500 psi	4600 psi
4000 psi @ 7 days	4000 psi	5600 psi

* May be employed for preliminary designs
** To be used for final designs

E. In no case, however, shall the resulting mix conflict with the limiting values for maximum water content and net minimum cement factor as specified in Table 03300-1.

F. Testing to establish conformity of the various concrete mix components and the mix design with the provisions of this Specification shall be at no additional expense to the Owner.

PART - II PRODUCTS

2.01 CAST-IN-PLACE CONCRETE

A. Materials shall comply with these Specifications and any State or local requirements.

B. Cement for all cast-in-place concrete shall be domestic Portland cement (ASTM C150, Type II) or high early strength Portland cement (ASTM C150, Type III). Cement brands shall be subject to approval by the Engineer.

1. For all hydraulic and below grade structures use Type II cement.

2. High early strength cement shall be used only after obtaining written approval from the Engineer.
3. Use only Portland cement produced at locations approved and listed in the Qualified Products List of LADOTD.

C. Aggregates

1. Fine aggregate shall consist of washed inert natural sand conforming to the requirements of LADOTD Specifications, Section 1003.02, and the following requirements:

   a. Gradation:

Sieve (ASTM Ell)	Percentage Passing
3/8 inch	100%
No. 4	95 - 100%
No. 16	45 - 90%
No. 50	7 - 30%
No. 100	0 – 7%
No. 200	0 - 3%

b. Fineness Modulus	2.60 - 3.00
c. Organic	See ASTM C33
d. Silt	2.0% maximum
e. Mortar Strength	95% minimum as per ASTM C87 Section 10
f. Soundness	8% maximum loss, using magnesium sulfate, subjected to 5 cycles

2. Coarse aggregate shall consist of well-graded crushed stone or washed gravel conforming to the requirements of LADOTD Specifications Section 1003.02, and the following detailed requirements.

a. Organic	See ASTM C33
b. Silt	1.0% maximum
c. Soundness	8% maximum loss, using magnesium sulfate, subjected to 5 cycles

   d. Maximum coarse aggregate size shall be:

      i. 2-inch for mass concrete
      ii. 1-inch for reinforced section l0-inches and over in thickness
      iii. 3/4-inch for reinforced sections less than 10-inch thickness

e. The "Designated Size" and the corresponding gradations shown in the LADOTD Specifications represent the end or combined gradation of the coarse aggregate to be used in the final concrete mix.

D. Water

1. Water shall be clean and free from injurious amounts of oil, acid, alkali, organic matter, or other deleterious substances.
2. Mortar specimens made with the water under examination and normal Portland cement shall have at least one-hundred percent (100%) of the strength of similar specimens made with distilled water when tested for 28-day strength in accordance with ASTM C87.
3. Potable tap water will normally fulfill the requirements noted. Water from all other sources shall be tested and approved before use and shall not contain impurities in excess of the following limits:

   a. Acidity or alkalinity calculated in terms of calcium carbonate: 0.05%
   b. Total soluble organic solids: 0.05%
   c. Total soluble inorganic solids: 0.08%
   d. Total chlorides as sodium chloride: 0.05%

E. Admixtures

1. A water reducing agent such as Pozzolith, WRDA or approved equal shall be used in all concrete. The admixture shall comply with ASTM C494, Type A or Type D, shall contain no chlorides, shall be non-toxic after thirty (30) days, and shall be compatible with the air entraining admixtures. Proportioning and mixing shall be as recommended by the manufacturer.
2. Admixtures causing accelerated setting of cement in concrete shall not be used.
3. Air entraining admixtures compatible with the concrete mix shall be used in moderation along with the water reducing agent to obtain the specified percent air entrainment in the resultant concrete.
4. Corrosion resistant admixture shall be used in all wet well top slabs. The admixture shall be Xypex Admix C-1000-T as manufactured by Xypex Chemical Corporation, Richmond, B.C., Canada (distributed by Technical Coatings Services (504) 466-4564) or prior approved equal. The Xypex admix shall be added to the concrete at the time of batching at a dosage rate of 3.5% by weight of cement.

2.02 NON-SHRINK CEMENT GROUT

A. Non-shrink cement grout shall consist of cement, aggregate and additives formulated to meet the following volume change requirements.

1. Early volume change (within 24 hours) as tested by ASTM C827 shall be limited to zero percent (0%) shrinkage and four percent (4%) maximum expansion.

2. Long term volume change of hardened non-shrink cement grout (after 1 day of cure) shall conform to the Corps of Engineers' Specification for Non-Shrink Grout, CRD-C621-82B.
3. Shrinkage shall be zero percent (0%) and expansion limited to a maximum of 0.4 percent volume change.
4. Cement additives required to meet this specification shall be recommended by the grout manufacturer, but shall be non-staining and non-metallic. Grout shall be equal to "Five Star" products by the U.S. Grout Corporation.

B. Non-Shrink Grout

1. For small repairs and patching, the grout shall consist of the following minimum cement/sand proportions plus the manufacturer's recommended additives.

Material	Volumes	Weights
Cement	1.0	1.0
Sand	1.5	1.5

2. For very heavy (generally formed) patches, the Engineer may order the addition of pea gravel to the mixture and the proportions modified as follows: (Non-shrink additives by manufacturer)

Material	Volumes	Weights
Cement	1.0	1.0
Sand	1.0	1.0
Pea Gravel	1.5	1.5

2.03 NON-SHRINK EPOXY GROUT

A. Non-shrink epoxy grout shall meet plastic volume changes within the first four hours of zero percent (0%) shrinkage and four percent (4%) maximum expansion as tested by ASTM C 827. Restrained hardened epoxy grout shall have 0 percent shrinkage as tested by ASTM C531.

B. Epoxy grout shall have zero percent (0%) expansion in volume change after set under constant temperature conditions.
1. Epoxy grout shall be one-hundred percent (100%) solids formulated with resin, hardener and aggregate as recommended by the manufacturer and shall be equal to "Five Star" Epoxy products manufactured by the U.S. Grout Corporation.

2.04 EPOXY BONDING AGENT

SECTION 03300 – CAST-IN-PLACE CONCRETE

A. Epoxy bonding agent shall be a two component epoxy adhesive specifically formulated for bonding old concrete to new (plastic) concrete. Component A shall be an epoxy resin and Component B shall be epoxy hardener. The epoxy bonding agent shall be "Sikdadur 32, Hi-Mod", by Sika Corporation, Lyndhurst, NJ; "Pro Bond 821 or 822" by Protex Industries, Denver CO; "Concresive 1170" by Adhesive Engineering Company, San Carlos, CA; or equal.

B. The mixing ratio shall be as recommended by the manufacturer for the ambient temperature when placed. Furnish manufacturer's specific instruction for specific job application and obtain Engineer's review prior to purchase.

C. Epoxy bonding agent shall conform to ASTM C881 and corresponding tests for bond strength and shrinkage as specified in ASTM C882, C883, and C884.

D. The properties of the cured material shall meet the following:

Compressive Strength (ASTM D695)

48 hour - 1000 psi
28 day - 7000 psi

Tensile Strength (ASTM D638)

7 day - 4000 psi

Bond Strength (ASTM C882 or C884) - 1500 psi

E. Approval requirements: The Contractor must furnish notarized certification that the material proposed for use meets all of the above requirements and that the material has been previously used successfully for the purpose described.

PART - III EXECUTION

3.01 MEASURING MATERIALS

A. Measure materials by weighing except as otherwise specified or where other methods are specifically authorized by the Engineer. The apparatus provided for weighing the aggregates and cement shall be suitably designed and constructed for this purpose. Scales shall have been certified by the local Sealer of Weights and Measures within one year of use and a copy of the certification shall be delivered to the Engineer prior to beginning of placement of concrete. The accuracy of all weighing devices shall be such that successive quantities can be measured to within one percent (1%) of the desired amount.

B. Cement and each type of aggregate shall be weighed separately. Cement in standard packages (sacks) need not be weighed, but bulk cement and fractional packages shall be weighed.

C. Water shall be measured by volume or by weight. The water-measuring devices shall be capable of control to one-half (½%) percent accuracy. All measuring devices shall be subject to approval by the Engineer.

D. Admixtures shall be dispensed either manually with use of calibrated containers or measuring tanks, or by means of an automatic dispenser approved by the manufacturer of the specific admixture.

3.02 MIXING

A. Concrete shall be ready-mixed concrete by equipment acceptable to the Engineer. No hand-mixing will be permitted. Adding water in controlled amounts during the mixing cycle shall be done only with the express approval of the Engineer and under his direction. The amount of water added shall be shown on each delivery invoice.

B. Ready-mix concrete shall be transported to the site in watertight agitator or mixer trucks loaded not in excess of rated capacities for the respective conditions as stated on the name plate. Discharge at the site shall be within 1-1/2 hours after water was first introduced to the mix.

C. Central plant and rolling stock equipment and methods shall comply with the latest Truck Mixer and Agitator Standards of the Truck Mixer Manufacturers' Bureau of the National Ready-Mixed Concrete Association, as well as ACI 318 Section 5.2, and ASTM C94.

D. Retempering of concrete or mortar that has partially hardened (that is, mixing with or without additional cement, aggregate, or water) shall not be permitted.

E. Attention is called to the importance of dispatching trucks from the batching plant so they arrive at the site of the work just before the concrete is required, thus avoiding excessive mixing of concrete while waiting or delays in placing successive layers of concrete in the forms.

3.03 FIELD TESTS

A. Slump tests and concrete cylinders will be made in the field by the Owner's laboratory technician prior to the addition of any water at the discharge site. An additional slump test shall be made after adding water and prior to placement of any concrete.

B. Sets of a minimum of three (3) field control cylinder specimens will be taken at random by the Engineer during the progress of the Work, in compliance with ASTM C31; the total number of specimens taken on the project shall average one (1) set per 100 cubic yards, and not less than one (1) set of specimens shall be taken on any one day. When average 28-day compressive strength of control cylinders in any set falls below the required compressive strength or below proportional minimum seven-day strengths (where proper relation between seven and 28-day strengths have been established by tests), proportions, water content, or temperature conditions shall be changed to achieve the required strengths.

C. The Contractor shall cooperate in the making of tests by allowing free access to the work for the selection of samples, providing a closed curing box for specimens, affording protection to the specimens against injury or loss through his operations, and furnishing material and labor required for the purpose of taking concrete cylinder samples. All shipping of specimens will be paid for by the Owner. Curing boxes shall be acceptable to the Engineer.

D. Air entrainment shall be measured by the Owner's laboratory technician at the time of concrete deposit in compliance with ASTM C231.

3.04 INSPECTION AND CONTROL

A. The preparation of forms, placing of reinforcing steel, conduits, pipes, and sleeves, batching, mixing, transporting, placing, and curing of concrete shall be all times under the observation of the Engineer.

B. The Contractor shall advise the Engineer of his readiness to proceed at least 24 hours prior to each concrete placement. The Engineer will inspect the preparations for concreting including the preparation of previously placed concrete, the reinforcing and the alignment and tightness of formwork. No placement shall be made without the inspection and acceptance of the Engineer.

C. Coordination with the Owner’s testing laboratory shall be the Contractor’s responsibility to assure that a lab technician will be present during placement of concrete.

3.05 CONCRETE APPEARANCE

A. Concrete for the Work shall provide a homogeneous structure which, when hardened, will have the required strength, durability and appearance.

B. Formwork, mixtures and workmanship shall be such that concrete surfaces, when exposed, will require no finishing.

C. When concrete forms are stripped, the concrete surface when viewed in good lighting from 10-feet away shall be pleasing in appearance, and at 20-feet shall show no visible defects.

3.06 FORMS

A. Forms shall be used for all cast-in-place concrete, including footings, except for thrust blocks where required. Forms shall be constructed and placed so the resulting hardened concrete will conform to the shape, lines, dimensions, appearance, and elevations indicated on the Drawings. The Engineer shall have the right to approve or reject material used in the construction or fabrication of formwork.

B. Forms for all exposed exterior and interior concrete walls shall be Type A-C exterior grade plywood with the "A" veneer turned to the casting side. Rustications shall be as

located and detailed on the Drawings. Moldings for chamfers and rustications shall be milled and planed smooth.

C. Forms for all other cast-in-place concrete shall be made of wood, metal, or other acceptable material. Wood forms shall be constructed of sound lumber or plywood of suitable dimensions, free from knotholes and loose knots. Where used for exposed surfaces, boards shall be dressed and matched. Plywood shall be sanded smooth and fitted with tight joints between panels. Metal forms shall be of an acceptable type for the class of work involved and of the thickness and design required for rigid construction.

D. Edges of all form panels in contact with concrete shall be flush within 1/32-inch and forms for plane surfaces shall be such that the concrete will be plane within 1/16-inch in four (4) feet. Forms shall be tight to prevent the passage of mortar, water and grout.

E. Forms for walls shall have removable panels at the bottom for cleaning, inspecting, and scrubbing-in of bonding agent. Forms for walls of considerable height shall be arranged with tremies and hoppers for placing concrete in a manner that will prevent segregation and accumulation of hardened concrete on the forms or reinforcing above the fresh concrete.

F. Molding or bevels shall be placed to produce a 3/4-inch chamfer on all exposed projecting corners, unless otherwise noted on the Drawings. Provide similar chamfer strips at horizontal and vertical extremities of all wall placements to produce "clean" separation between successive placements as called for on the Drawings.

G. Forms shall be sufficiently rigid to withstand vibration and to prevent displacement or sagging between supports. Forms shall be constructed so that the concrete will not be damaged by their removal. The Contractor shall be entirely responsible for the adequacy of the forming system.

H. Forms, including new pre-oiled forms, shall be oiled before reinforcement is placed, with approved nonstaining oil or liquid form coating not having a paraffin base.

I. Before form material is reused, all surfaces in contact with concrete shall be thoroughly cleaned; all damaged places repaired; all projecting nails withdrawn; and all protrusions smoothed. Wood forms shall be pre-oiled before reuse.

J. Form ties encased in concrete other than those specified in the following paragraph shall be designed so that after removal of the projecting part, no metal shall be within one-inch of the face of the concrete. That part of the tie to be removed shall be at least ½-inch diameter or be provided with a wood or metal cone at least ½-inch diameter and one inch long. Form ties in concrete exposed to view shall be the cone-washer type equal to the Richmond "ILrscru". Throughbolts or common wire shall not be used for form ties.

K. Form ties for exposed exterior and interior walls shall be as specified in the preceding paragraph except that the cones shall be of approved wood or plastic conforming with the preceding dimensions or as otherwise shown on the Drawings.

SECTION 03300 – CAST-IN-PLACE CONCRETE

3.07 PLACING AND COMPACTING

A. Unless otherwise permitted, concrete placement begun on any day shall be completed, including finishing, in daylight of the same day.

B. Place no concrete until reinforcing steel, pipes, conduits, sleeves, hangers, anchors, and other work required to be cast into the concrete have been approved by the Engineer. Remove water and foreign matter from forms and excavation. Place no concrete on frozen soil, and provide adequate protection against frost action during freezing weather. All soil preparation below slabs and footings shall be approved by the Engineer before placing concrete.

C. Transport concrete from mixer to place of final deposit as rapidly as possible by methods which prevent separation of ingredients and displacement of reinforcement, and which avoid rehandling. Deposit no partially hardened concrete.

D. "Cold joints" are to be avoided unless called for on the Drawings. If they occur, they are to be treated as bonded construction joints.

E. At construction joints, the surfaces of the concrete already placed, including vertical and inclined surfaces, shall be thoroughly cleaned of foreign materials, laitance, and weak concrete and roughened with suitable tools to expose a fresh face. At least two hours before and again shortly before the new concrete is deposited, the joints shall be saturated with water. After glistening water disappears, the joints shall be given a thorough coating of an approved bonding agent. The surfaces shall receive a coating 1/8-inch in thickness or as recommended by the bonding agent manufacuturer, Bonding agent shall be well scrubbed-in by means of stiff bristle brushes whenever possible. New concrete shall be deposited before the bonding agent sets.

F. Deposit concrete to maintain a horizontal plastic surface. Vertical lifts shall not exceed 24-inches. Vertical lifts of 18 inches are preferable.

G. Chutes for conveying concrete shall be of U-shaped design sized to insure a continuous flow of concrete. Do not use flat (coal) chutes. Chutes shall be metal or metal-lined and each section shall have approximately the same slope. The slope shall be not less than 25 or more than 45 degrees and shall be such as to prevent the segregation of the ingredients. The discharge end of the chute shall be provided with a baffle plate or spout to prevent segregation. If the discharge end of the chute is more than five (5) feet above the surface of the concrete in the forms, a tremie or spout shall be used, and the lower end maintained as near the surface of deposit as practicable. When the operation is intermittent, the chute shall discharge into a hopper. Chutes shall be thoroughly cleaned before and after each delivery or separate, continuous pour. Debris and any water generated by the cleaning of chutes shall be discharged outside the forms. Concrete shall not be allowed to flow horizontally over distances exceeding five (5) feet.

H. Pumping of concrete is an acceptable method of placement. The proposed pumping equipment and concrete mix shall be submitted to the Engineer prior to usage for approval.

I. In thin sections of considerable height, concrete shall be placed using suitable hoppers, spouts with restricted outlets, or other approved methods.

J. Concrete shall be thoroughly compacted during and immediately after placement using suitable tools. Internal type mechanical vibrators shall be employed to produce the required quality of finish. Vibration shall be done by experienced operators under close supervision and shall be of the duration required to produce homogeneity and optimum consolidation without permitting segregation of the solid constituents or "pumping" or migration of air. All vibrators shall be supplemented by proper wooden spades to prevent puddling adjacent to forms and to remove bubbles and honeycomb, especially for the top lifts of walls. All vibrators shall operate at minimum 10,000 RPM. At least one vibrator shall be used for every 10 cubic yards of concrete placed per hour. In addition, one spare vibrator in operating condition shall be on the site.

K. Concrete slabs on the ground shall be well-tamped into place. Foundation materials shall be wet, tamped, and rolled until thoroughly compacted prior to placing reinforcement or concrete.

L. Concrete shall be deposited continuously in layers of such thickness that no concrete will be deposited on concrete that has sufficiently hardened to cause the formation of seams and planes of weakness within the section. If a section cannot be placed continuously, construction joints may be located at points as provided for in the Drawings or as acceptable to the Engineer.

3.08 CURING AND PROTECTION

A. Protect all concrete work against injury from the elements and defacements of any nature during construction operations.

B. All concrete shall be treated immediately after concrete placing and finishing is completed to provide continuous moist curing above 50°F for at least seven (7) days (fourteen (14) days minimum for water-retaining structures), regardless of the ambient air temperature. Absorptive wood forms remaining in place will not be considered as a satisfactory means of curing. Forms and vertical surfaces shall be covered and kept moist with three layers of continuously saturated burlap, or by other approved means. Horizontal surfaces, slabs, etc. shall be ponded to a depth of ½-inch or kept continuously wet by use of sprinklers. Street pavement, driveways, and sidewalks shall be cured by application of a white-pigmented liquid-membrane-forming compound applied in strict conformance with LADOTD Specifications, Section 601.12. Liquid-membrane forming compounds shall conform to LADOTD Specifications Section 1011.01.

C. Cured surfaces and slabs shall be protected from the direct rays of the sun to prevent checking and crazing until the concrete is 28 days old.

D. Cold Weather Concreting:

1. Concrete placed at air temperature below 40°F shall have a minimum temperature of 60°F. When the air temperature is below or near 40°F and falling, the water and aggregates shall be heated before mixing. Concrete shall be protected so the temperature at the surface will not fall below 50°F for at least seven (7) days after placing. No salt, manure, or other chemicals shall be used for protection. Overheating or non-uniformity of heating shall be prevented. The surface temperature of the concrete shall not exceed 95°F during heating operations.
2. In cold weather, continuous warm curing (with supplementary heat when required) shall provide a total of 35 day-degrees (i.e., 5 days at 70°F, etc.) of heat.
3. The Contractor shall submit for acceptance by the Engineer a Work Plan describing the methods and procedures he proposes to use for concrete placement and curing during periods with temperatures below 40°F.

E. Hot Weather Concreting

1. For this Specification, "hot weather" is defined as any combination of high air temperatures, low relative humidity, and wind velocity that produces a rate of evaporation as estimated by Figure 2.1.5 of ACI 305R approaching or exceeding 0.2 lb/ft/hr.
2. Concrete placed during hot weather shall be batched, delivered, placed, cured and protected in compliance with the recommendations of the latest ACI Committee 305 Report and the additional requirements of this Specification.

   a. Temperature of concrete being placed shall not exceed 90°F and every effort shall be made to maintain a uniform concrete mix temperature below this level. The temperature of the concrete shall be such that it will cause no difficulties from loss of slump, flash set or cold joints.
   b. All necessary precautions shall be taken to promptly deliver and place the concrete upon its arrival at the job and to provide compaction immediately after placement.
   c. The Engineer may direct the Contractor to immediately cover plastic concrete with polyethylene.

3. The Contractor shall submit for acceptance by the Engineer a work Plan describing the methods and procedures he proposes to use for concrete mixing, including cooling or addition of ice to the aggregates, placement, finishing and curing during hot weather periods.

3.09 REMOVAL OF FORMS

A. Except as otherwise specifically authorized by the Engineer, forms shall not be removed before the concrete has cured as specified herein and the concrete has attained a strength of at least 30 percent of the ultimate strength prescribed by the design, and not before reaching the following number of day-degrees (whichever is the longer):

Forms For:	Day Degree*
Beams and slabs (spanning or self supporting)	500
Walls and vertical surfaces (non-water retaining)	100
Walls and vertical surfaces (water retaining)	150
Beams and slabs on grade	50

*Day-Degree: Total number of days times average daily air temperature at surface of concrete. For example, 5 days at a daily weighted average temperature of 60°F equal 300 day-degrees. Temperatures below 50°F not to be included.

B. Shores shall not be removed until the concrete has attained at least seventy-five percent (75%) of the specified strength and also sufficient strength to support safely its own weight and any construction live loads that may be placed upon it.

3.10 FAILURE TO MEET REQUIREMENTS

A. Should the strengths shown by the test specimens made and tested in compliance with the previous provisions fall below the values given in Table 03300-1, the Engineer shall have the right to require changes in proportions outlined to apply on the remainder of the Work. Furthermore, the Engineer shall have the right to require additional curing on those portions of the structure represented by the test specimens that failed. The cost of such additional curing shall be at no additional expense to the Owner. In the event that such additional curing does not provide the strength required, as evidenced by core and/or load tests, the Engineer shall have the right to require strengthening or replacement of those portions of the structure which fail to develop the required strength. The cost of all such core borings and/or load tests and any strengthening or concrete replacement required because strengths of test specimens are below that specified, shall be entirely at no additional expense to the Owner. In such cases of failure to meet strength requirements, the Contractor and Engineer shall confer to determine what adjustment, if any, can be made in compliance with Sections 15 and 17 of ASTM C94.

B. When the tests on control specimens of concrete fall below the required strength, the Engineer will permit check tests for strengths to be made by means of typical cores drilled from the structure in compliance with ASTM C42 and C39. In case of failure of the latter, the Engineer, in addition to other recourses, may require, at the Contractor's expense, load tests on any one of the slabs, beams, piles, caps, and columns in which such concrete was used. Test shall not be made until concrete has aged 60 days.

C. Slabs or beams, under load test, shall be free spanning (all forming and supports are to be removed) so as to load the structure with their own weights (dead load) plus a

superimposed load of other design dead loads and 2 times design live load. The load shall be applied uniformly over portion being tested in an acceptable manner, and left in position for 24 hours. The structure shall be considered satisfactory if deflection "D" in feet, at end of 24-hour period does not exceed value: D = 0.001 L/t in which "L" is the clear span length in feet and "t" is depth of slab or beam in inches.

D. If deflection exceeds "D" in the above formula, the concrete shall be considered faulty unless within 24 hours after removal of the load, slab or beam under test recovers at least seventy-five percent (75%) of observed deflection.

E. Should the strength of test cylinders fall below sixty percent (60%) of the required minimum 28-day strength, the concrete shall be rejected and shall be removed and replaced.

3.11 PATCHING AND REPAIRS

A. It is the intent of these Specifications to require forms, mixture of concrete and workmanship so concrete surfaces, when exposed, will require no patching.

B. As soon as the forms have been stripped and the concrete surfaces exposed, fins and other projections shall be removed, and surface defects which do not impair structural strength shall be repaired. Clean all exposed concrete surfaces and adjoining work stained by leakage of concrete.

C. Immediately after removal of forms remove plugs and break off metal ends of form ties. Holes are then to be promptly filled upon stripping. Moisten the hole with water, followed by a 1/16-inch brush coat of neat cement slurry mixed to the consistency of a heavy paste. Immediately plug the hole with a 1-1.5 mixture of cement and concrete sand mixed slightly damp to the touch (just short of "balling"). Hammer the grout into the hole until dense, and an excess of paste appears on the surface in the form of a spider web. Trowel smooth with heavy pressure. Avoid burnishing.

D. When patching or repairing exposed surfaces, the same source of cement and sand as used in the parent concrete shall be employed. Adjust color if necessary by addition of proper amounts of white cement. Rub lightly with a fine Carborundum stone at an age of one to five days if necessary to bring the surface down with the parent concrete. Exercise care to avoid damaging or staining the virgin skin of the surrounding parent concrete. Wash thoroughly to remove all rubbed matter.

E. Defective concrete and honeycombed areas as determined by the Engineer shall be chipped down reasonably square and at least 1-inch deep to sound concrete by means of hand chisels or pneumatic chipping hammers. Irregular voids or surface stones need not be removed if they are sound, free of laitance, and firmly embedded in the parent concrete, subject to Engineer's final inspection. If honeycomb exists around reinforcement, chip to provide a clear space at least 3/8-inch wide all around the steel. For areas less than 1-1/2-inch deep, the patch may be made in the same manner as described above for filling form tie holes, care being exercised to use adequately dry

(non-trowelable) mixtures and to avoid sagging. Thicker repairs will require build-up in successive 1-1/2-inch layers on successive days, each layer being applied (with slurry, etc.) as described above. To aid strength and bonding of the multiple layer repairs, the Engineer may order the use of epoxy bonding agent as specified below.

3.12 MODIFICATION AND REPAIR TO EXISTING CONCRETE

A. Cut, repair, reuse, demolish, excavate or otherwise modify parts of the existing structures or appurtenances, as indicated on the Drawings, specified, or necessary to permit completion of the work. Finishes, joints, reinforcements, sealants, etc. are specified in respective sections of Specification. All work shall conform with other requirements of this Section and as shown on the Drawings.

B. Mix proportions of patching or filling grout materials used in the modifications and repair to existing concrete as indicated on the Drawings shall be:

1. When new grout other than non-shrink grout is shown to be connected to existing concrete, add the following cement mixtures depending on the depths called for or shown on the Drawings

a. Equal to or less than 2-inches in depth:

Material	Volume
Cement	1.0
Sand	2.0
Water = 5 gals/200 lbs. cement	

b. Greater than 2-inches to 12-inches in depth:

Material	Volume
Cement	1.0
Sand	2.0
Pea Gravel	2.5
Water = 5 gals/100 lbs. cement	

c. Greater than 12-inch in depth

Material	Concrete as specified in this Section

2. Non-shrink Cement Grout shall be as previously specified.

3. Non-shrink epoxy grout, when specifically called for on the Drawings, shall be as previously specified. Proportions of aggregate shall be as recommended by the grout manufacturer for the specific installation.

SECTION 03300 – CAST-IN-PLACE CONCRETE

C. Demolition of Existing Concrete

1. Concrete shown to be removed on the Drawings shall be performed by line drilling at limits followed by jack-hammering in areas where concrete is to be taken out.
2. The Contractor shall be responsible for removing concrete in such a manner that surrounding concrete or existing reinforcing to be left in place and existing in place equipment is not damaged.
3. Saw cutting at limits of concrete to be removed shall be performed where indicated on the Drawings.

D. Connection to Existing Concrete

1. Roughen surface of existing concrete to be connected to new materials by sand-blasting, chipping, or scarifying. Thoroughly clean area of concrete to receive new materials of loose particles and dust or other contaminating objects.
2. Existing reinforcing to be left in place as shown on the Drawings shall be wire brushed to remove rust or concrete. New reinforcing shall be cut, bent, or lapped to existing reinforcing as shown on the Drawings and provided with a minimum of one inch of cover all around and at ends of the bar. The reinforcing shall be thoroughly cleaned of loose particles and dust before incorporating in new materials.
3. Connection Methods

    a. Method A. After existing concrete surface at connection has been roughened and cleaned as specified above, thoroughly saturate and maintain saturation for a period of at least 12 hours. Brush on a 1/8-inch layer of cement and water mixed to the consistency of a heavy paste. Immediately after application of cement paste, place new concrete or group mixture as detailed on the Drawings.
    b. Method B. After existing concrete surface has been roughened, cleaned and saturated as specified above, apply epoxy bonding agent at connection surface. The field preparation and application of the epoxy bonding agent shall comply strictly with the manufacturer's recommendations. Place new concrete or non-shrink grout to limits shown on the Drawings within time constraints recommended by the epoxy bonding agent manufacturer.
    c. Method C for Dowels. Drill hole 1-1/2 times the diameter of the dowel. The holes shall be blown clear of loose particles and dust prior to installing epoxy. The drilled hole shall first be filled with non-shrink epoxy grout, then dowels shall be inserted by tapping. Place new epoxy grout mixture to depth shown on the Drawings.
    d. Method D for Dowels. Dowels and anchor bolts shall be set in existing concrete by the use of non-shrink cement grout in drilled holes. The diameter of the drilled hole shall be two inches larger than the diameter of the dowel or anchor bolt. The hole shall be thoroughly cleaned and non-shrink cement grout shall be placed in the bottom of hole. The dowel or anchor bolt is then inserted into place and the remaining void is filled by ramming in non-shrink cement grout. The dowel or anchor bolt shall have a minimum of 3/4-inches of grout between it and the drilled side of the hole. If the surface of the grout is to be exposed, the non-shrink grout

shall be discontinued ½-inches from the surface and the remaining void filled with mortar matching the existing concrete as near as practical.

e. Method E. Non-expanding polyester resin/aggregate glass capsule anchor system shall be set in existing concrete by drilling holes to the required depth to develop the full tensile and shear strengths of the anchor material being used. The anchor bolts system shall be installed per the manufacturer's recommendation in holes sized and cleaned as required prior to inserting the capsule. The capsule anchor system shall be equal to Molly Parabond two part stud and capsule system by USM Corp, 504 Mt. Laurel, Temple, PA, or the HVA Adhesive Anchoring System by Hilti North America, Tulsa, OK. The capsule shall consist of a sealed glass capsule containing premeasured amounts of a polyester or vinylester resin, quartz sand aggregate, and a hardener contained in a separate vial within the capsule. The anchor stud bolt, rebar or other embedment item shall be tipped with a double 45 degree chamfered point, securely fastened into the chuck of a rotary percussion hammer drill, and drilled into the capsule filled hole. The anchor may be installed in horizontal, vertical and overhead positions.

E. Waterstops installed in existing concrete shall be in accordance with the Division 03 specification for Joints.

F. Where existing reinforcing is exposed due to saw cutting and removal of existing concrete, a coating or surface treatment of epoxy protectant shall be applied to the entire cut surface. The epoxy manufacturer shall submit to the Engineer for review specifications for the epoxy mortar material to be used. The epoxy protectant shall be formulated for the intended application.

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 05 - METALS

SECTION 05500 – MISCELLANEOUS METAL

PART 1 - GENERAL

1.01 SCOPE OF WORK

Furnish all labor, materials, equipment, and incidentals required and install covers, grates, frames, catch basin castings, and other miscellaneous metals as shown on the Drawings and specified herein. The miscellaneous metal items include but are not limited to the following:

1. All metal frames, ladders, stair rails, floor opening frames including gratings, and supports.

2. Pre-fabricated access hatches and frames.

3. Anchors or anchor bolts except those specified to be furnished with all equipment.

4. Handrails, posts, and supports.

5. Cast iron frames, covers, grates, drain leaders, and drains.

6. Structural steel for hoist and steel beam supports.

7. Drain leaders.

8. Stair nosings, steel plates, angle frames, plates, and miscellaneous angles and channels as shown on the Drawings.

1.02 COORDINATION

A. The work of this Section shall be completely coordinated with the work of other Sections. Verify at the site both the dimensions and work of other trades adjoining items of work in this Section before fabrication and installation of items herein specified.

B. Furnish to the pertinent trades all items included under this Section that are to be built into the work of other Sections.

1.03 SUBMITTALS

A. Shop drawings, working drawings and product data, as provided for in Section 01340, showing at least sizes of members, method of assembly, materials, anchorage, and connection to other members shall be submitted to the Engineer for review before fabrication.

B. Submit drawings and data for column covers including details, gaskets, fasteners, thickeners, dimensions and any other pertinent descriptive literature.

C. Submit two (2) samples of column material of sufficient size to indicate connection and gasketing detail along with the finish.

D. Submit complete operation and maintenance data for the floor and roadway hatches in accordance with Section 01730.

1.04 FIELD MEASUREMENTS

Field measurements shall be taken at the site to verify or supplement indicated dimensions and to ensure proper fitting of all items.

1.05 REFERENCE SPECIFICATIONS

A. Aluminum Association

1. AA 5052 Aluminum Sheet and Plate, Rolled Rod and Bar and Drawn Tube.

2. AA 6061 T6 Aluminum Sheet and Plate.

3. AA 6063 T5 Aluminum Extruded Shapes.

4. AA 6063 T6 Alnum Extruded pipe.

5. AA M31 C22 A41

a. M31 Mechanical Finish, Fine Satin

b. C22 Chemical Finish, Medium Matte

c. A41 Clear Anodic coating, Class 1

B. American National Standards Institute (ANSI)

ANSI A14.3 Safety Requirement for Fixed Ladders

C. American Society for Testing and Materials (ASTM)

1. ASTM A36 Specification for Structural Steel

2. ASTM A48 Specification for Gray Iron Castings, Class 30

3. ASTM A53 Specification for Pipe, Steel, Black and Hot Dipped, Zinc-Coated Welded and Seamless

4. ASTM A123 Specification for Zinc (Hot Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip.

5. ASTM A153 Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

6. ASTM A307 Specification for Carbon Steel Externally Threaded Standard Fasteners.

7. ASTM A325 Specification for High-Strength Bolts for Structural Steel Joints.

8. ASTM A386 Specification for Zinc-Coated (Hot-Dip) on Assembled Steel Products.

9. ASTM A446 Specification for steel sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.

10. ASTM A525 Specifications for Steel sheet, Zinc-Coated (Galvanized) by the Hot Dip Process.

11. ASTM A611 Specification for Steel, Cold-Rolled Sheet, Carbon, Structural.

12. ASTM B209 Specification for Aluminum-Alloy Sheet and Plate, Alloy 6061, T-6.

13. ASTM B221 Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Alloy 6063, T-5.

14. ASTM B429 Specification for Aluminum-Alloy Extruded Structural Pipe and Tube, Alloy 6063, T-6.

D. American Iron and Steel Institute (AlSI)

1. AlSI, Type 302 Stainless steel Bolts, Bars and Shapes.

2. AlSI, Type 304 and 316 Stainless Steel Plate and Sheet.

E. American Welding Society (AWS)

AWS Specification for Arc Welding (Type E70XX) Welding Rods for Steel

F. Occupational Safety and Health Act Standards

PART 2: PRODUCTS

2.01 ANCHORS, BOLTS, AND FASTENING DEVICES

A. Anchors, bolts, etc. shall be furnished as necessary for installation of the work of this Section.

B. Compound masonry anchors shall be of the type shown or required and shall be equal to Star Slugin compounded masonry anchors manufactured by Star Expansion Industries, equal by Phillips Drill Co., Rahlplug, or equal. Anchors shall be minimum "two unit" type.

C. The bolts used to attach the various members to the anchors shall be the sizes shown or required. Aluminum and stainless steel shall be attached to concrete or masonry by means of stainless steel machine bolts and iron or steel shall be attached with steel machine bolts unless otherwise specifically noted.

D. For structural purposes, unless otherwise noted, expansion bolts shall be Phillips Drill Co. "Wedge Anchors," Hilti "Kwik-Bolt," or equal. When length of bolt is not called for on the Drawings, the length of bolt provided shall be sufficient to place the wedge portion of the bolt a minimum of l-inch behind the reinforcing steel within the concrete. Material shall be as noted on the Drawings. If not noted, provide in galvanized steel. Bolts shall be supplied with nuts, flat washers, and lock washers as required and shall be of the same material as the bolt.

E. Bolts and nuts shall conform to Federal Specification FF-B-575. Bolts and nuts shall be hexagon type. stainless steel bolts, nuts, screws, washers, and related appurtenances shall be equal to AISI Type 302. All exposed portions of anchor bolts installed in concrete shall be greased, wrapped in burlap or plastic sleeve, and tied.

F. Toggle bolts shall be Diamond, Keystone, Star, or equal.

2.02 ALUMINUM ITEMS

A. Aluminum gratings shall be of the depths and thickness shown and shall be Reliance Steel Products Company, Type lR4i equal by Borden Metal Products Co.; Intertec Corp.; or equal. All openings 2-inches and greater in diameter shall be banded with a bar of the same depth and thickness as the main bearing bars of the grating. Each cut bar shall be welded to the band. The ends of all grating sections shall be likewise banded. Clamps and bolts used for attaching grating to supporting member shall be stainless steel. All grating shall be clamped unless noted otherwise. Clamps shall be as recommended by the manufacturer.

B. Aluminum stair treads shall be as specified above for grating and shall have abrasive, non-slip nosing.

C. Aluminum ladders shall be fabricated as detailed and installed as shown on the Drawings.

SECTION 05500 – MISCELLANEOUS METAL

D. Handrailings

1. Handrailings shall be a I-lj2-inch inside diameter, welded, Schedule 40 aluminum pipe for rails and Schedule 80 aluminum pipe for posts with a floating panel screen as detailed on the Drawings.

2. Welds shall be circumferential ground smooth and even to produce a railing that is neat in appearance and structurally sound as approved. After welding, aluminum shall be anodized in clear satin finish that complies with Aluminum Association Designation M3l C2l A41.

3. Form bends to the dimensions shown for the angles required by the project conditions. No distortion of the circular railing shape will be allowed.

4. Spacing of posts shall be as approved on shop drawings, but in all cases, shall be uniform and shall be placed as shown or at 6 feet-a-inches O.C. maximum. Shorter spacing shall be used where required to maintain the maximum spacing and where indicated on the elevations to follow a pattern.

5. Floating panel shall be fabricated from 2-inch square press crimped l/4-inch thick aluminum with a l-inch by l/2-inch by l/3-inch thick framing channel. The finish on all the components of the floating panel shall be the same clear anodized aluminum as the pipe railing portion of the handrail. The frame shall be attached to the pipe rail with screws or by other fasteners that insure rigid construction. Fastening shall be on all edges of the screen and shall be as inconspicuous as possible. The screen and frame shall be manufactured by Kentucky Metal Products Company, Miller Wire Works, or equal.

6. Toeplates where shown on the Drawings or required by OSHA shall be fabricated and installed. Aluminum safety gate at handrailing openings where required shall be fabricated of matching pipe with approved spring hinges, stop and latch. Gate width shall be 3-feet-0-inches or as required by equipment.

7. All handrailings shall be erected to line and plumb. Field splicing and expansion compensation shall be accomplished using internal splice sleeves, welded one end and set screw fastened one end or where shown on the Drawings rivet fastened. Make provisions for removable railing sections as detailed and where shown on the Drawings.

8. Where handrailing is top mounted in concrete, the posts shall be set into sleeves of same material as handrailing and firmly grouted with Portland cement grout. Post collars shall be placed on the posts and fastened in place as detailed on approved shop drawings.

9. Where handrailing is supported from structural members, the connection shall be as detailed on the Drawings or shall be of approved sockets, flanges and brackets, or another approved means which will provide neat and substantial support.

10. All handrailing shall be properly protected by paper, or by an approved coating or by both against scratching, splashes of mortar, paint, or other defacements during transportation and erection and until adjacent work by other trades has been completed.

E. Elastomeric Expansion Joint Seals

1. Elastomeric joint seals shall be Elastolum Type ELV by Construction Specialties, equal by MM Systems Corp. or equal.

2. Elastomeric material shall be factory bonded to aluminum side retainer frames of the configurations shown. Bonding surfaces for elastomeric material shall be toothed along entire length to increase bond strength. Provide all factory fabricated intersections and corners required by job conditions. Elastomeric material shall have a minimum depth of Ij2-inch and a minimum Shore A durometer of 18 and a maximum of 25.

3. Field joints shall be located at a maximum spacing of twenty (20) feet and as shown on the approved shop drawings. The Contractor shall provide a field joint sealer approved by the Engineer.

4. Color of elastomeric material shall be black.

5. Aluminum side retainer frames where in contact with concrete and masonry shall be factory coated with zinc chromate primer.

6. Provide masonry anchors and stainless steel fasteners as approved for securing aluminum frames into recesses in structural concrete as required at 24-inches on center.

7. Grout shall be non-ferric, non-shrink type equal to Master Builders Masterflow 713, Euclid Chemical Co. N-S Grout or equal.

F. Prefabricated Aluminum Hatches:

1. Prefabricated aluminum hatches shall be Type "J" or "JD" as manufactured by Bilco Co., Babcock-Davis Associates, Inc.; Halliday Products; or equal, sized as required. Hatches with either dimension over 3 feet-6 inches shall be double leaf type. Hatch doors shall be 1/4-inch aluminum diamond pattern plate designed to withstand a live load of 300 pounds per square foot. Channel frame shall be 1/4-inch aluminum with anchor flange all around the perimeter. Hatch shall be equipped with heavy forged brass hinges, stainless steel pins, spring operators, and an automatic hold-open arm

with release handle. A snap lock with removable handle shall be provided. Each individual hatch shall also be furnished with a removable threaded aluminum plug to seal the lock aperture. Special fabrications, if required to meet specific installation conditions, shall be provided by the Contractor at no additional cost. Hatch hinges shall be welded to the hatch assembly.

2. It will be required that the opening dimension be with the hatches opened at 90° upright, openings will not be considered enlarged by having to dismantle any portion of the operating mechanisms. Hatch clear openings shall provide a minimum 2-inch clearance on all sides for removal of equipment.

3. It will be required that all parts be welded including, but not limited to, hinges and all stiffening angles. All mechanisms housing springs and releases will be' installed in housings similar to "Bilco" or "Halliday" or approved equal.

G. Checkerplate aluminum cover plates shall be fabricated to the details shown and installed at the locations shown.

H. Column covers shall be fabricated from two sheets of aluminum, sandwiching a core of extruded thermoplastic, formed in a continuous process, with no glues or adhesives between dissimilar materials. Aluminum shall be AA5205 alloy, .51 mm (0.020 inch) thick with a clear, integral coating AA-C22-4l. Total composite panel shall be 3-mm (0.118-inch) thick. Deviation from vertical alignment shall be no more than 1/4-inch in twenty (20) feet. Panel bow shall not be more than 0.8 percent of the panel dimension in width and length. Panel lines, breaks, and angles shall be sharp and true, and surfaces shall be free from warp or buckle. Fasteners shall all be concealed and. non-corrosive. Panels shall be circular and as detailed on the drawings and reinforced for exterior use. Panels shall be Alucobond by Consolidated Aluminum, pittcon Industries, Inc., or equal.

I. Aluminum nosing at concrete stairs shall be equal to Wooster Products, Inc., Alumogrit Treads, Type 116 x 4-inch wide; equal by Barry Pattern and Foundry Co.; Andco; or equal. Furnish with wing type anchors and flat head stainless steel machine screws, 12-inch O. C. Nosing shall extend to within three (3) inches at each side of the stair.

J. Aluminum ladders shall be fabricated as detailed and installed as shown in accordance with ANSI Al4.3. Side rails shall be fabricated from 3/8-inch by 2-1/2-inch continuous extruded flat bars, spaced a minimum 18-inches apart. Rungs shall be fabricated from extruded shapes with a serrated tread, number A5680 by Washington Aluminum Company or equal.

K. Miscellaneous aluminum shapes and plates shall be fabricated as shown. Angle frames for hatches, beams, grates, etc. shall be furnished complete with welded strap anchors attached. Furnish all miscellaneous aluminum shown but not otherwise specified herein.

SECTION 05500 – MISCELLANEOUS METAL

2.03 STEEL ITEMS

A. Sleeves shall be steel or cast iron pipe in walls and floors with end joints as shown on the Drawings. All pipe sleeves shall have center anchor around circumference as shown.

B. All miscellaneous lintels and closures required, but not specifically shown on the Drawings, shall be galvanized steel and shall be provided as a part of this Section sized as required for strength and coverage.

C. Miscellaneous steel pipe for sleeves and lifting attachments and other uses as required including concrete filled galvanized steel bollards shall be Schedule 40 pipe fabricated according to details as shown on the Drawings. ..

D. Miscellaneous steel shall be fabricated and installed as required and in accordance with the Drawings and shall include miscellaneous angles, support brackets, anchor bolts (except for equipment furnished in Division 15); lintels coped-back 3/4-inch where they bear on masonry; checkerplates; bar racks; and any other miscellaneous steel called for on the Drawings and not otherwise specified.

2.04 CAST IRON FRAMES AND COVERS

A. Frames, covers, and grates for manholes, catch basins and inlets and emergency pump out manholes shall be of a good quality, strong, tough even grained cast. iron except as otherwise specified below. Castings shall be as manufactured by Vulcan Foundry, or equal. Sizes shall be as .shown on the Drawings. Covers to have letters "SEWER" or "DRAIN," as applicable, embossed on top.

B. Provide solid manhole and handhole covers and frames for electrical and telephone underground systems. (Covers to have letters "HIGH VOLTAGE," *"LCJt1* VOLTAGE," "SIGNAL," "TELEPHONE," as applicable, embossed on top.) .

PART 3: EXECUTION

3.01 FABRICATION

A. All miscellaneous metal work shall be formed true to detail with clean, straight, sharply defined profiles and smooth surfaces of uniform color and texture and free from defects impairing strength or durability.

B. Connections and accessories shall be of sufficient strength to safely withstand stresses and strains to which they will be subjected. Steel accessories and connections to steel or cast iron shall be steel, unless otherwise specified. Threaded connections shall be made so that the threads are concealed by fitting.

SECTION 05500 – MISCELLANEOUS METAL

C. Welded joints shall be rigid and continuously welded or spot welded as specified or shown. The face of welds shall be dressed flush and smooth. Exposed joints shall be close fitting and jointed where least conspicuous.

D. Welding of parts shall be in accordance with the Standard Code for Arc and Gas Welding in Building Construction of the AWS and shall only be done where shown, specified, or permitted by the Engineer. All welding shall be done only by welders certified as to their ability to perform welding in accordance with the requirements of the AWS Code. Component parts of built-up members to be welded shall be adequately supported and clamped or held by other adequate means to hold the parts in proper relation for welding.

E. Welding of aluminum work shall be on the unexposed side as much as possible in order to prevent pitting or discoloration.

F. All aluminum finish exposed surfaces, except as specified-, below, shall have manufacturer's standard mill finish. Aluminum handrails shall be given an anodic oxide treatment in accordance with the Aluminum Association Specification AA-C22-A41. A coating of methacrylate lacquer shall be applied to all aluminum before shipment from the factory.

G. All steel finish work shall be thoroughly cleaned, by effective means, of all loose mill scale, rust, and foreign matter before shipment and shall be given one shop coat of primer compatible with finish coats specified in painting Section after fabrication, but before shipping. Paint shall be applied to dry surfaces and shall be thoroughly': and evenly spread and well worked into joints and other open spaces. Abrasions in the field shall be touched up with primer immediately after erection. Shop and final painting is specified in Section 09900.

H. Galvanizing, where required, shall be the hot-dip zinc process after fabrication. Following all manufacturing operations, all items to be galvanized shall be thoroughly cleaned, pickled, fluxed, and completely immersed in a bath of molten zinc according to ASTMA525. The resulting coating shall be adherent and shall be the normal coating to be obtained by immersing the items in a bath of molten zinc and allowing them to remain in the batch until their temperature becomes the same as the bath. Coating shall be not less than 2 oz. per square foot of surface.

I. Zinc coating which has been burned by welding, abraded, or otherwise damaged shall be cleaned and repaired after installation. The damaged area shall be thoroughly cleaned by wire brushing and all traces of welding flux and loose or cracked zinc coating removed prior to painting. The cleaned area shall be painted with-two coats of zinc oxide-zinc dust paint conforming to the requirements of Military Specifications MIL-P-15145. The paint shall be properly compounded with a suitable vehicle in the ratio of one part zinc oxide to four parts zinc dust by weight.

J. Castings shall be of good quality, strong, tough, even-grained, smooth, free from scale, lumps, blisters, sand holes, and defects of any kind which render them unfit for the service for which they are intended. Castings shall be thoroughly cleaned and will be subjected to a hammer inspection in the field by the Engineer. All finished surfaces shown on the Drawings and/or specified shall be machined to a true plane surface, and shall be true and seat at all points without rocking. Allowances shall be made in the patterns so that the thickness specified or shown shall not be reduced in obtaining finished surfaces. Castings will not be acceptable if the actual weight is less than ninety-five percent (95%) of the theoretical weight computed from the dimensions shown. The Contractor shall provide facilities for weighing castings in the presence of the Engineer showing true weights, certified by the supplier.

3.02 INSTALLATION

A. Install all items furnished except items to be embedded in concrete or other masonry which shall be installed under Division 3 and Division 4 respectively. Items to be attached to concrete or masonry after such work is completed shall be installed in accordance with the details shown. Fastening to wood plugs in masonry will not be permitted. All dimensions shall be verified at the site before fabrication is started.

B. All steel surfaces to come in contact with exposed concrete or masonry shall receive a protective coating of an approved heavy bitumastic troweling mastic applied in accordance with the manufacturer's instructions prior to installation.

C. Where aluminum contacts a dissimilar metal, apply a heavy brush coat of zinc-chromate primer followed by two (2) coats of aluminum metal and masonry paint to the dissimilar metal.

D. Where aluminum contacts masonry or concrete, apply a heavy coat of approved alkali resistant paint to the masonry or concrete.

E. Where aluminum contacts wood, apply two (2) coats of aluminum metal and masonry paint to the wood.

F. Installation of column covers shall be after all plumbing, mechanical and electrical work behind them has been completed. Concealed fasteners shall be installed according to the manufacturer's recommendations. Panels shall be protected during construction and any damaged panels shall be removed and replaced. Clean exposed panel surfaces in accordance with the manufacturer's written instructions.

END OF SECTION

TECHNICAL SPECIFICATIONS
DIVISION 10 - GENERAL REQUIREMENTS

SECTION 10100 - RELOCATION OF INFRASTRUCTURE ITEMS

PART - I GENERAL

1.01 RELOCATION WORK PERFORMED BY THE CONTRACTOR

A. The cost for relocating, repairing, replacing or removing any of the Owner's unforeseen or privately owned utilities or structures; such as, but not limited to, water, sewer, gas, power, subsurface drainage systems, trees, etc. which are in conflict with the items to be installed under this project, shall be paid under item "Relocation of Infrastructure Items" included in the bid form and shall include all labor, equipment, materials, and incidentals necessary for proper performance of this work. Such work shall be paid for only when the work is deemed necessary by Engineer or Owner for performance of this contract.

B. The work outlined herein includes only such items associated with the relocation, repair, replacement, or removal of utilities, such as utility lines and/or piping, systems, and/or structures that were unforeseen. This work does not include relocation, repair, replacement, or removal of any utilities, structures, or items that are already clearly designated in the Drawings.

C. Costs for necessary relocation, repairs, or removal are to be paid for by the Owner under the "Relocation of Infrastructure Items" payment item. The costs shall be prepared as is detailed for changes in the Work described in the General Conditions and submitted to the Engineer for review and approval prior to beginning work.

D. All utilities owned by the Owner requiring relocation due to conflicts shall be performed by the Contractor, and payment for the work will be made under item for "Relocation of Infrastructure Items".

E. Relocation, repair, or removal of any items for the Contractor's convenience will be at no additional cost to the Owner.

1.02 RELOCATION WORK PERFORMED BY UTILITY COMPANIES

A. The cost of removal, replacement, or relocation of any other utilities, such as power company facilities, telephone company cables, and gas lines, within publicly owned right-of-way (R/W) shall be borne by the respective companies provided the work is required for proper performance of this contract and approved by the Engineer or Owner prior to scheduling of the relocation work by the utility company.

B. When any of these utilities are outside the R/W and removal, repair, replacement and relocation has been approved by the Engineer or Owner, the Contractor shall inform the respective utility company for performing the work. The cost of such work shall be reimbursed to the utility company, when applicable, by the Contractor. Payment for which will be made to the Contractor under item "Relocation of Infrastructure Items", subject to approval by the Engineer prior to the relocation work being performed.

SECTION 10100 - RELOCATION OF INFRASTRUCTURE ITEMS

C. The relocation work performed by a utility company shall be considered to be subcontractor work and Contractor shall be allowed a five percent fee as defined in the General Conditions for changes to the Work.

1.03 Utilities not properly located in accordance with the State of Louisiana's utility location law and subsequently broken or disturbed by the Contractor shall not be considered under this item for reimbursement. In such a case, it shall be the Contractor's responsibility to remedy the claim with the proper utility company at no cost to the Owner or the Engineer.

1.04 The cost for this work that is included in the Bid Form in Division 00 of these documents is a projected budget cost and the Contractor is not guaranteed payment of the full allowance under this item of Work. Upon completion of construction, any portion of this item's projected cost that was not authorized for utilization by the Engineer or Owner shall be deducted from the total contract price.

PART - II PRODUCTS (NOT USED)

PART - III EXECUTION (NOT USED)

END OF SECTION

SECTION 26 01 00 - BASIC ELECTRICAL REQUIREMENTS

STATE OF LOUISIANA
MICHAEL LEE TERRY, III
LICENSE NO. 42812
PROFESSIONAL ENGINEER IN ELECTRICAL ENGINEERING
02/24/2023

PART 1 - GENERAL

1.1 SCOPE

A. The work to be performed under these specifications shall include the furnishing of all labor, materials, equipment and services required for a complete electrical system as specified herein and as shown by the Drawings. A state of Louisiana licensed Electrical Contractor shall perform the work specified herein. The work includes but is not limited to:

1. Furnishing and installing a new 120/240 Volt, 1-phase, 3-wire service entrance as shown on the Drawings, including coordinating with the utility company and including associated costs in bids.

2. Furnishing and installing conduits with conductors from service entrance service equipment to the booster station building as shown on the Drawings.

3. Furnishing and installing service entrance rated manual transfer switch, power panels, and disconnect switches for use at the site.

4. Furnishing and installing lighting fixtures, receptacles, toggle switches, and special outlet boxes for electrical systems shown on Drawings.

5. Furnishing and installing emergency lighting and exit lighting fixtures and circuits.

6. Furnishing and installing electrical conduit and wiring required for connection of mechanical equipment furnished under other sections of these specifications.

7. Furnishing and installing new pump power and control wiring as shown on the Drawings. The Contractor shall coordinate electrical requirements with the booster station control panel supplier prior to bidding.

8. Furnishing and installing new raceways for controls wiring as shown on the Drawings.

9. Furnishing and installing spare conduits for the SCADA supplier as shown on the Drawings. The Contractor shall coordinate requirements with the SCADA supplier prior to bidding.

10. Installation of temporary construction power required by the General Contractor and Sub-Contractors during the construction period.

1.2 GENERAL CONDITIONS

A. The General Conditions and Supplementary General Conditions are a part of this section of these Specifications. The Contractor is cautioned to read and be thoroughly familiar with all provisions of the General Conditions. These conditions shall be complied with in every aspect. The word "shall" where used, is to be understood, as mandatory and the word "should" as advisory. "May" is used in the permissive sense.

1.3 GENERAL REQUIREMENTS

A. The Contractor is referred to all of the Drawings for building construction as well as the electrical Drawings.

B. The Contractor shall examine the site and shall verify to his own satisfaction the location of all utilities, and shall adequately inform himself as to their relation to his work before entering into a Contract and he shall base his bid on any conditions, which may be encountered during the progress of the work.

C. The Contractor shall furnish and install properly all materials, devices, equipment, supports, controls, appurtenances, etc., mentioned or required to make complete or satisfactory installations in working order whether shown or not. All electrical equipment shall be connected in accordance with manufacturer's instructions. All work shall be executed in a workmanlike manner and shall present a neat and mechanical appearance when completed.

1.4 MINIMUM STANDARDS

A. Applicable rules of the National Electrical Code apply as a minimum standard for this contract, but do not replace or reduce any specific requirement herein.

1.5 DRAWINGS

A. Plans and detail sketches are submitted to limit, explain, and define structural conditions, specified requirements, conduit sizes, and manner of erecting work. The Contractor is cautioned to field check and verify all existing conditions before bidding, as no extra compensation will be allowed for conditions found different than represented in the construction drawings and/or specifications. Written approval of the Architect shall be obtained prior to any alterations or additions to specified work.

B. Structural or other conditions may require certain modifications from the manner of installation shown, and such deviations are permissible and shall be made as required, but specified sizes and requirements necessary for satisfactory operations shall remain unchanged.

C. The drawings and these specifications are complementary to each other and what is called for by one shall be binding as if called for by both.

D. General arrangement of work is indicated on plans. Due to the small scale of the drawings, offsets, fittings, and boxes required are not all indicated; provide fittings, boxes, etc., as needed in accordance with codes and accepted practices.

1.6 SUPERVISION

A. The Contractor shall personally or through an authorized and competent representative, constantly supervise the work from beginning to completion and final acceptance. So far as possible, he shall keep the same foreman and workmen throughout the project duration.

B. During its progress, the work shall be subject to inspection by representatives of the Architect, at which times the Contractor shall furnish required information.

C. It is not the Engineer's duty to direct or guarantee the work of the Contractor, but to assist the Owner in obtaining a complete building in accordance with plans, specifications and addenda and to furnish engineering services in accordance with recognized practices.

1.7 PRIOR APPROVALS

A. The Contractor shall base his proposal on materials as specified herein. Any references to a specific manufacturer or trade name is made to establish a standard of quality and to define a type of product and in no way is intended to indicate a preference for a particular manufacturer. It is the intent of these specifications to allow all manufacturers of equipment, products, etc., judged equal to the specified product to bid on a competitive basis.

1.8 MEASUREMENTS

A. The Contractor shall verify all measurements and shall be responsible for the correctness of same, before ordering any materials or doing any work. No extra charge or compensation will be allowed for any differences between the actual measurements and those indicated on the drawings.

1.9 LAWS, PERMITS AND FEES

A. The entire electrical work shall comply with the rules and regulations of the City, Parish, and State, including the State Fire Marshal and State Board of Health, whether so shown on plans or not. The Contractor shall pay fees for permits, inspections, etc., and shall arrange with the inspecting authorities all required inspections.

1.10 SITE INSPECTION

A. The Contractor shall visit the site and familiarize himself with difficulties attendant to the successful execution of the work before bidding. Failure to visit the site shall not relieve the Contractor of the extent or conditions of the work required of him.

PART 2 - PRODUCTS

2.1 MATERIAL AND EQUIPMENT

A. All materials, equipment, and accessories installed under this Contract, whether approved or not, shall be new and shall conform to all rules, codes, etc., as recommended or adopted by the National Association(s) governing the manufacture, rating and testing of such materials, equipment, and accessories.

2.2 SHOP DRAWINGS

A. The Contractor shall submit to the Architect complete descriptive and dimensional data on the following items for review and approval:

1. Panelboards

2. Service Entrance Manual Transfer Switch

3. Disconnect Switches

4. Lighting Fixtures and Controls

5. Single Phase to Three Phase Converter

6. Conduit and Fittings

7. Conductors

8. Pump Motor Electrical Information

9. Control Panel Electrical Information

10. Booster Station Electrical Information

11. Surge Protection Devices

PART 3 - METHODS OF INSTALLATIONS

3.1 CONTRACTOR COORDINATION

A. The Drawings are diagrammatic in nature. Cooperate with other trades so the interferences of facilities and equipment will be avoided.

3.2 OPENINGS, CUTTING AND PATCHING

A. Cut all openings as required for the electrical work. Patching will be done by the various crafts whose work is involved. Furnish and install all necessary sleeves, thimbles, hangers, inserts, etc., at such times and in such a manner as not to delay or interfere with the work of other Contractors. Caulk, flash or otherwise make weatherproof all penetrations through the roof and exterior walls.

B. Where conduit, cable or other items that are provided for under this contract penetrate fire rated walls or floors, the Contractor is to seal around the item to maintain the integrity of the rated system.

3.3 PAINTING

A. Painting shall be performed as described in the painting specifications. No painting will be required by the Contractor except for touch-up of factory finishes on equipment furnished under this contract.

3.4 APPLICABLE GENERAL CODES AND REGULATIONS

A. All electrical work and equipment, in whole or in part, shall conform to the applicable portions of the following specifications, codes and regulations in effect on that date of invitation for bids, and shall form a part of this specification.

1. National Electrical Code, Latest Edition as accepted by the State Fire Marshal

2. National Electrical Manufacturers Association Standards

3. National Fire Protection Association Recommended Practices

4. Local, City and State Codes and Ordinances

5. National Board of Fire Underwriter's Recommended Practices

6. Life Safety Code, Latest Edition as accepted by the State Fire Marshal

7. International Building Codes

B. Equipment that has been inspected and approved by the Underwriter's Laboratory shall bear its label or appear on its list of approved apparatus.

3.5 TESTS AND INSPECTIONS

A. The Contractor shall assist in making periodic inspections or tests required by the Architect or Engineer. When requested, the Contractor shall provide the assistance of foremen and qualified craftsmen for reasonable duration of each test, etc.

3.6 SAFETY PRECAUTIONS DURING CONSTRUCTION

A. It shall be the Contractor's responsibility to furnish and install proper guards and instruction signs for prevention of accidents and to provide and maintain for the duration of construction any installations needed for safety of life and property.

3.7 HEATING AND AIR CONDITIONING SYSTEM

A. This Contractor shall be responsible for providing electrical service to all devices of the heating and air conditioning system, and is referred to the mechanical plan for the exact location of the various devices.

3.8 EQUIPMENT NAMEPLATE

A. Each item of electrical equipment installed by the Contractor shall be provided with an engraved nameplate noting the equipment's function or designation. Nameplates shall be engraved laminated plastic with black letters on a white background. Letters shall be 1/4" high, all caps.

3.9 PANELBOARD SCHEDULES

A. The Contractor shall provide and affix typed panelboard schedules for each panelboard. Schedule will accurately list equipment served by each branch circuit, and not simply indicate “LIGHTING” or “RECEPTACLES”, etc. Schedules shall indicate rooms served and device or devices connected to the circuit.

3.10 COMPLETION

A. The Contractor shall leave all electrical equipment with proper connections, and in proper

working order. He shall test the entire electrical system to show that it is properly installed. Contractor shall leave all panels and switches completely fused or complete with circuit breakers.

3.11 RECORD DRAWINGS

A. The Contractor shall furnish one (1) complete set of drawings on which any changes in the work shall be shown. These drawings must be turned over to the Architect prior to final acceptance of the work.

3.12 GUARANTEE

A. The Contractor shall guarantee to keep the entire electrical system as installed by him or his subcontractors in repair and in perfect working order for one (1) year from the date of the final Certification of Final Acceptance, and shall furnish free of cost to the Owner, all material and labor necessary to comply with the above guarantee; said guarantee shall be based upon defective material and workmanship. In any case where equipment has a factory warranty exceeding this one-year limit, the full extent of the warranty shall apply.

3.13 CLEANING

A. When all work has been finally tested, the Contractor shall clean all fixtures, equipment, conduits, ducts, and all exposed work. All cover plates and other finished products shall be thoroughly cleaned.

3.14 INSTRUCTION MANUALS

A. The Contractor shall provide three (3) operating and maintenance instruction manuals on all systems and equipment installed in the electrical work.

3.15 CONTRACTOR SPECIAL NOTE

A. The Contractor is again cautioned to refer to all parts of these Specifications and all Drawings, not just electrical sections, and the individual cross references made to other standard specifications or details describing any electrical work, which may be required under these other sections. The Contractor is cautioned to note carefully any other sections which may reference electrical work in order for this Contractor to fully understand the wiring requirements and electrical work that is required. Any conflicts found between the electrical sections of these Specifications or Drawings shall be immediately directed to the General Contractor for clarification.

B. These Specifications and the electrical Drawings size equipment, wire, conduit, etc. based on the horsepower of motors and/or wattages of equipment as shown on the plans or specified herein. The Contractor shall install electrical raceways, conductors, fuses, safety switches, breakers, contactors, starters or any other electrical equipment with the capacities to suit the horsepower and/or wattages of the equipment actually furnished and installed. The Contractor shall not furnish or install any electrical raceways, conductors, safety switches, contactors or motor starters of sizes smaller than those shown on the Drawings or specified herein. The Contractor shall coordinate with the various sections of the Specifications and/or Drawings and with the various Sub-Contractors to provide the properly sized equipment without additional cost to the Owner.

C. The Contractor shall be required to install electrical services underground. Existing underground utilities should be disconnected. Refer to the electrical and mechanical drawings for demolition plans. However, some existing underground utilities may remain in service at the site. Contractor is cautioned to exercise extreme care when digging to not damage any existing utilities or equipment. Contractor shall be required to repair any utilities or equipment he may damage during construction.

END OF SECTION 26 01 00

SECTION 26 05 00 - BASIC ELECTRICAL MATERIALS AND METHODS

STATE OF LOUISIANA
MICHAEL LEE TERRY, III
LICENSE NO. 42812
PROFESSIONAL ENGINEER IN ELECTRICAL ENGINEERING
02/24/2023

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. All material furnished shall be new and shall conform to all rules and codes as recommended or adopted by the National Association governing the manufacture, rating and testing of the material. All electrical equipment shall be UL listed for the intended use.

PART 2 - PRODUCTS

2.1 RACEWAYS AND FITTINGS

A. Raceways permitted on this project shall be hot dipped galvanized rigid steel conduit; electrical metallic tubing (EMT); flexible metallic tubing; liquid-tight flexible metal conduit; and rigid polyvinyl chloride (PVC) conduit. All conduits shall be new and shall bear the inspection label of the Underwriter's Laboratories, Inc.

B. Metallic conduit shall be metalized, or hot-dipped galvanized. Non-metallic conduit shall be schedule 40 PVC.

C. Fittings for conduit shall be an approved type specially designed and manufactured for their purpose. EMT fittings shall be watertight, compression type. Rigid metal conduit fittings, bushings, and other components shall be galvanized. All fittings for rigid steel or aluminum conduit shall be threaded and coupled unless specifically approved otherwise by the Engineer.

D. Where conduit connects to an outlet box, it shall have an insulated throat type connector.

2.2 EXPOSED CONDUIT

A. Exposed conduit shall be firmly supported on galvanized hangers; on brackets, hangers, or pipe straps; or by beam clamps. Conduit installed exposed shall be neatly aligned and run at right angles to the building walls or walls of the rooms in which installed. All exposed conduit shall be located to avoid all conflicts with architectural or mechanical components.

2.3 FLEXIBLE CONDUIT

A. Liquid-tight flexible metal conduit shall have a spiral wound, flexible, galvanized steel core and a tough extruded synthetic moisture-tight outer covering. All flexible conduits shall be UL listed.

2.4 GALVANIZED CONDUIT

A. Galvanized conduit furnished in accordance with these specifications shall be of mild steel piping, galvanized inside and outside, and shall conform in all respects to the American Standard Association Rigid Steel Conduit Specification C80.1-1959 and Underwriter's Laboratories Specifications.

B. The galvanized coat of zinc shall be of uniform thickness applied by the hot-dipped process to

not only the inside surfaces of the conduit, but also to the threads of the conduit. It shall be further dipped in a chromic acid bath to chemically form a corrosive resistant protective coating of zinc chromate over hot-dipped galvanized surface. Each piece of conduit shall be straight, free from blisters and other debris, cut square and taper reamed, and furnished with coupling in 10-foot length threaded each end. The interior threaded surface of each coupling shall be galvanized to insure 100% galvanic protection on all surfaces. The hot galvanized zinc chromate on the inside and outside surfaces shall be sufficiently elastic to prevent cracking or flaking when sample of finished conduit is bent 90° at a minimum temperature of 60°F, the inner edge of the bend having a radius of six (6) times the inside diameter of the conduit.

2.5 RACEWAYS

A. Lay-in duct, JIC Wireway and troughs shall be NEMA 1 for indoor application and NEMA 3R for outdoor or applications exposed to weather or water. Raceways shall be sized as noted on Drawings and shall have hinged or screw covers with captive screws. Finish shall be gray enamel. All components shall be UL listed for steel enclosed wireway or auxiliary gutter.

2.6 OUTLET AND SWITCH BOXES

A. Outlet boxes in concealed conduit systems shall be flush mounted. Boxes shall be galvanized steel of sufficient size to accommodate devices shown and shall have raised covers where required to meet requirements of NEC Article 314.

B. All boxes shall be stamped, one-piece, galvanized steel, of proper size and shape for conduits entering them, and shall be UL listed and NEC approved for the intended use. Boxes shall be installed so that device and/or coverplates shall be tight and plumb with wall finish, have all unused openings closed with knock-out plugs, and be weatherproof for exterior locations.

C. Boxes for lighting fixtures shall be 4 inches octagon, not less than 1-1/2 inches deep, with fixtures stud fastened through from back box. Where boxes are installed in a concrete slab, boxes designed for this application shall be used.

D. Outlet boxes for switches in concealed work shall be standard switch boxes of required number of gangs. Outlet boxes for receptacles, telephone, and communication use in concealed work shall be 4-inch square, not less than 1-1/2 inches deep. Outlet boxes for switches and receptacles installed in exposed conduit system shall be cast type FS or FD, number of gangs as required. Outlet boxes for telephone and communication use in exposed systems to be cast, 4 inches square, not less than 1-1/2 inches deep.

E. Boxes shall not to be installed back-to-back in walls. Offset with connecting conduit as specified. Do not use long, extended boxes that would effectively couple light and sound between adjoining spaces.

2.7 WIRE (600 VOLT AND BELOW)

A. All conductors used in the work shall be of soft drawn annealed copper having a conductivity of not less than 98% of that of pure copper. Conductors shall be standard code gauge in size, insulated and shall have insulation rated for use at 600 volts.

B. Unless noted otherwise or specified, insulation shall be type THW, THWN, or THHN for sizes up to and including No. 2 AWG. Insulation for wire sizes larger than No. 2 AWG shall be type

THW, XHHW, or THHN. Lighting fixture wire shall be heat resistant type TF (150°C) with 300-volt insulation minimum. Wires shall be of the single conductor type. Sizes No.14 AWG and larger shall be stranded. No wire shall be single strand solid copper.

C. Throughout the system, all conductors shall be identified as to the phase and voltage of the system by color-coding in accordance with NEC 210.5. Color-coding shall be continuous the full length of the wire with surface printing at regular intervals on all conductors and for neutral conductors.

D. Color coding shall be as follows:

3phase, 120/240V System	1phase, 120/240V System
Phase 1-Black	Phase 1-Black
Phase 2-Orange	Phase 2-Red
Phase 3-Blue	
Neutral-White	Neutral-White
Ground-Green	Ground-Green

2.8 WEATHERPROOF RECEPTACLES

A. Weatherproof receptacles shall be GFCI duplex receptacles as specified under WIRING DEVICES, mounted in a cast iron type FD conduit box and fitted with gasketed metal cover with spring. Weatherproof receptacles shall be flush mounted in exterior walls.

2.9 WIRING DEVICES

A. Wiring devices shall be as listed. The color of device shall match color of outlet cover plate. It shall be the responsibility of the Contractor to provide plugs, receptacles and fittings required for any equipment furnished or installed or connected under the contract. Color as selected by the Engineer.

	Leviton	P & S	Hubbell
Toggle Switches: 20A 120/277V			
Single pole	1221-I	20AC1-I	1221-I
Three-way	1223-I	20AC3-I	1223-I
Duplex Receptacle: 20A, 125V, NEMA 5-20R	5362-I	5362-I	5363-I
Ground Fault Circuit Interrupter: 20A, 125V, Feed Through, NEMA 5-20R	6899-I	2091-S	GF-5362-I

B. Quad receptacles shall be 20-amp, 125 volt rated, NEMA 5-20R, with two (2) duplex receptacles or single four-plex device.

2.10 OUTLET COVER PLATES

A. Unless otherwise specified, all outlets shall be fitted with cover plates. Cover plates shall be standard size, uniform in design and finish for switches, receptacles and other outlets requiring cover plates. Plates shall be one piece of the required number of gangs. All cover plates shall be lexan unbreakable type. Engineer shall select coverplate color.

2.11 SPECIAL PURPOSE RECEPTACLE

A. Provide receptacles for special purpose devices as indicated on the plans. Refer to equipment specification for proper receptacle to be supplied. Provide stainless steel cover plate.

2.12 FIRESTOPPING PRODUCTS

A. The Contractor shall provide and install at all fire-rated wall through-penetrations, a non-hardening, conformable firestop system. The system shall consist of a water insoluble putty and suitable damming materials (where required). The non-hardening putty shall be a two-staged intumescent and capable of expanding up to 8 times its original volume. This putty shall contain no asbestos, no fiberglass, no solvents nor corrosive mineral salts of any kind. It shall remain soft during its installed life and shall be capable of being removed and reinstalled to facilitate the addition of cables or pipes. The putty shall exhibit aggressive adhesion to all common building materials and penetrants and shall allow reasonable movement of penetrants without being displaced. The firestop system shall be tested to the time/temperature requirements of ASTM E119 and shall be tested to UL 1479 (ASTM E814) and classified for up to 3 hours.

PART 3 - EXECUTION

3.1 WIRING - GENERAL

A. Unless otherwise specified, all wiring shall be installed in conduit. No wire shall be smaller than No. 12 unless noted otherwise. Wiring for low voltage control may be #14 AWG. Wire for each branch circuit shall be of single size and type from the branch circuit protective device the last outlet of the circuit. BX wiring and MC cable shall not be allowed.

B. Feeders, motor circuit conductors and main service entrance conductors shall run their entire length without joints or splices. Wiring for branch circuits shall run the entire length without splices, with splices and joints made only at outlets or in accessible junction boxes only when absolutely necessary and approved by the Engineer. Joints and splices in branch circuit wiring shall be made with compression type solderless connectors.

C. Connectors of the non-metallic screw on type are not acceptable. Terminations or splices for conductors No. 6 AWG and larger shall utilize bolted connecting lugs. All splices and terminations shall be insulated in an approved manner by an integral or separate cover or by taping to provide insulating value equal to that of the conductors being joined.

D. Type THW or THWN conductors may be connected directly to recessed fixtures only when the fixtures are equipped with outlet boxes listed by Underwriter's Laboratories, Inc. for use with wire having insulation rated for maximum operating temperatures of 75°C (167°F); otherwise, for fixtures not rated for 75°C directly connection, use 125°C insulated conductors from the fixture to an outlet box placed at least one (1) foot, but not more than four (4) feet from the fixture.

E. Branch circuit home run numbers shown on the drawings shall be used as a guide for connection of circuit wiring to similarly number protective devices in branch circuit panelboards. Requests for changes in the plans shall be directed to the Architect. No changes

shall be made without approval from the Architect.

F. Each circuit shall be furnished with its own neutral conductor. There shall be no sharing of neutral conductors.

G. In instances where a junction box, wireway, etc. contains three (3) or more branch circuits, the feeders shall be labeled within the junction box, wireway, etc. with circuit location, including panel name and breaker number. Labeling shall be neatly typed and affixed to each feeder. Labeling shall meet all applicable Code requirements.

H. No more than three (3) 20A/1P circuits may be installed in a single conduit. Circuits may not share grounds or neutrals. Conductors sharing raceways shall be derated per table 310.15(B)(3)(a) of the NEC.

3.2 ELECTRICAL SERVICE GROUNDING

A. Main electrical service equipment, conduit work, motors, panelboards and all other electrical equipment shall be effectively and permanently grounded. Grounding connections and conductor sizes shall be in accordance with requirements of the National Electrical Code, Article 250 and local or State ordinances.

B. Provide as part of the service grounding system an ufer ground in the building slab. The ufer ground shall be 20' long bare #4 copper wire and bonded to the main service ground lug with a grounding electrode cable of the size indicated on the drawings.

C. The building foundation steel and structural steel (if applicable) shall be connected to the service entrance ground lug with a grounding electrode cable of the size indicated on the drawings.

D. All ground lugs shall be properly torqued, as per the gear manufacturer's instructions and provide pictures of all ground connections to the architect and engineer for inspection before they are covered.

E. All grounding connections shall be mechanically made. Cadwell style connections are not permitted.

3.3 EQUIPMENT GROUNDING

A. All conduit entering panelboards shall be grounded to the panelboard by means of a grounding type locknut installed on the instead o the panelboard. Where the continuity of the metallic conduit system is interrupted by a section of non-metallic conduit, as separate grounding conductor, sized in accordance with NEC table 250.122 shall be installed in the conduit with the insulated conductors. A separate grounding conductor, as described above or as called for on the plans, shall be run in the conduit with the circuit conductors for all circuits serving multi-outlet assemblies.

B. Conduit runs shall be increased in size where necessary to accommodate the grounding conductor in addition to circuit conductors. The grounding screw on all grounding type receptacles shall be securely grounded to the outlet box using a No. 12 green insulated conductor attached to the outlet box with lug screw.

C. The grounding screw on all grounding type receptacles shall be security grounded to the outlet box using a No. 12 green insulated conductor attached to the outlet box with lug screw. Ground screws shall be green.

D. All switch legs shall include a green ground conductor connected to the circuit ground conductor and terminated in the switch outlet box.

3.4 CONDUIT - MATERIALS AND METHODS

A. Conduit shall be installed as per NEC and NEMA regulations and the manufacturer's recommendations. Conduit shall be as follows:

B. Rigid Steel Conduit shall be used for all conduits exposed to the weather, and underground conduit except where non-metallic conduit is specified or approved. Underground and under slab runs are to be watertight. All horizontal runs of underground conduit shall utilize rigid steel elbows on vertical risers. Conduits used for receptacles and run under the building slab shall be hot dipped galvanized rigid steel and shall be 3/4" minimum size.

C. All conduits routed underground shall not be placed in building slab. Conduits larger than 1" routed under building slab shall be routed below the vapor barrier. Minimum conduit size allowed to be routed underground shall be 3/4". Conduits routed under building slab may be PVC. All conduits rising vertically out of slab or out of ground shall be type RMC to 48” above finished floor.

D. Electrical Metallic Tubing or metal clad cabling (if permitted) shall be used for all other feeders, branch circuit and communications and control wiring where rigid steel or non-metallic conduit is not specified.

E. Non-metallic conduit, minimum schedule 40 PVC, shall be permitted to be installed underground. Non-metallic conduit shall not be used in any environmental air plenum. If PVC conduit is run, a full-sized grounding conductor shall be pulled with the circuit conductors. PVC conduit shall not be run exposed. Where PVC conduit is run underground, it shall be encased in concrete or run minimum 24" below grade, or at the depth below grade shown on the drawings.

F. Flexible metallic tubing and EMT shall only be permitted in spaces above finished ceilings and within enclosed walls within the interior of buildings. Flexible metallic tubing shall only be permitted for the final four (4) feet of conduit runs to fixtures located above finished ceilings. No flexible metallic tubing or EMT will be permitted exposed. Also, EMT may not be installed in or below concrete slabs.

G. Flexible metal conduit or liquid-tight flexible metal conduit shall be used for the final connection of runs to motors. Flexible conduit shall be at least twelve (12) inches, but not more than 48 inches long. Where used, an external grounding conductor shall be run with conduit unless conductor is made as a part of the conduit.

H. Conduits installed underground and used for communications system wiring shall be reviewed with the communications contractor prior to installation. As an example, conduits below the vapor barrier may require moisture proof wiring to comply with the structured connectivity solution or conduits may need to be installed above the vapor barrier to maintain connectivity

solution compliance. All conduit shall conform to the requirements of the data manufacturer's warranty and be accepted by the communications contractor.

3.5 CONDUIT - GENERAL

A. Fittings for rigid steel conduits shall be hot-dipped galvanized steel and shall be of a type especially designed and manufactured for their purpose. Fittings for EMT shall be die cast zinc type. Rigid conduit joints for single conduit runs shall be made with threaded fittings made tight with at least five threads fully engaged. Fittings for rigid non-metallic conduit shall be solvent welded.

B. Where they enter boxes or cabinets that do not have threaded hubs, conduits shall be secured in place with galvanized locknuts inside and outside the cabinet and shall have bushings inside. Conduits larger than 1-1/4 inch shall have galvanized locknuts and galvanized bushings.

C. All conduits shall be installed concealed or as indicated or scheduled on the drawings and shall be of sufficient size to accommodate the required number of insulated conductors including equipment grounding conductor where such grounding conductor is required or specified.

D. Conduit runs shall be straight; elbows and bends shall be uniform, symmetrical and free from dents or flattening. Exposed conduit shall be firmly supported on galvanized hangers; on brackets, hangers, or pipe straps; or by beam clamps. Conduit installed exposed shall be neatly aligned and run at right angles to the building walls or walls of the rooms in which they are installed. All exposed conduit shall be located to avoid all conflicts with architectural or mechanical components.

E. Pull boxes shall be installed as required to permit proper installation of conductors and expansion fittings installed where conduit runs cross building expansion joints.

F. Conduit shall be run no closer than six (6) inches to covering of hot water or steam piping except where crossings are unavoidable. Conduit shall be kept at least one (1) inch from crossing steam and hot water piping.

G. Conduit shall be held securely in place by hangers and fasteners of appropriate design and dimensions for the particular application. Support shall be such that no strain will be transmitted to outlet box and pull box supports. Wire shall not be used, with or without spring steel fasteners, clips or clamps, for the support of any conduit. Conduit shall not be supported by or attached to duct work unless specifically allowed otherwise.

H. Hangers and other fasteners shall be supported on solid masonry with inserts or expansion sleeves and bolts, on wood with wood screws, hollow masonry with toggle bolts, on steel with machine screws or welded threaded studs. Fastenings shall be proof tested by the Contractor for secure mounting.

I. All conduits shall be cut square and reamed at the ends. The conduit system shall be complete and cleaned before any conductors are installed. Open ends of all conduits shall be capped until conductors are installed. A non-metallic fish wire shall be installed in all empty conduits. Empty conduit shall remain capped.

J. Contractor shall refer to National Electrical Code Appendix C, Conduit and Tubing Fill Tables for Conductors and Fixture Wire of the Same Size. Contractor shall refer to the appropriate

table for the conduit and wire condition and shall install wiring in accordance with code requirements.

3.6 FLEXIBLE CONDUIT

A. Flexible metal conduit may be used for short final connections to equipment where permitted by governing codes. Flexible metal conduit shall be sized and supported in accordance with Article 350 of the NEC or more stringent local codes. A separate equipment-grounding conductor sized in accordance with NEC Table 250.122 shall be installed in flexible conduit unless exceptions are allowed by governing codes and if the fittings used are UL listed for the purpose.

B. Liquid-tight flexible metal conduit shall be used where flexible conduit is permitted and desired and conditions of installation, operation, or maintenance require protection from liquids, vapors, or solids and in other hazardous locations where specifically approved. Flexible conduit for all exterior motor connections shall be liquid tight. Liquid-tight flexible conduit shall be used with terminal fittings approved for the purpose.

3.7 FIRE-RATED WALL AND FLOOR THROUGH-PENETRATIONS

A. All fire-rated walls or floors penetrated by this Contractor shall be properly sealed with fire stopping materials. All floor through-penetrations shall be fire stopped with a light-weight mortar material. Wall through-penetrations shall be fire stopped with a non-hardening putty material. Contractor shall see that all penetrations are fire stopped and seals are inspected.

3.8 SUPPORTS AND FITTINGS

A. The Contractor shall furnish and install all supports for equipment under this contract. Supports shall be spaced at intervals of eight (8) feet maximum for rigid conduit and five (5) feet maximum for EMT and as necessary to obtain rigid support. Perforated strap supports will not be permitted.

B. All conduits shall be firmly secured with pipe clamps, conduit straps, or suspension hangers as appropriate. Fasten to steel with screws in tapped holes, to wood with wood screws, and to masonry with expansion anchors. Expansion anchors shall have a minimum pull out load of 1,200 pounds and an ultimate shear load of 1,950 pounds.

C. All conduit, fixtures, and accessories shall be rigidly supported to form a firm, well-braced installation.

D. Joints shall be made tight with standard galvanized or sheradized couplings; corners turned with fittings, elbows, or long radius bends.

E. Low voltage wiring installed above accessible ceilings shall be supported on J-hooks. J-hooks installed for communications system wiring shall not be used for other low voltage system wiring (fire alarm, security, EMS controls, etc.).

3.8 WEATHERPROOF EQUIPMENT

A. All disconnect switches, starters, and other electrical equipment located on the exterior of the building or exposed to the outside shall be enclosed in a rain-tight enclosure.

B. All lighting fixtures or other devices located on an exterior wall of the building shall be mounted on a flush-mounted, cast outlet box.

3.9 MOUNTING HEIGHTS

A. Unless otherwise noted on the drawings or required by the Engineer, the following mounting heights shall apply:

Toggle Switches	4'-0"
Receptacles	1'-6"
Panelboards	6'-0" to top
Safety Switches	5'-0" to top
Motor Control Equipment	5'-0" to top

B. Upon permission of the Engineer, mounting heights may be adjusted to simplify cutting of masonry units or to facilitate furniture and cabinet arrangements. Dimensions above refer to the centerline of the device unless noted otherwise.

3.10 HOUSE KEEPING PADS

A. All floor and ground mounted electrical equipment - panels, switchboards, motor control centers, transformers, etc. shall be installed with a reinforced concrete housekeeping pad, whether shown on the drawings or not. The pad shall extend 4” above either the finished floor or final grade (as applicable), have 45 degree chamfered edges, and be constructed of 3000psi concrete. The pad shall extend 3” beyond the edge of the respective electrical equipment.

END OF SECTION 26 05 00

SECTION 26 05 72 - OVERCURRENT PROTECTIVE DEVICE SHORT-CIRCUIT STUDY

STATE OF LOUISIANA
MICHAEL LEE TERRY, III
LICENSE NO. 42812
PROFESSIONAL ENGINEER IN ELECTRICAL ENGINEERING
02/24/2023

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes a computer-based, fault-current study to determine the minimum interrupting capacity of circuit protective devices.

1.3 DEFINITIONS

A. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

B. One-Line Diagram: A diagram which shows, by means of single lines and graphic symbols, the course of an electric circuit or system of circuits and the component devices or parts used therein.

C. Protective Device: A device that senses when an abnormal current flow exists and then removes the affected portion from the system.

D. SCCR: Short-circuit current rating.

E. Service: The conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served.

1.4 ACTION SUBMITTALS

A. Product Data: For computer software program to be used for studies.

B. Other Action Submittals: Submit the following after the approval of system protective devices submittals. Submittals shall be in digital form.

1. Short-circuit study input data, including completed computer program input data sheets.

2. Short-circuit study and equipment evaluation report; signed, dated, and sealed by a qualified professional engineer.

a. Submit study report for action prior to receiving final approval of the distribution equipment submittals. If formal completion of studies will cause delay in equipment manufacturing, obtain approval from Architect for preliminary submittal of sufficient study data to ensure that the selection of devices and associated characteristics is satisfactory.

b. Revised single-line diagram, reflecting field investigation results and results of short-circuit study.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Short-Circuit Study Specialist and Field Adjusting Agency.

B. Product Certificates: For short-circuit study software, certifying compliance with IEEE 399.

1.6 QUALITY ASSURANCE

A. Studies shall use computer programs that are distributed nationally and are in wide use. Software algorithms shall comply with requirements of standards and guides specified in this Section. Manual calculations are unacceptable.

B. Short-Circuit Study Software Developer Qualifications: An entity that owns and markets computer software used for studies, having performed successful studies of similar magnitude on electrical distribution systems using similar devices.

1. The computer program shall be developed under the charge of a licensed professional engineer who holds IEEE Computer Society's Certified Software Development Professional certification.

C. Short-Circuit Study Specialist Qualifications: Professional engineer in charge of performing the study and documenting recommendations, licensed in the state where Project is located. All elements of the study shall be performed under the direct supervision and control of this professional engineer.

D. Field Adjusting Agency Qualifications: An independent agency, with the experience and capability to adjust overcurrent devices and to conduct the testing indicated, that is a member company of the International Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 COMPUTER SOFTWARE

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. SKM Systems Analysis, Inc.

2. ETAP

B. Comply with IEEE 399 and IEEE 551.

C. Analytical features of fault-current-study computer software program shall have the capability to calculate "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.

D. Computer software program shall be capable of plotting and diagramming time-current-characteristic curves as part of its output.

2.2 SHORT-CIRCUIT STUDY REPORT CONTENTS

A. Executive summary.

B. Study descriptions, purpose, basis, and scope. Include case descriptions, definition of terms, and guide for interpretation of the computer printout.

C. One-line diagram, showing the following:

1. Protective device designations and ampere ratings.

2. Cable size and lengths.

3. Transformer kilovolt ampere (kVA) and voltage ratings.

4. Motor and generator designations and kVA ratings.

5. Switchgear, switchboard, motor-control center, and panelboard designations.

D. Comments and recommendations for system improvements, where needed.

E. Protective Device Evaluation:

1. Evaluate equipment and protective devices and compare to short-circuit ratings.

2. Tabulations of circuit breaker, fuse, and other protective device ratings versus calculated short-circuit duties.

3. For 600-V overcurrent protective devices, ensure that interrupting ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.

4. For devices and equipment rated for asymmetrical fault current, apply multiplication factors listed in the standards to 1/2-cycle symmetrical fault current.

5. Verify adequacy of phase conductors at maximum three-phase bolted fault currents; verify adequacy of equipment grounding conductors and grounding electrode conductors at maximum ground-fault currents. Ensure that short-circuit withstand ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.

F. Short-Circuit Study Input Data: As described in "Power System Data" Article in the Evaluations.

G. Short-Circuit Study Output:

1. Low-Voltage Fault Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:

a. Voltage.

b. Calculated fault-current magnitude and angle.

c. Fault-point X/R ratio.

d. Equivalent impedance.

2. Momentary Duty Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:

a. Voltage.

b. Calculated symmetrical fault-current magnitude and angle.

c. Fault-point X/R ratio.

d. Calculated asymmetrical fault currents:
1) Based on fault-point X/R ratio.
2) Based on calculated symmetrical value multiplied by 1.6.
3) Based on calculated symmetrical value multiplied by 2.7.

3. Interrupting Duty Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:

a. Voltage.

b. Calculated symmetrical fault-current magnitude and angle.

c. Fault-point X/R ratio.

d. No AC Decrement (NACD) ratio.

e. Equivalent impedance.

f. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a symmetrical basis.

g. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a total basis.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Obtain all data necessary for the conduct of the study.

1. Verify completeness of data supplied on the one-line diagram. Call any discrepancies to the attention of Engineer.

2. For equipment provided that is Work of this Project, use characteristics submitted under the provisions of action submittals and information submittals for this Project.

3. For relocated equipment and that which is existing to remain, obtain required electrical distribution system data by field investigation and surveys, conducted by qualified technicians and engineers. The qualifications of technicians and engineers shall be qualified as defined by NFPA 70E.

4. Obtain all arc flash information from the local utility in a timely manner. No extension of the contract time shall be permitted due to coordination with the local utility.

B. Gather and tabulate the following input data to support the short-circuit study. Comply with recommendations in IEEE 551 as to the amount of detail that is required to be acquired in the field. Field data gathering shall be under the direct supervision and control of the engineer in charge of performing the study, and shall be by the engineer or its representative who holds NETA ETT Level III certification or NICET Electrical Power Testing Level III certification.

1. Product Data for Project's overcurrent protective devices involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.

2. Obtain electrical power utility impedance at the service.

3. Power sources and ties.

4. For transformers, include kVA, primary and secondary voltages, connection type, impedance, X/R ratio, taps measured in percent, and phase shift.

5. For reactors, provide manufacturer and model designation, voltage rating, and impedance.

6. For circuit breakers and fuses, provide manufacturer and model designation. List type of breaker, type of trip, SCCR, current rating, and breaker settings.

7. Generator short-circuit current contribution data, including short-circuit reactance, rated kVA, rated voltage, and X/R ratio.

8. Busway manufacturer and model designation, current rating, impedance, lengths, and conductor material.

9. Motor horsepower and NEMA MG 1 code letter designation.

10. Cable sizes, lengths, number, conductor material and conduit material (magnetic or nonmagnetic).

3.2 SHORT-CIRCUIT STUDY

A. Perform study following the general study procedures contained in IEEE 399.

B. Calculate short-circuit currents according to IEEE 551.

C. Base study on the device characteristics supplied by device manufacturer.

D. The extent of the electrical power system to be studied is indicated on Drawings.

E. Begin short-circuit current analysis at the service, extending down to the system overcurrent protective devices as follows:

1. To normal system low-voltage load buses where fault current is 10 kA or less.

2. Exclude equipment rated 240-V ac or less when supplied by a single transformer rated less than 125 kVA.

F. Study electrical distribution system from normal and alternate power sources throughout electrical distribution system for Project. Study all cases of system-switching configurations and alternate operations that could result in maximum fault conditions.

G. The calculations shall include the ac fault-current decay from induction motors, synchronous motors, and asynchronous generators and shall apply to low- and medium-voltage, three-phase ac systems. The calculations shall also account for the fault-current dc decrement, to address the asymmetrical requirements of the interrupting equipment.

1. For grounded systems, provide a bolted line-to-ground fault-current study for areas as defined for the three-phase bolted fault short-circuit study.

H. Calculate short-circuit momentary and interrupting duties for a three-phase bolted fault at each of the following:

1. Electric utility's supply termination point.

2. Incoming switchgear.

3. Unit substation primary and secondary terminals.

4. Low-voltage switchgear.

5. Motor-control centers.

6. Control panels.

7. Standby generators and automatic transfer switches.

8. Branch circuit panelboards.

9. Disconnect switches.

3.3 ADJUSTING

A. Make minor modifications to equipment as required to accomplish compliance with short-circuit study.

3.4 DEMONSTRATION

A. Train Owner's operating and maintenance personnel in the use of study results.

END OF SECTION 26 05 72

SECTION 26 05 73 - OVERCURRENT PROTECTIVE DEVICE COORDINATION STUDY

STATE OF LOUISIANA
MICHAEL LEE TERRY, III
LICENSE NO. 42812
PROFESSIONAL ENGINEER IN ELECTRICAL ENGINEERING
02/24/2023

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes computer-based, overcurrent protective device coordination studies to determine overcurrent protective devices and to determine overcurrent protective device settings for selective tripping.

1.3 DEFINITIONS

A. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

B. One-Line Diagram: A diagram which shows, by means of single lines and graphic symbols, the course of an electric circuit or system of circuits and the component devices or parts used therein.

C. Protective Device: A device that senses when an abnormal current flow exists and then removes the affected portion from the system.

D. SCCR: Short-circuit current rating.

E. Service: The conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served.

1.4 ACTION SUBMITTALS

A. Product Data: For computer software program to be used for studies.

B. Other Action Submittals: Submit the following after the approval of system protective devices submittals. Submittals shall be in digital form.

1. Coordination-study input data, including completed computer program input data sheets.

2. Study and equipment evaluation reports.

3. Overcurrent protective device coordination study report; signed, dated, and sealed by a qualified professional engineer.

a. Submit study report for action prior to receiving final approval of the distribution equipment submittals. If formal completion of studies will cause delay in equipment manufacturing, obtain approval from Architect for preliminary

submittal of sufficient study data to ensure that the selection of devices and associated characteristics is satisfactory.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Coordination Study Specialist and Field Adjusting Agency.

B. Product Certificates: For overcurrent protective device coordination study software, certifying compliance with IEEE 399.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For the overcurrent protective devices to include in emergency, operation, and maintenance manuals.

1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
   a. The following parts from the Protective Device Coordination Study Report:
      1) One-line diagram.
      2) Protective device coordination study.
      3) Time-current coordination curves.
   b. Power system data.

1.7 QUALITY ASSURANCE

A. Studies shall use computer programs that are distributed nationally and are in wide use. Software algorithms shall comply with requirements of standards and guides specified in this Section. Manual calculations are unacceptable.

B. Coordination Study Software Developer Qualifications: An entity that owns and markets computer software used for studies, having performed successful studies of similar magnitude on electrical distribution systems using similar devices.
   1. The computer program shall be developed under the charge of a licensed professional engineer who holds IEEE Computer Society's Certified Software Development Professional certification.

C. Coordination Study Specialist Qualifications: Professional engineer in charge of performing the study and documenting recommendations, licensed in the state where Project is located. All elements of the study shall be performed under the direct supervision and control of this professional engineer.

D. Field Adjusting Agency Qualifications: An independent agency, with the experience and capability to adjust overcurrent devices and to conduct the testing indicated, that is a member company of the International Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 COMPUTER SOFTWARE DEVELOPERS

A. Software Developers:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

a. SKM Systems Analysis, Inc.

b. ETAP

B. Comply with IEEE 242 and IEEE 399.

C. Analytical features of device coordination study computer software program shall have the capability to calculate "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.

D. Computer software program shall be capable of plotting and diagramming time-current-characteristic curves as part of its output. Computer software program shall report device settings and ratings of all overcurrent protective devices and shall demonstrate selective coordination by computer-generated, time-current coordination plots.

1. Optional Features:

a. Arcing faults.

b. Simultaneous faults.

c. Explicit negative sequence.

d. Mutual coupling in zero sequence.

2.2 PROTECTIVE DEVICE COORDINATION STUDY REPORT CONTENTS

A. Executive summary.

B. Study descriptions, purpose, basis and scope. Include case descriptions, definition of terms and guide for interpretation of the computer printout.

C. One-line diagram, showing the following:

1. Protective device designations and ampere ratings.

2. Cable size and lengths.

3. Transformer kilovolt ampere (kVA) and voltage ratings.

4. Motor and generator designations and kVA ratings.

5. Switchgear, switchboard, motor-control center, and panelboard designations.

D. Study Input Data: As described in "Power System Data" Article.

E. Short-Circuit Study Output: As specified in "Short-Circuit Study Output" Paragraph in "Short-Circuit Study Report Contents" Article in Section 260572 "Overcurrent Protective Device Short-Circuit Study."

F. Protective Device Coordination Study:
   1. Report recommended settings of protective devices, ready to be applied in the field. Use manufacturer's data sheets for recording the recommended setting of overcurrent protective devices when available.

      a. Phase and Ground Relays:
         1) Device tag.
         2) Relay current transformer ratio and tap, time dial, and instantaneous pickup value
         3) Recommendations on improved relaying systems, if applicable.
      b. Circuit Breakers:
         1) Adjustable pickups and time delays (long time, short time, ground).
         2) Adjustable time-current characteristic.
         3) Adjustable instantaneous pickup.
         4) Recommendations on improved trip systems, if applicable.
      c. Fuses: Show current rating, voltage, and class.

G. Time-Current Coordination Curves: Determine settings of overcurrent protective devices to achieve selective coordination. Graphically illustrate that adequate time separation exists between devices installed in series, including power utility company's upstream devices. Prepare separate sets of curves for the switching schemes and for emergency periods where the power source is local generation. Show the following information:

   1. Device tag and title, one-line diagram with legend identifying the portion of the system covered.

   2. Terminate device characteristic curves at a point reflecting maximum symmetrical or asymmetrical fault current to which the device is exposed.

   3. Identify the device associated with each curve by manufacturer type, function, and, if applicable, tap, time delay, and instantaneous settings recommended.

   4. Plot the following listed characteristic curves, as applicable:

      a. Power utility's overcurrent protective device.

      b. Medium-voltage equipment overcurrent relays.

      c. Medium- and low-voltage fuses including manufacturer's minimum melt, total clearing, tolerance, and damage bands.

      d. Low-voltage equipment circuit-breaker trip devices, including manufacturer's tolerance bands.

e. Transformer full-load current, magnetizing inrush current, and ANSI through-fault protection curves.

f. Cables and conductors damage curves.

g. Ground-fault protective devices.

h. Motor-starting characteristics and motor damage points.

i. Generator short-circuit decrement curve and generator damage point.

j. The largest feeder circuit breaker in each motor-control center and panelboard.

5. Series rating on equipment allows the application of two series interrupting devices for a condition where the available fault current is greater than the interrupting rating of the downstream equipment. Both devices share in the interruption of the fault and selectivity is sacrificed at high fault levels. Maintain selectivity for tripping currents caused by overloads.

6. Provide adequate time margins between device characteristics such that selective operation is achieved.

7. Comments and recommendations for system improvements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine Project overcurrent protective device submittals for compliance with electrical distribution system coordination requirements and other conditions affecting performance. Devices to be coordinated are indicated on Drawings.

1. Proceed with coordination study only after relevant equipment submittals have been assembled. Overcurrent protective devices that have not been submitted and approved prior to coordination study may not be used in study.

3.2 PROTECTIVE DEVICE COORDINATION STUDY

A. Comply with IEEE 242 for calculating short-circuit currents and determining coordination time intervals.

B. Comply with IEEE 399 for general study procedures.

C. The study shall be based on the device characteristics supplied by device manufacturer.

D. The extent of the electrical power system to be studied is indicated on Drawings.

E. Begin analysis at the service, extending down to the system overcurrent protective devices as follows:

1. To normal system low-voltage load buses where fault current is 10 kA or less.

2. Exclude equipment rated 240-V ac or less when supplied by a single transformer rated less than 125 kVA.

F. Study electrical distribution system from normal and alternate power sources throughout electrical distribution system for Project. Study all cases of system-switching configurations and alternate operations that could result in maximum fault conditions.

G. Transformer Primary Overcurrent Protective Devices:

1. Device shall not operate in response to the following:

a. Inrush current when first energized.

b. Self-cooled, full-load current or forced-air-cooled, full-load current, whichever is specified for that transformer.

c. Permissible transformer overloads according to IEEE C57.96 if required by unusual loading or emergency conditions.

2. Device settings shall protect transformers according to IEEE C57.12.00, for fault currents.

H. Motor Protection:

1. Select protection for low-voltage motors according to IEEE 242 and NFPA 70.

2. Select protection for motors served at voltages more than 600 V according to IEEE 620.

I. Conductor Protection: Protect cables against damage from fault currents according to ICEA P-32-382, ICEA P-45-482, and protection recommendations in IEEE 242. Demonstrate that equipment withstands the maximum short-circuit current for a time equivalent to the tripping time of the primary relay protection or total clearing time of the fuse. To determine temperatures that damage insulation, use curves from cable manufacturers or from listed standards indicating conductor size and short-circuit current.

J. Generator Protection: Select protection according to manufacturer's written recommendations and to IEEE 242.

K. The calculations shall include the ac fault-current decay from induction motors, synchronous motors, and asynchronous generators and shall apply to low- and medium-voltage, three-phase ac systems. The calculations shall also account for the fault-current dc decrement, to address the asymmetrical requirements of the interrupting equipment.

1. For grounded systems, provide a bolted line-to-ground fault-current study for areas as defined for the three-phase bolted fault short-circuit study.

L. Calculate short-circuit momentary and interrupting duties for a three-phase bolted fault and single line-to-ground fault at each of the following:

1. Electric utility's supply termination point.

2. Switchgear.

3. Unit substation primary and secondary terminals.

4. Low-voltage switchgear.

5. Motor-control centers.

6. Standby generators and automatic transfer switches.

7. Branch circuit panelboards.

M. Protective Device Evaluation:

1. Evaluate equipment and protective devices and compare to short-circuit ratings.

2. Adequacy of switchgear, motor-control centers, and panelboard bus bars to withstand short-circuit stresses.

3.3 LOAD-FLOW AND VOLTAGE-DROP STUDY

A. Perform a load-flow and voltage-drop study to determine the steady-state loading profile of the system. Analyze power system performance two times as follows:

1. Determine load-flow and voltage drop based on full-load currents obtained in "Power System Data" Article.

2. Determine load-flow and voltage drop based on 80 percent of the design capacity of the load buses.

3. Prepare the load-flow and voltage-drop analysis and report to show power system components that are overloaded, or might become overloaded; show bus voltages that are less than as prescribed by NFPA 70.

3.4 MOTOR-STARTING STUDY

A. Perform a motor-starting study to analyze the transient effect of the system's voltage profile during motor starting. Calculate significant motor-starting voltage profiles and analyze the effects of the motor starting on the power system stability.

B. Prepare the motor-starting study report, noting light flicker for limits proposed by IEEE 141 and voltage sags so as not to affect the operation of other utilization equipment on the system supplying the motor.

3.5 POWER SYSTEM DATA

A. Obtain all data necessary for the conduct of the overcurrent protective device study.

1. Verify completeness of data supplied in the one-line diagram on Drawings. Call discrepancies to the attention of Engineer.

2. For new equipment, use characteristics submitted under the provisions of action submittals and information submittals for this Project.

3. For existing equipment, whether or not relocated obtain required electrical distribution system data by field investigation and surveys, conducted by qualified technicians and engineers. The qualifications of technicians and engineers shall be qualified as defined by NFPA 70E.

B. Gather and tabulate the following input data to support coordination study. The list below is a guide. Comply with recommendations in IEEE 551 for the amount of detail required to be acquired in the field. Field data gathering shall be under the direct supervision and control of the engineer in charge of performing the study, and shall be by the engineer or its representative who holds NETA ETT Level III certification or NICET Electrical Power Testing Level III certification.

1. Product Data for overcurrent protective devices specified in other Sections and involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.

2. Electrical power utility impedance at the service.

3. Power sources and ties.

4. Short-circuit current at each system bus, three phase and line-to-ground.

5. Full-load current of all loads.

6. Voltage level at each bus.

7. For transformers, include kVA, primary and secondary voltages, connection type, impedance, X/R ratio, taps measured in percent, and phase shift.

8. For reactors, provide manufacturer and model designation, voltage rating, and impedance.

9. For circuit breakers and fuses, provide manufacturer and model designation. List type of breaker, type of trip and available range of settings, SCCR, current rating, and breaker settings.

10. Generator short-circuit current contribution data, including short-circuit reactance, rated kVA, rated voltage, and X/R ratio.

11. For relays, provide manufacturer and model designation, current transformer ratios, potential transformer ratios, and relay settings.

12. Maximum demands from service meters.

13. Busway manufacturer and model designation, current rating, impedance, lengths, and conductor material.

14. Motor horsepower and NEMA MG 1 code letter designation.

15. Low-voltage cable sizes, lengths, number, conductor material, and conduit material (magnetic or nonmagnetic).

16. Medium-voltage cable sizes, lengths, conductor material, and cable construction and metallic shield performance parameters.

17. Data sheets to supplement electrical distribution system diagram, cross-referenced with tag numbers on diagram, showing the following:

    a. Special load considerations, including starting inrush currents and frequent starting and stopping.

    b. Transformer characteristics, including primary protective device, magnetic inrush current, and overload capability.

    c. Motor full-load current, locked rotor current, service factor, starting time, type of start, and thermal-damage curve.

    d. Generator thermal-damage curve.

    e. Ratings, types, and settings of utility company's overcurrent protective devices.

    f. Special overcurrent protective device settings or types stipulated by utility company.

    g. Time-current-characteristic curves of devices indicated to be coordinated.

    h. Manufacturer, frame size, interrupting rating in amperes rms symmetrical, ampere or current sensor rating, long-time adjustment range, short-time adjustment range, and instantaneous adjustment range for circuit breakers.

    i. Manufacturer and type, ampere-tap adjustment range, time-delay adjustment range, instantaneous attachment adjustment range, and current transformer ratio for overcurrent relays.

    j. Panelboards, switchboards, motor-control center ampacity, and SCCR in amperes rms symmetrical.

    k. Identify series-rated interrupting devices for a condition where the available fault current is greater than the interrupting rating of the downstream equipment. Obtain device data details to allow verification that series application of these devices complies with NFPA 70 and UL 489 requirements.

3.6 FIELD ADJUSTING

A. Adjust relay and protective device settings according to the recommended settings provided by the coordination study. Field adjustments shall be completed by the engineering service division of the equipment manufacturer under the Startup and Acceptance Testing contract portion.

B. Make minor modifications to equipment as required to accomplish compliance with short-circuit and protective device coordination studies.

C. Testing and adjusting shall be by a full-time employee of the Field Adjusting Agency, who holds NETA ETT Level III certification or NICET Electrical Power Testing Level III certification.

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters. Perform NETA tests and inspections for all adjustable overcurrent protective devices.

3.7 DEMONSTRATION

A. Engage the Coordination Study Specialist to train Owner's maintenance personnel in the following:

1. Acquaint personnel in the fundamentals of operating the power system in normal and emergency modes.

2. Hand-out and explain the objectives of the coordination study, study descriptions, purpose, basis, and scope. Include case descriptions, definition of terms, and guide for interpreting the time-current coordination curves.

3. Adjust, operate, and maintain overcurrent protective device settings.

END OF SECTION 26 05 73

SECTION 26 05 74 - OVERCURRENT PROTECTIVE DEVICE ARC-FLASH STUDY

STATE OF LOUISIANA
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LICENSE NO. 42812
PROFESSIONAL ENGINEER IN ELECTRICAL ENGINEERING
02/24/2023

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes a computer-based, arc-flash study to determine the arc-flash hazard distance and the incident energy to which personnel could be exposed during work on or near electrical equipment.

1.3 DEFINITIONS

A. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

B. One-Line Diagram: A diagram which shows, by means of single lines and graphic symbols, the course of an electric circuit or system of circuits and the component devices or parts used therein.

C. Protective Device: A device that senses when an abnormal current flow exists and then removes the affected portion from the system.

D. SCCR: Short-circuit current rating.

E. Service: The conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served.

1.4 ACTION SUBMITTALS

A. Product Data: For computer software program to be used for studies.

B. Other Action Submittals: Submit the following submittals after the approval of system protective devices submittals. Submittals shall be in digital form.

1. Arc-flash study input data, including completed computer program input data sheets.

2. Arc-flash study report; signed, dated, and sealed by a qualified professional engineer.

a. Submit study report for action prior to receiving final approval of the distribution equipment submittals. If formal completion of studies will cause delay in equipment manufacturing, obtain approval from Architect for preliminary submittal of sufficient study data to ensure that the selection of devices and associated characteristics is satisfactory.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Arc-Flash Study Specialist and Field Adjusting Agency.

B. Product Certificates: For arc-flash hazard analysis software, certifying compliance with IEEE 1584 and NFPA 70E.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance procedures according to requirements in NFPA 70E shall be provided in the equipment manuals.

B. Operation and Maintenance Procedures: In addition to items specified in Section 017823 "Operation and Maintenance Data," provide maintenance procedures for use by Owner's personnel that comply with requirements in NFPA 70E.

1.7 QUALITY ASSURANCE

A. Studies shall use computer programs that are distributed nationally and are in wide use. Software algorithms shall comply with requirements of standards and guides specified in this Section. Manual calculations are unacceptable.

B. Arc-Flash Study Software Developer Qualifications: An entity that owns and markets computer software used for studies, having performed successful studies of similar magnitude on electrical distribution systems using similar devices.

1. The computer program shall be developed under the charge of a licensed professional engineer who holds IEEE Computer Society's Certified Software Development Professional certification.

C. Arc-Flash Study Specialist Qualifications: Professional engineer in charge of performing the study, analyzing the arc flash, and documenting recommendations, licensed in the state where Project is located. All elements of the study shall be performed under the direct supervision and control of this professional engineer.

D. Field Adjusting Agency Qualifications: An independent agency, with the experience and capability to adjust overcurrent devices and to conduct the testing indicated, that is a member company of the International Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 COMPUTER SOFTWARE DEVELOPERS

A. Software Developers:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
   a. SKM Systems Analysis, Inc.

b. ETAP

B. Comply with IEEE 1584 and NFPA 70E.

C. Analytical features of device coordination study computer software program shall have the capability to calculate "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.

2.2 ARC-FLASH STUDY REPORT CONTENT

A. Executive summary.

B. Study descriptions, purpose, basis and scope.

C. One-line diagram, showing the following:

1. Protective device designations and ampere ratings.

2. Cable size and lengths.

3. Transformer kilovolt ampere (kVA) and voltage ratings.

4. Motor and generator designations and kVA ratings.

5. Switchgear, switchboard, motor-control center and panelboard designations.

D. Study Input Data: As described in "Power System Data" Article.

E. Short-Circuit Study Output: As specified in "Short Circuit Study Output" Paragraph in "Short-Circuit Study Report Contents" Article in Section 260572 "Overcurrent Protective Device Short-Circuit Study."

F. Protective Device Coordination Study Report Contents: As specified in "Protective Device Coordination Study Report Contents" Article in Section 260573 "Overcurrent Protective Device Coordination Study."

G. Arc-Flash Study Output:

1. Interrupting Duty Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:

a. Voltage.

b. Calculated symmetrical fault-current magnitude and angle.

c. Fault-point X/R ratio.

d. No AC Decrement (NACD) ratio.

e. Equivalent impedance.

f. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a symmetrical basis.

g. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a total basis

H. Incident Energy and Flash Protection Boundary Calculations:

1. Arcing fault magnitude with and without required Arc Energy Reduction methods.

2. Protective device clearing time.

3. Duration of arc.

4. Arc-flash boundary.

5. Working distance.

6. Incident energy.

7. Hazard risk category.

8. Recommendations for arc-flash energy reduction.

I. Fault study input data, case descriptions, and fault-current calculations including a definition of terms and guide for interpretation of the computer printout.

2.3 ARC-FLASH WARNING LABELS

A. Comply with requirements in Section 260553 "Identification for Electrical Systems." Produce a 3.5-by-5-inch thermal transfer label of high-adhesion polyester for each work location included in the analysis.

B. The label shall have an orange header with the wording, "WARNING, ARC-FLASH HAZARD," and shall include the following information taken directly from the arc-flash hazard analysis:

1. Location designation.

2. Nominal voltage.

3. Flash protection boundary.

4. Hazard risk category.

5. Incident energy.

6. Working distance.

7. Engineering report number, revision number, and issue date.

C. Labels shall be machine printed, with no field-applied markings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine Project overcurrent protective device submittals. Proceed with arc-flash study only after relevant equipment submittals have been assembled. Overcurrent protective devices that have not been submitted and approved prior to arc-flash study may not be used in study.

3.2 ARC-FLASH HAZARD ANALYSIS

A. Comply with NFPA 70E and its Annex D for hazard analysis study.

B. Preparatory Studies:

1. Protective Device Coordination Study Report Contents: As specified in "Protective Device Coordination Study Report Contents" Article in Section 16402 "Overcurrent Protective Device Coordination Study."

C. Calculate maximum and minimum contributions of fault-current size.

1. The minimum calculation shall assume that the utility contribution is at a minimum and shall assume no motor load.

2. The maximum calculation shall assume a maximum contribution from the utility and shall assume motors to be operating under full-load conditions.

D. Calculate the arc-flash protection boundary and incident energy at locations in the electrical distribution system where personnel could perform work on energized parts.

E. Include medium- and low-voltage equipment locations, except equipment rated 240-V ac or less fed from transformers less than 125 kVA.

F. Safe working distances shall be specified for calculated fault locations based on the calculated arc-flash boundary, considering incident energy of 1.2 cal/sq.cm.

G. Incident energy calculations shall consider the accumulation of energy over time when performing arc-flash calculations on buses with multiple sources. Iterative calculations shall take into account the changing current contributions, as the sources are interrupted or decremented with time. Fault contribution from motors and generators shall be decremented as follows:

1. Fault contribution from induction motors should not be considered beyond three to five cycles.

2. Fault contribution from synchronous motors and generators should be decayed to match the actual decrement of each as closely as possible (e.g., contributions from permanent magnet generators will typically decay from 10 per unit to three per unit after 10 cycles).

H. Arc-flash computation shall include both line and load side of a circuit breaker as follows:

1. When the circuit breaker is in a separate enclosure.

2. When the line terminals of the circuit breaker are separate from the work location.

I. Base arc-flash calculations on actual overcurrent protective device clearing time. Cap maximum clearing time at two seconds based on IEEE 1584, Section B.1.2.

3.3 POWER SYSTEM DATA

A. Obtain all data necessary for the conduct of the arc-flash hazard analysis.

1. Verify completeness of data supplied on the one-line diagram on Drawings and under "Preparatory Studies" Paragraph in "Arc-Flash Hazard Analysis" Article. Call discrepancies to the attention of Engineer.

2. For new equipment, use characteristics submitted under the provisions of action submittals and information submittals for this Project.

3. For existing equipment, whether or not relocated, obtain required electrical distribution system data by field investigation and surveys, conducted by qualified technicians and engineers.

B. Electrical Survey Data: Gather and tabulate the following input data to support study. Comply with recommendations in IEEE 1584 and NFPA 70E as to the amount of detail that is required to be acquired in the field. Field data gathering shall be under the direct supervision and control of the engineer in charge of performing the study, and shall be by the engineer or its representative who holds NETA ETT Level III certification or NICET Electrical Power Testing Level III certification.

1. Product Data for overcurrent protective devices specified in other Sections and involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.

2. Obtain electrical power utility impedance at the service.

3. Power sources and ties.

4. Short-circuit current at each system bus, three phase and line-to-ground.

5. Full-load current of all loads.

6. Voltage level at each bus.

7. For transformers, include kVA, primary and secondary voltages, connection type, impedance, X/R ratio, taps measured in per cent, and phase shift.

8. For reactors, provide manufacturer and model designation, voltage rating and impedance.

9. For circuit breakers and fuses, provide manufacturer and model designation. List type of breaker, type of trip and available range of settings, SCCR, current rating, and breaker settings.

10. Generator short-circuit current contribution data, including short-circuit reactance, rated kVA, rated voltage, and X/R ratio.

11. For relays, provide manufacturer and model designation, current transformer ratios, potential transformer ratios, and relay settings.

12. Busway manufacturer and model designation, current rating, impedance, lengths, and conductor material.

13. Motor horsepower and NEMA MG 1 code letter designation.

14. Low-voltage cable sizes, lengths, number, conductor material and conduit material (magnetic or nonmagnetic).

15. Medium-voltage cable sizes, lengths, conductor material, and cable construction and metallic shield performance parameters.

3.4 LABELING

A. Apply one arc-flash label for 600-V ac, 480-V ac, and applicable 208-V ac panelboards and disconnects and for each of the following locations:

1. Motor-control center.

2. Low-voltage switchboard.

3. Switchgear.

4. Medium-voltage switch.

5. Control panel.

3.5 APPLICATION OF WARNING LABELS

A. Install the arc-fault warning labels under the direct supervision and control of the Arc-Flash Study Specialist.

3.6 DEMONSTRATION

A. Engage the Arc-Flash Study Specialist to train Owner's maintenance personnel in the potential arc-flash hazards associated with working on energized equipment and the significance of the arc-flash warning labels.

END OF SECTION 26 05 74

SECTION 26 20 00 - SERVICE AND DISTRIBUTION

STATE OF LOUISIANA
MICHAEL LEE TERRY, III
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PROFESSIONAL ENGINEER IN ELECTRICAL ENGINEERING
02/24/2023

PART 1 - GENERAL

1.1 SYSTEM VOLTAGE

A. The building service from the service entrance rack shall be 120/240V, 1 phase, 3 wire and shall be converted to 120/240V, 3 phase, 4 wire via a phase converter.

1.2 TERMINATIONS

A. All wiring shall be sized based on 75°C rated conductors. All connectors shall be rated for 75°C in accordance with N.E.C. Article 110-14 requirements.

PART 2 - PRODUCTS

2.1 SAFETY SWITCHES

A. Furnish and install safety switches as shown on the Drawings. All switches shall be fused NEMA Heavy Duty Type HD and Underwriter's Laboratories listed. All switches shall have blades that are fully visible in the "OFF" position with the door open. Switches shall be dead-front construction with permanently attached arc suppressers. Lugs shall be UL listed for copper and aluminum conductor and front removable. All current carrying parts shall be plated to resist corrosion. Switches shall be quick-make, quick-break type. During operation of the switch, the movable contacts shall not be able to be restrained by the handle once the closing or the opening action of the contacts has been initiated. Switches shall have cover interlocks to prevent opening of the switch door while the switch is in the "ON" position or closing the switch with the door open. Switch shall have padlocking capabilities in the "OFF" position.

B. Safety switches shall be rated 600 volts for 480 volt service and rated 240 volts for 208 volt service. Switches shall be motor rated when used for motor loads. Switches shall be NEMA 1 enclosed for indoor applications and NEMA 3R for outdoor or wet area locations.

C. Switches used for service entrance shall be service entrance rated. Safety switches shall be furnished complete with fuses.

D. Safety switches shall be Square D Heavy Duty Class 3110 type, Eaton Heavy Duty type, or prior approved equal.

2.2 FUSES

A. All fuse holders shall be provided with dual-element, time-lag fuses as scheduled on the Drawings or as recommended by the equipment manufacturer. Fuses shall be rated 200,000 AIC. Fuses shall be Buss Fusetron, Economy Econ, or Gould Shawmut Tri-Onic for component protection and Buss Limitron, Economy Econolin, or Gould Shawmut Amp-Trap for circuit protection.

2.3 CIRCUIT BREAKER PANELBOARDS

A. Panelboards shall be sized as shown on the drawings and schedules, and shall be the bolted breaker panelboard type. Panelboards shall have copper bussing and solid neutral busses. Panelboards shall have door-in-door trim.

B. All branch breakers are to be quick-make, quick-break (over center toggle device) with trip indication and common trip on all multiple breakers. Trip indication shall be clearly shown by breaker handle taking a position between "ON" and "OFF" position. Breakers shall be ambient compensated to carry full NEC load in 120 degree F room temperature. Panelboards shall have distributed phase busing throughout. Any two adjacent single pole breakers shall be replaceable by a two pole breaker, and any three adjacent single pole breakers shall be replaceable by a three pole breaker. 277/480 volt panelboards shall use E-frame branch breakers and 120/208 volt panelboards shall use QOB-type branch breakers.

C. Minimum interrupting capacity of breakers shall be as shown on panel schedules. No breakers shall be rated less than 10,000 RMS symmetrical amperes.

D. Branch breakers shall be numbered 1, 3, 5, etc. from top to bottom beginning at the top of the left hand column so that #1 shall be on phase A, #3 on phase B, and #5 on phase C.

E. All breakers shall be bolt on type. Panelboards for 120/208 volt or 120/240 volt service shall be Square D type NQ, Eaton Pow-R-Line series, or prior approved equal. Panelboards for 480/277 volt service shall be Square D type NF, Eaton Pow-R-Line series, or prior approved equal.

2.4 PHASE CONVERTERS

A. Contractor shall install phase converter in the size and at the location as shown on the Drawings. Phase converter will be used to convert the electrical service from single phase to three phase. Converters shall be UL listed and shall be furnished with a NEMA 3R enclosure from the manufacturer.

B. Converters shall be rotary type and shall have a voltage balance of +/- 2% to 5%. Converters shall have phase power failure protection and shall be included with a power “ON” indicator light.

C. Converters shall be floor mounted on isolation pads. Enclosure shall be heavy gauge steel with ventilation openings protected against falling dirt and drip, and shall be shielded against actual touching of live parts. A nameplate in accordance with NEMA standards shall be permanently affixed to the enclosure.

D. Phase converters shall be North America Phase Co. UL-100-EER or prior approved equal.

2.5 MANUAL TRANSFER SWITCHES

A. Manual transfer switches shall be non-fused type, furnished with a factory installed bondable neutral, and suitable for use as service entrance. Switches shall be dead-front construction with permanently attached arc suppressers. Switch shall be UL listed for use in accordance with Article 702 of the National Electrical Code. Lugs shall be UL listed for copper and aluminum conductor and front removable. All current carrying parts shall be plated to resist corrosion. All 240 volt rated switches shall be load make/break and continuous duty rated for their

nameplate ampere value and rated for switching HP loads as noted. All 600 volt rated switches shall be continuous duty rated for their nameplate ampere value and rated for switching HP loads as noted. During operation of the switch, the movable contacts shall not be able to be restrained by the handle once the closing or the opening action of the contacts has been initiated. Switches shall have dual cover interlocks to prevent opening of the switch door while the switch is in the "ON" position or closing the switch with the door open. Switch shall have padlocking capabilities in the "OFF" position.

B. Safety switches shall be rated 600 volts for 480-volt service and rated 240 volts for 208-volt service. Switches shall be NEMA 1 enclosed for indoor applications and NEMA 3R for outdoor or wet area locations.

C. Switches used for service entrance shall be service entrance rated and furnished with grounding kit.

D. Manual transfer switches shall be Square D Double Throw Class 3140 type, or prior approved equal.

PART 3 - EXECUTION

3.1 COORDINATION

A. Contractor shall coordinate all service and distribution work with other crafts on the project.

3.2 TEST AND BALANCING

A. At such times as the Architect directs, the Contractor shall conduct in the Architect's presence operating tests to demonstrate the electrical systems are installed and will operate properly and in accordance with the requirements of the specifications. The Contractor shall furnish instruments and personnel required for such tests. Any work that is found to be defective, or material that are found to vary from the requirements of the drawings or specifications shall be replaced by the Contractor without additional cost of the Owner.

3.3 EMERGENCY CIRCUITS

A. All wiring for emergency power and lighting circuits shall be run in conduits independent of all other circuits or conductors. Emergency circuit installations shall be made in accordance with National Electrical Code Article 700.9.

3.4 EQUIPMENT FUSING

A. All equipment shall be furnished complete with fuses as described herein and/or as shown on the Drawings. Contractor shall furnish one set of spare fuses for each size fuse furnished on the project. Fuses shall be delivered to Owner prior to acceptance of project.

B. Fusing for protective equipment shall be of the type specifically designed for the intended application. Fuses for service entrance rated equipment shall be Class L. Fuses for branch circuit protection shall be Class RK5 unless specified otherwise. Provide protective fuses as specifically required by the equipment manufacturer.

3.5 INSTALLATION

A. The Electrical Contractor shall place a sign at the Main Switchboard indicating the type and location of the emergency generator in accordance with National Electrical Code Article 702.8(A) requirements.

B. Disconnecting means shall be provided for each motor and motor controller, and shall be located within site from the controller and motor locations in accordance with National Electrical Code Article 430.102 requirements.

END OF SECTION 26 20 00

SECTION 26 43 00 - SURGE PROTECTION DEVICES FOR LOW-VOLTAGE ELECTRICAL POWER CIRCUITS

STATE OF LOUISIANA
MICHAEL LEE TERRY, III
LICENSE NO. 42812
PROFESSIONAL ENGINEER IN ELECTRICAL ENGINEERING
02/24/2023

PART 1 - GENERAL

1.1 SCOPE

A. This section describes the materials and installation requirements for surge protective devices (SPD) for the protection of all AC electrical circuits.

1.2 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section. Other sections that may relate to the work in this section include, but are not limited to, the following:

1. Section 26 05 00 – Basic Electrical Materials and Methods

1.3 SUBMITTALS

A. Submit shop drawings and product information for approval and final documentation in the quantities listed according to the Conditions of the Contract. Customer name, customer location, and customer order number shall identify all transmittals.

B. Submittals shall include UL 1449 3rd Edition Listing documentation verifiable by visiting www.UL.com, clicking “Certifications” link, searching using UL Category Code: VZCA.

1. Short Circuit Current Rating (SCCR)

2. Voltage Protection Ratings (VPRs) for all modes

3. Maximum Continuous Operating Voltage rating (MCOV)

4. I-nominal rating (I-n)

5. SPD shall be Type 1 UL listed and labeled

C. Upon request, an unencapsulated but complete SPD formally known as TVSS shall be presented for visual inspection.

D. Minimum of ten (10) year warranty

1.4 RELATED STANDARDS

A. The following codes and standards shall be referenced:

1. IEEE C62.41.1, IEEE Guide on the Surge Environment in Low-Voltage (1000 V and Less) AC Power Circuits,

2. IEEE C62.41.2, IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and Less) AC Power Circuits,

3. IEEE C62.45, IEEE Recommended Practice on Surge Testing for Equipment Connected to Low-Voltage (1000 V and Less) AC Power Circuits.

4. National Electrical Code: Article 285

5. UL 1283 - Electromagnetic Interference Filters

6. UL 1449, Third Edition, effective September 29, 2009 – Surge Protective Devices

1.5 LISTING REQUIREMENTS

A. SPD shall bear the UL Mark and shall be Listed to most recent editions of UL 1449 and UL 1283. "Manufactured in accordance with" is not equivalent to UL listing and does not meet the intent of this specification.

B. SPD and performance parameters shall be posted at www.UL.com under Category Code: VZCA. Products or parameters without posting at UL.com shall not be approved.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Engage a firm with at least ten (10) years' experience in manufacturing transient voltage surge suppressors.

B. Manufacturer shall be ISO 9001 or 9002 certified.

C. The manufacturer of this equipment shall have produced similar electrical equipment for a minimum period of five (10) years. When requested by the Engineer, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.

D. The SPD shall be compliant with the Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC.

1.7 DELIVERY, STORAGE AND HANDLING

A. Handle and store equipment in accordance with manufacturer's Installation and Maintenance Manuals. One (1) copy of this document to be provided with the equipment at time of shipment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Provide internally mounted transient voltage suppressors as described herein.

B. Manufacturer and/or manufacturer's model number listed in this Specification are used to establish general style, type, character, and quality of product desired. Similar items

manufactured by manufacturers other than those listed will be considered, providing submittals are made according to Pre-Bid Approval requirements of Instructions to Bidders.

C. Where no manufacturer or model number are given, any product meeting performance or design criteria, or referenced trade association standard may be used and Pre-Bid Approval is not required.

D. Subject to compliance with the specified requirements, provide products by one of the following manufacturers:
Advanced Protection Technologies
Eaton

2.2 SURGE PROTECTIVE DEVICE FEATURES

A. SPD shall be UL 1449 labeled with 200kA Short Circuit Current Rating (SCCR). Fuse ratings shall not be considered in lieu of demonstrated withstand testing of SPD, per NEC 285.6.

B. SPD shall be UL 1449 labeled as Type 1 intended for use without need for external or supplemental overcurrent controls. Internal overcurrent and thermal overtemperature controls shall protect every suppression component of every mode, including N-G. SPDs relying upon external or supplementary installed safety disconnectors do not meet the intent of this specification.

C. SPD shall be UL 1449 labeled with 20kA I-nominal (I-n) (verifiable at UL.com) for compliance to UL 96A Lightning Protection Master Label and NFPA 780.

D. Suppression components shall be heavy duty 'large block' MOVs, each exceeding 30mm diameter.

E. Standard 7 Mode Protection paths: SPD shall provide surge current paths for all modes of protection: L-N, L-G, L-L, and N-G for Wye systems; L-L, L-G in Delta and impedance grounded Wye systems.

F. If a dedicated breaker for the SPD is not provided in the switchboard, the service entrance SPD shall include an integral UL Recognized disconnect switch. A dedicated breaker shall serve as a means of disconnect for distribution SPD's.

G. SPD shall meet or exceed the following criteria:

1. Minimum surge current capability (single pulse rated) per phase shall be:

a. Service Entrance applications:
Eaton Model SPD300 Series with Maximum surge current capability of 300kA per phase.
Advanced Protection Technologies Model TE_XAS30 series with Maximum 7-Mode surge current capability of 300kA per phase.

b. Distribution applications:
Eaton Model SPD200 Series with Maximum surge current capability of 200kA per phase.

Advanced Protection Technologies Model TE_XAS20 series with Maximum surge current capability of 200kA per phase

c. Branch Panel applications:
Eaton Model SPD100 Series with Maximum surge current capability of 100kA per phase.
Advanced Protection Technologies Model TE_XDS104 series with Maximum surge current capability of 100kA per phase

2. UL 1449 Listed Voltage Protection Ratings (VPRs) shall not exceed the following:

VOLTAGE	L-N	L-G	N-G
208Y/120V	700V	700V	700V
480Y/277V	1500V	1500V	1500V

H. UL 1449 Listed Maximum Continuous Operating Voltage (MCOV) (verifiable at UL.com):

System Voltage	Allowable System Voltage Fluctuation (%)	MCOV
208Y/120	25%	150V
480Y/277V	20%	320V

I. SPD shall include a serviceable, replaceable module (excluding Distribution).

J. Service Entrance SPD shall have UL 1283 EMI/RFI filtering with minimum attenuation of -50dB at 100kHz.

K. SPD shall have a warranty for a period of ten (10) years, incorporating unlimited replacements of suppressor parts if they are destroyed by transients during the warranty period.

L. Service Entrance SPDs shall be equipped with the following diagnostics:

1. Visual LED diagnostics including a minimum of one green LED indicator per phase, and one red service LED.

2. Audible alarm with on/off silence function and diagnostic test function (excluding branch).

3. Form C dry contacts

4. Surge Counter

5. No other test equipment shall be required for SPD monitoring or testing before or after installation.

M. Distribution Panels and Branch Panels SPDs shall be equipped with the following diagnostics:

1. Visual LED diagnostics including a minimum of one green LED indicator per phase, and one red service LED.

2. No other test equipment shall be required for SPD monitoring or testing before or after installation.

N. Surge protection devices installed for individual equipment items shall meet or exceed the following criteria:

1. Minimum surge current capability (single pulse rated) per phase shall be:

a. Advanced Protection Technologies Model S50A series with dry contact and surge current capability shall be 50kA per phase.

2. UL 1449 Listed Voltage Protection Ratings (VPRs) shall not exceed the following:

VOLTAGE	L-N	L-G	N-G
208Y/120V	600V	1000V	1000V
480Y/277V	1200V	2000V	1000V

3. UL 1449 Listed Maximum Continuous Operating Voltage (MCOV) (verifiable at UL.com):

System Voltage	Allowable System Voltage Fluctuation (%)	MCOV
208Y/120	25%	150V
480Y/277V	20%	320V

4. Furnished with NEMA 4X Polycarbonate enclosure.

PART 3 - EXECUTION

3.1 INSTALLATION

A. The installation shall meet the following criteria:

1. Install per manufacturer's recommendations and contract documents.

2. Install units plumb, level and rigid without distortion

3. One primary suppressor shall be installed internal to the service entrance in accordance with manufacturer instructions.

4. Service Entrance SPD shall be installed on the line or load side of the main service disconnect.

5. Service Entrance SPD ground shall be bonded to the service entrance ground.

6. At Service Entrance or Transfer Switch, a UL approved disconnect switch shall be provided as a means of servicing disconnect if a 60A breaker is not available.

7. One SPD shall be installed internal to each designated distribution panelboard.

8. At Distribution, MCC and Branch, TVSS shall have an independent means of servicing disconnect such that the protected panel remains energized. A 30A breaker (or larger) may serve this function.

9. SPD shall be installed per manufacturer's installation instructions with lead lengths as short (less than 24") and straight as possible. Gently twist conductors together.

10. Installer may reasonably rearrange breaker locations to ensure short & straightest possible leads to SPDs.

11. Before energizing, installer shall verify service and separately derived system Neutral to Ground bonding jumpers per NEC.

3.2 ADJUSTMENTS AND CLEANING

A. Remove debris from SPD and wipe dust and dirt from all components.

B. Repaint marred and scratched surfaces with touch up paint to match original finish.

3.3 TESTING

A. Check tightness of all accessible mechanical and electrical connections to assure they are torqued to the minimum acceptable manufacture's recommendations.

B. Check all installed panels for proper grounding, fastening and alignment.

3.4 WARRANTY

A. Equipment manufacturer warrants that all goods supplied are free of non-conformities in workmanship and materials for one year from date of initial operation, but not more than eighteen months from date of shipment.

END OF SECTION 26 43 00

SECTION 26 50 00 - LIGHTING

STATE OF LOUISIANA
MICHAEL LEE TERRY, III
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PROFESSIONAL ENGINEER IN ELECTRICAL ENGINEERING
02/24/2023

PART 1 - GENERAL

1.1 LIGHTING SCHEDULE

A. The Contractor shall install lighting fixtures and accessories as shown on the drawings and/or described herein. The Contractor shall also install lamps for all fixtures.

PART 2 - PRODUCTS

2.1 LED LIGHTING

A. Lighting fixtures with LED light sources shall meet the following fixture and light source requirements:

1. LED Color Temperature – Neutral White (NW), 4000K nom., CRI > 70

2. Line Voltage – Universal Voltage 120-277 volts

3. Governmental Standards – LM79 and LM80 Compliant

4. Expected Lamp Life – LED Life Rating (L_{70} B_{10}) to be 60,000 hours to 100,000 hours; Defined as time of operation (in hours) to 30% lumen depreciation (i.e. 70% lumen maintenance), derived from Luminaire in-situ temperature measurement testing (i.e. LED chip package temperature (T_S) measurement obtained with the LED chip package operating in given luminaire and in a given stabilized ambient environment) under UL1598 environments and directly correlated to LED package manufacturers IESNA LM-80-08 data. Predicted (L_{70} B_{10}) Limits (@ 25°C luminaire ambient operating environment): Greater than 60,000 hours @ 350mA Drive Current

5. Driver – Components must be fully encased in potting material for moisture resistance, and must comply with IEC and FCC standards

6. Surge Protection – Surge protection must be provided including separate sure protection built into electronic driver

7. Mechanical – Luminaire LED system components to be low copper aluminum, with high performance heat sink(s) designed specifically for LED luminaires. No active cooling features (Fans, etc.). Luminaire configuration must allow for modular upgradability and/or field repair of all electrical components (i.e. LED modules, Driver(s), etc.). Drivers and vertical light bars must be all mounted to a twist-lock tool-less assembly for ease of installation and trouble- shooting.

2.2 FIXTURES

A. Fixtures as described in the Fixture Schedule on the drawings shall be furnished by the Contractor and shall be properly installed.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Unless otherwise specified, lighting fixtures shall be permanently installed and connected to the wiring system.

B. The Contractor shall support each fixture, independently from the building structure. Ceiling framing members shall not be used to support fixtures except in specified areas where ceiling supports for this purpose have been specified elsewhere in these specifications. Each fixture shall have at least two fixture supports.

C. Flexible conduit used for fixture whips shall be at least twelve (12) inches, but not more than 48 inches long.

3.2 CEILING COMPATIBILITY

A. Catalog numbers shown on the drawings or descriptions of lighting fixtures contained herein may indicate fixture compatibility with certain types of ceiling construction. Contractor shall determine exact type of ceiling actually to be furnished in each area and shall obtain fixtures to suit, deviation from specified catalogue numbers or descriptions only where necessary and only to the extent necessary to insure fixture/ceiling compatibility.

3.3 LIGHT LEAKS

A. The Contractor shall, at the end of this project, adjust all recessed lighting fixtures so that there will be no light leaks between the fixture trim and the ceiling. Contractor shall also adjust recessed fluorescent fixtures to eliminate any light leaks between fixture trim and ceiling grid member.

3.4 LAMPS

A. The Contractor shall install lamps in all fixtures and shall obtain replacement lamps should any not properly operate or become damaged during construction.

3.5 EXIT FIXTURES

A. Exit fixtures shall be installed according to Life Safety Code requirements, with face(s) plainly visible and directional arrows indicating the proper direction of egress.

END OF SECTION 26 50 00

SECTION 31 20 00 - EARTH MOVING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Preparing subgrades for slabs-on-grade**.**
2. Subsurface drainage backfill for walls and trenches.
3. Excavating and backfilling trenches for utilities and pits for buried utility structures.

B. Related Sections:

1. Divisions 26, and 33 Sections for installing underground mechanical and electrical utilities and buried mechanical and electrical structures, as applicable.
2. Division 31 Section "Site Clearing" for site stripping, grubbing, and stripping and stockpiling topsoil.
3. Division 31 Section "Excavation Support and Protection" for shoring, bracing, and sheet piling of excavations.

1.2 DEFINITIONS

A. Soil and aggregate definitions are as follows:

1. **Angular**: particles having sharp edges and relatively plane sides with unpolished surfaces.
2. **Aggregate**: granular material of hard inert mineral composition such as sand, gravel, shell, slag, or crushed stone used with a cementing medium such as portland cement or fine soil binder to form mortar, plaster, concrete, or such structural composites or used alone as in base courses or railroad ballast.
3. **Boulder**: a rock fragment, usually rounded by weathering of abrasion with an average dimension of 12 inches or more.
4. **Clean**: description of soil in which the fines content is about 5% or less
5. **Cobble**: a rock fragment, usually rounded or semi rounded, with an average dimension between 3 and 12 inches.

6. **Coarse Aggregate**: that in which the sizes graded according to usage are in approximate range of 3 inch to No. 4 U.S. standard sieve.

7. **Coarse Fraction**: the component of soil retained on a No. 200 U.S. standard sieve; individual soil particles which are visible to the naked eye.

8. **Coarse-Grained Soil**: that in which more than half of the particles are visible to the naked eye.

9. **Cohesionless Soil**: a soil that when unconfined has little or no strength when air-dried and that has little or no cohesion when submerged.

10. **Fine Aggregate**: that in which the sizes graded according to usage are in the approximate range of No. 4 to No. 200 U.S. standard sieve. Natural or manufactured sand.

11. **Fine Fraction or Fines**: the component of soil passing a No. 200 U.S. standard sieve; individual soil particles which cannot be seen by the naked eye.

12. **Fine-grained Soil**: that in which more than one half of the particles are so fine that they cannot be seen by the naked eye.

13. **Graded**: particles that are passed through sieves to determine or to rearrange the grain sizes and their distribution.

14. **Granular**: consisting of grains or small particles, generally visible.

15. **Granular Materials**: those soils or aggregates which have predominantly coarse particles with fine particles constituting less than 35% or 50%, as defined.

16. **Gravel**: rounded or semi-rounded particles of rock that will pass a 3-inch and be retained on a No. 4 U.S. standard sieve.

17. **Non-cohesive Soil**: see cohesionless soil.

18. **Organic Soil**: that in which organic matter is visible or indicated by color and odor.

19. **Poorly Graded**: that which consists of predominantly one particle size (uniformly graded) or has a wide range of sizes with some intermediate sizes obviously missing (gap graded).

20. **Rock**: natural solid mineral matter occurring in large masses or fragments.

21. **Sand**: particles of rock that will pass the No. 4 sieve and be retained on the No. 200 U.S. standard sieve.

22. **Soil**: (earth) sediments or other unconsolidated accumulations of solid particles produced by the physical and chemical disintegration of rocks, and which may or may not contain organic matter.

23. **Well Graded**: that which has a wide range in grain size and substantial amounts of most intermediate particle sizes.

B. Other definitions used in this Specification section are as follows:

1. **Backfill**: that which replaces a void resulting from excavation.

2. **Base**: the support or foundation for a pavement.

3. **Borrow Soil**: satisfactory soil imported from offsite for use as fill or backfill.

4. **Common Embankment or Fill**: the placement of earth or other material which is unclassified for the purposes of description or measurement and payment.

5. **Common Excavation**: the removal of earth which is unclassified for the purposes of description or measurement and payment.

6. **Embankment**: a raised earth fill to support a structure, carry a roadway or hold back water.

7. **Execution**: removal of material encountered above subgrade elevations or beyond indicated lines and dimensions indicated.

8. **Fill**: natural or man-made material used to raise existing grade.

9. **Flowable Fill**: A cementitious mixture of Portland cement, fly ash (depending on the mix design), fine aggregate, water, entrained air, and admixtures appropriate to the application.

10. **Granular Materials**: predominantly visible aggregates classified as either fine or coarse with from 50% to 100% retained on the No. 200 U.S. standard sieve.

11. **Ordinary Trench Backfill**: earth placed in a trench from which it was excavated in such a manner that it is consolidated primarily by nature.

12. **Refill**: backfill, replacement of excavation, or replacement of over excavation.

13. **Special Trench Backfill**: earth or graded aggregate placed in the intermediate backfill zone or final backfill zone of a trench and densified by a particular method to a specified degree.

14. **Structures**: buildings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtances, or other man made stationary features constructed above or below the ground surface.

15. **Sub-base**: underlying support placed below what is normally construed as a base for a roadbed or pavement.

16. **Sub-grade:** uppermost surface of an excavation or the top surface of a filler backfill immediately below subbase, drainage fill, or topsoil materials.

17. **Utilities**: underground pipes, conduits, ducts, and cables.

1.3 SUBMITTALS

A. Material Test Reports: For each borrow soil material proposed for fill and backfill as follows:

1. Classification according to ASTM D 2487.

2. Laboratory compaction curve according to ASTM D 698 or ASTM D 1557.

3. Site of aggregates according to ASTM D448.

1.4 QUALITY ASSURANCE

A. Geotechnical Testing Agency Qualifications: Qualified according to ASTM E 329 and ASTM D 3740 for testing indicated.

1.5 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth moving operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.

2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

B. Utility Locator Service: Notify **"One Call"** for area where Project is located before beginning earth moving operations.

C. Do not commence earth moving operations until temporary erosion- and sedimentation-control measures are in place.

D. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.

2. Parking vehicles or equipment.

3. Foot traffic.

4. Erection of sheds or structures.

5. Impoundment of water.

6. Excavation or other digging unless otherwise indicated.

7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

E. Prohibit heat sources, flames, ignition sources, and smoking.

F. Do not direct vehicle or equipment exhaust towards protection zones.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: Soil Classification Groups GW, GP, GM, SW, SP, and SM according to ASTM D 2487 or a combination of these groups; free of rock or gravel larger than **3 inches** in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487 or a combination of these groups.

1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.

E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.

F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.

G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.

1. Pipe Bedding: in trench of native clay or silt, size No. 78; ASTM D448

2. Pipe Bedding: in trench of rock or coarse granular material, size No. 7; ASTM D448

H. Drainage Course: Narrowly graded mixture of washed crushed stone, or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

I. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch sieve and 0 to 5 percent passing a No. 4 sieve.

J. Sand: ASTM C 33; fine aggregate.

K. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

L. Flowable Fill: Flowable fill conforming to section 710 of the Louisiana Department of Transportation Standard Specification for Roads and Bridges.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.

B. Protect and maintain erosion and sedimentation controls during earth moving operations.

C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

C. An adequate weight of fill material should be in place to prevent buoyance prior to discontinuing operating of dewatering system.

1. If the dewatering system fails or is inadequate resulting in loosening of the foundation or strata, instability of slopes and trench walls, flooding of the site, inadequate pipe joining, floating of pipes or structures, or damage to foundations or structures; remove, replace and repair damage.

3.3 EXPLOSIVES

A. Explosives: Do not use explosives.

3.4 EXCAVATION, GENERAL

A. Haul: all haul shall be considered a necessary and incidental part of the work and the cost therefore shall be included in prices for the various pay items of work. No payment will be made separately or directly for haul.

B. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

C. Classified Excavation: Excavate to subgrade elevations. Material to be excavated will be classified as earth and rock. Do not excavate rock until it has been classified and cross sectioned by Engineer. The Contract Sum will be adjusted for rock excavation according to unit prices included in the Contract Documents. Changes in the Contract Time may be authorized for rock excavation.

1. Earth excavation includes excavating pavements and obstructions visible on surface; underground structures, utilities, and other items indicated to be removed; together with soil, boulders, and other materials not classified as rock or unauthorized excavation.

a. Intermittent drilling; blasting, if permitted; ram hammering; or ripping of material not classified as rock excavation is earth excavation.

3.5 EXCAVATION FOR STRUCTURES

A. Excavations for Footings and Foundations: See Structural Plans

B. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.

3.6 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.

1. The minimum width of trench shall be the width which will permit proper assembly of piping and joints, and proper compaction of backfill under the haunches and along both side of the pipe.

2. Allowable maximum trench width one foot (1’) above the top of pipe:

3.

Type Line	Max Trench Width
Sewer and Drain Lines	W = D+ 18”
Water and Gas Lines	W=D+12”, but not less than 18” total
Buried Cable, Electrical Conduit and Plumbing	W=12”

C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade. Maintain a dry trench bottom by dewatering, if necessary.

1. Where pipe is to be laid on imported bedding or cradled in concrete, the trench may be excavated by machinery to the designated subgrade.

2. When the machinery used results in a disturbed trench bottom, the machine excavation shall be stopped above the finished subgrade and the excavation finished by hand shovel to provide a firm and undisturbed trench bottom.

3. Where native soil is suitable for pipe bedding, a smooth edged bucket plus hand shovel trimming shall be used for excavating to the designated grade so that the soil is smooth, firm and undisturbed.

4. Over excavation in excess of that required shall be backfilled at Contractor’s expense with approved cohesionless material.

3.7 SUBGRADE INSPECTION

A. Notify Engineer when excavations have reached required subgrade.

B. If Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Engineer, without additional compensation.

3.8 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Engineer.

3.9 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations and proposed foundations. Do not store within drip line of remaining trees.

3.10 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.

2. Surveying locations of underground utilities for Record Documents.

3. Testing and inspecting underground utilities.

4. Removing concrete formwork.

5. Removing trash and debris.

6. Removing temporary shoring and bracing, and sheeting.

7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

C. Place backfill in uniform lifts on both sides of pipes, or walls and all around structures.

3.11 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Trenches under Footings: Backfill trenches excavated under footings and within 18 inches of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings.

D. Trenches under Roadways and Railroads: Backfill material and methods shall meet permit conditions and approval of the State Department of Transportation or owning railroad with their respective right-of-ways.

E. Backfill voids with satisfactory soil while removing shoring and bracing.

F. Trench Zones and Backfill Requirements: Backfill methods for trenches are classified into three (3) zones; pipe embedment, intermediate backfill and final backfill.

G. Within 1,500' of the Mississippi River Levee do not use granular material. Where called for, use excavatable flowable fill.

TRENCH ZONES & BACKFILL

STANDARD TERMINOLOGY

1. Pipe Embedment: the material under, around and over the pipe. Pipe embedment is separated into bedding, haunching and initial backfill. Embedment material shall be either native or imported material, as specified. Native material shall be loose earth selected from the excavation which is free of large clods or stones larger than ¾ inch size and other objectionable material. Imported material shall be well graded granular material, as specified.

   Place bedding material prior to laying pipe, with bell holes if the pipe has bells, to provide a smooth and uniform support for the full length of the pipe barrel.

   The pipe haunch is the area above the bedding material or bottom of the pipe to a point above the pipe springline or horizontal centerline or the 0.7 lower pipe depth, as shown. Place haunching material and take care to fill all voids under the pipe haunches to the depth indicated. Place haunching by hand shoveling and slicing with the shovel in six inch (6") maximum lifts followed by tamping.

   Place initial backfill in six inch (6") maximum lifts uniformly on both sides and densify as required. Avoid heavy tamping on top of flexible type pipes to avoid disturbing the haunching support.

2. Intermediate Backfill: is the material placed above the pipe embedment and initial backfill and extending up to the final backfill, which is within six to eighteen inches (6"-18") of finished grade.

   Intermediate trench backfill is classified as ordinary or special. Ordinary backfill utilizes natural forces of gravity, isolated loads and rainfall and ground water for trench densification, which necessitates long term maintenance and delay in final clean-up and

dressing trenches. Special backfill requires immediate densification of trench backfill by various methods which allow intermediate restoration of surfaces and pavements for traffic.

a. Ordinary Trench Backfill: Ordinary trench backfill shall be used on excavations in undeveloped areas, open fields, lawns, neutral grounds which are free of traffic, and other unimproved areas free of vehicular traffic. Ordinary trench backfill shall not be used under surfaces or pavements of walks, drives, streets or roads for vehicular or pedestrian traffic, street or roadway shoulders, or within rights-of-ways of State or U.S. highways or railroads. Blade loose material into the trench for the full trench depth to the level ground surface with little, if any, mounding or walking of the trench. Surplus excavation shall be stockpiled adjacent to the trench. After appreciable settlement has occurred or prior to final acceptance of the work, the final or surface backfill zone shall be installed.

b. Special Trench Backfill: Special trench backfill shall be used under surfaces or pavements of walks, drives, streets or roads for pedestrian or vehicular traffic, street or roadway shoulders, or within rights-of-ways of State of U.S. Highways or railroads. Contract may use special trench backfill in other locations at no increase in the Contract price to expedite final backfill and clean-up.

Density intermediate special trench backfill to not less than 85% Standard Proctor density or 40% relative density for cohesionless materials and not less than 90% Standard Proctor density for cohesive material, unless higher density is required.

3. Final Backfill: is the material placed in the upper six to eighteen inches (6”-18”) of the trench after densification of the intermediate trench backfill.

Final trench backfill is classified as either ordinary or special according to the location of the work, as specified herein before for intermediate trench backfill. Use ordinary final backfill for undeveloped areas, open fields, lawns, pastures, neutral grounds which are free of traffic and other unimproved areas which are free of traffic. Use special final backfill for locations under pavements or surfaces of roads, streets, drives or walks or within the rights-of-ways of highways or railroads.

Ordinary final backfill material shall be selected from the excavation using as much top soil and fine organic material as practical. Place material by blading and rolling with equipment wheels in six-inch (6”) lifts and dress the surface in a slight mound over the trench.

Special final backfill material shall be selected from the excavation with as much granular material as practical, except where base course is required. Place material in not more than six inch (6”) lifts and densify.

H. Install warning tape or locator wire, as specified directly above utilities.

3.12 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations.

C. Place soil fill on subgrades free of mud, frost, snow, or ice.

D. Where embankments are made, construct in lengths of not less than 300 feet. Construction of a section of embankment for a basin or pond shall begin on a side, and where possible, shall be carried uniformly past any corner and around the perimeter back to the starting point. In no case shall adjacent sections of embankment be permitted to tie together closer than 50' from any corner.

3.13 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.

2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.14 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Under footings, slabs and foundations: see structural drawings.

B. Other fill and backfill.

1. Place backfill and fill soil materials in layers not more than 8 inches (200 mm) in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches (100 mm) in loose depth for material compacted by hand-operated tampers.

2. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

3. Material shall be densified by either compaction or saturation with or without vibration. The contractor shall achieve the specified densification results. He may select equipment and methods of his choice which is suitable and does not damage the completed work and existing structures.

4. Retain one option in paragraph below based on ASTM laboratory-test method required. Replace the term "unit weight" with "density" if preferred.

5. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 698 or ASTM D 1557:

Use or Location	Min. Density as % of Max. Dry Density	Moisture Controls % of Optimum
Common site Embankment & Fill	85% Std. Protector	±3
Common Roadway Embankment & Fill	95% Std. or 90% Mod. Proctor	±2
Levee, Pond or Dike Embankment & Fill - 15' max. height	90% Std. or 85% Mod. Proctor	±2
Pipe Embedment, fill or backfill within 1,500' of the Mississippi River Levee (where granular material would otherwise be called for)	Excavatable Flowable Fill	N.A.
Roadway & Pavement Sub-bases Sub grade	90% Mod. Proctor	±2
Pavement Bases	95% Mod. Proctor or 70% Relative	N.A.
Refill Fill or Embankment Under Structure	See structural drawings	See structural drawings
Backfill Against Structures with no Superimposed Surface Load	85% Std. Proctor or 40% Relative	N.A.
Pipe Embedment	See Pipe Embedment Spec.	
Pipe Foundation or Over excavation Refill	85% Std. Proctor or 40% Relative	N.A.
Ordinary Trench Backfill	N.A.	N.A.
Special Imported or Native Cohesionless Trench Backfill	85% Std. Protector or 40% Relative	N.A.
Special Native Cohesive Trench Backfill	90% Std. Protector	+3

3.15 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.

2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:

1. Turf or Unpaved Areas: Plus or minus 1 inch.

2. Walks: Plus or minus 1 inch.

3. Pavements: Plus or minus 1/2 inch.

C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.16 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:

1. Determine prior to placement of fill that site has been prepared in compliance with requirements.

2. Determine that fill material and maximum lift thickness comply with requirements.

3. Determine, at the required frequency, that in-place density of compacted fill complies with requirements.

B. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.

C. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.

D. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Engineer.

E. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:

1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2000 sq. ft. or less of paved area or building slab, but in no case fewer than three tests.

2. Trench Backfill: At each compacted initial and final backfill layer, at least one test for every 150 feet or less of trench length, but no fewer than two tests.

F. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained. Contractor shall pay for all retesting.

3.17 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by Engineer; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.18 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

B. Transport surplus satisfactory soil to designated storage areas on Owner's property. Stockpile or spread soil as directed by Engineer.

1. Remove waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 31 20 00

SECTION 33 11 00 - WATER UTILITY DISTRIBUTION PIPING SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes water-distribution piping and related components for water service.

1.3 DEFINITIONS

A. CS: Carbon Steel

B. CT: Copper Tubing

C. EPDM: Ethylene propylene diene terpolymer rubber

D. HDPE: High Density Polyethylene

E. LLDPE: Linear, low-density polyethylene plastic

F. NF: New Ferrous Metallic

G. PA: Polyamide (nylon) plastic

H. PCCP: Concrete Pressure Pipe

I. PE: Polyethylene plastic.

J. PEX: Cross-Linked Polyethylene

K. PP: Polypropylene plastic.

L. PVC: Polyvinyl chloride plastic.

M. RTRF: Reinforced thermosetting resin (fiberglass) fittings

N. RTRP: Reinforced thermosetting resin (fiberglass) pipe, without aggregate

O. WS: Welded Steel

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Affidavit of Compliance, manufacturers shall provide an affidavit that delivered materials comply with requirements of this specification.

C. Layout and shop drawings for fabricated pipe, fittings, and specials along with brochures, dimensions and data on pipe, fittings, valves, linings, and cathodic protection. Data shall include printed assembly, application and installation recommendations.

D. Thrust restraint design for approval prior to use, where the device used is other than the ordinary concrete thrust block sized in accordance with the Drawings.

E. Steel pipe manual welding operator certifications prior to work.

F. Cathodic protection design and report of tests, data, surface, survey, anode current output survey, and pipe to soil potential survey for buried coated steel pipelines.

G. Field quality – control test reports.

H. Operation and Maintenance Data: For specialties to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Comply with requirements of utility company supplying water. Include tapping of water mains and backflow prevention.

2. Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.

3. Comply with standards of authorities having jurisdiction for fire-suppression water-service piping, including materials, hose threads, installation, and testing.

B. Piping materials shall bear label, stamp, or other markings of specified testing agency.

C. NSF Compliance:

1. Comply with NSF 14 for plastic potable-water-service piping: Include the seal of the National Sanitation Foundation on the piping.

2. Comply with NSF 61 for materials for water-service piping and specialties for domestic water.

3. Comply with NSF 372 for drinking water components lead content, certified to be lead free.

1.6 DELIVERY, STORAGE, AND HANDLING

A. All piping, valves, fittings, services, and accessories shall be new and stored, handled, laid, and placed in accordance with the manufacturer's recommendations.

B. Handling: Use sling to handle pipes, valves and fire hydrants if size requires handling by crane or lift.

C. Protect stored piping from moisture and dirt. Elevate above grade.

D. Protect flanges, fittings, and specialties from moisture and dirt.

E. Shield plastic materials, both thermoplastic and thermoset, from direct sunlight when stored for longer than two months. Provide adequate ventilation under any covering. Support to prevent sagging and bending.

F. Rubber gaskets shall be stored as recommended by their manufacturer in a cool, dry location away from direct sunlight, petroleum products, strong oxidants, or electric equipment.

1.7 PROJECT CONDITIONS

A. Interruption of Existing Water-Distribution Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water-distribution service according to requirements indicated:

1. Where interruption of service will be along a main servicing not more than fifty (50) residential and small commercial customers who will be affected by said interruption, and where the duration of said interruption is to be four (4) hours or less, interruption will be permitted provided the Contractor has notified the Resident Project Representative, the Owner, and each customer at least twenty-four (24) hours in advance of the contemplated interruption of service.

2. Where interruption of service will affect area fire protection, more than fifty customers, a large industrial customer, or the main business district, or will be of greater duration than four (4) hours, or a combination of the above conditions, interruption of service will be permitted only after the Resident Project Representative, the Owner, and the local fire department have approved such cases, and the Contractor has posted and published public notice at least seven (7) days in advance. The Owner reserves the right to require the Contractor to perform such work between the hours of 10:30 P.M. and 5:30 A.M. Any overtime pay required to be disbursed by the Contractor shall be included in the prices bid for the work.

1.8 COORDINATION

A. Locate surface and subsurface features and conflicts; locate or cause to be located all underground utilities; and Coordinate necessary Field Changes in locations of the work with the Resident Project Representative.

B. Contractor shall inspect all piping components before placing in the trench. It is the Contractor's responsibility to reject and replace all materials which are broken or damaged so as to impair their strength, function or durability. Use of repaired materials shall only be allowed with the Engineer's approval.

C. Coordinate connection to existing water main with utility company.

PART 2 - PRODUCTS

2.1 DUCTILE IRON PIPE (DI)

A. Pipe: sizes three through fifty-four inches (3" – 54") shall conform to ANSI A21.51/AWWA C 151.

1. The pipe thickness shall be designed in accordance with ANSA A21.50/AWWA C 150, as modified hereinfore, unless designated otherwise on the Drawings or in the Proposal.

2. Each length of pipe shall be hydrostatically tested during manufacture to 500 psi as evidenced by manufacturer's certified test reports or UL approval label on each piece.

3. All ductile iron pipe shall have standard thickness cement mortar lining and bituminous seal coating on the inside in accordance with ANSI/AWWA C 104.

4. All pipe which is not flanged shall have an exterior 1-mil thick bituminous coating. Flanged pipe shall be given a shop coat of primer in accordance with the Paints and Painting Division of these Specifications.

5. Pipe shall be manufactured in standard lengths of 18 or 20 feet.

B. Joint Materials:

1. Mechanical joint and accessories on fittings shall conform to ANSI A21.11/AWWA C 111. The bolts and nuts shall be corrosion resistant high strength alloy steel ("Cor-Ten").

2. Slip Joint pipe with rubber gaskets shall conform to ANSI A21.11/AWWA C 111.

3. Flanged joints shall conform to ANSI/AWWA C 110 for fittings and ANSI A21.15/AWWA C 115 for pipe with either 150 or 250 psi rating, as required. Flanged joints shall utilize high quality rubber, flat ring gaskets. Bolts shall be of such lengths that after the joints are made, they shall project not more than one-half inch (1/2") beyond the outer face of the nut.

4. Grooved and shouldered (Victaulic) type joints shall conform to AWWA C 606. Other type thrust restraining joints may be required.

5. Restraint type joints shall be designs which are tested and certified by the manufacturer to be pressure rated at not more than 1.5 times the test pressure and the pressure rating shall meet or exceed the system design pressure and system pressure test requirements.

a. Glands, bolts, and nuts for all joint restraint devices shall be Teflon-coated ductile iron with a cathodic protection cap on each bolt.

6. Approved restrained joints are "Fast Grip", "Flex-Ring", or "Field Flex-Ring" by American Ductile Iron Pipe, "TR-Flex" & "Field-Lok" by U.S. Pipe, or the 1100 series of Mega-Lug by EBBBA Iron, Inc.

C. Fittings

1. Fittings in sizes three through twenty four (24") shall be ductile iron and conform to

   ANSI/AWWA C 153 for compact bodied fittings. Sizes thirty through forty-eight inch (30" - 48") shall be gray or ductile iron and conform to ANSI/AWWA C 110 for standard short bodied fittings.

2. Fittings shall have mechanical joints for cast iron pipe diameters (CI-OD).

3. The pressure rating for sizes twelve-inch (12") and less shall be 350 psi for ductile iron, and for sizes fourteen-inch (14") and larger shall be 150 or 250 psi for gray iron or 350 psi for ductile iron, as appropriate.

4. The pressure rating for flanged fittings shall be as applicable for sizes twelve-inch (12") and less of 250 psi and for sizes 14" and larger of 150 psi or 250 psi.

5. Line fittings with standard thickness cement mortar lining and bituminous seal coating on the inside in accordance with ANSI A21.4/AWWA C 104. Fusion bonded epoxy coatings for the interior and exterior surfaces in accordance with AWWA C116 is an approved alternate.

6. All fittings which are not flanged shall have an exterior 1-mil thick bituminous coating.

7. Flanged fittings shall be given a shop coat of primer in accordance with the Paints and painting Division of these Specifications.

2.2 PVC PRESSURE CLASS PIPE (PVC-PC)

A. PVC pressure class pipe: size four through sixty inches (4" - 60") shall be less than one year old and conform to AWWA C900.

1. Pipe compound shall conform to ANSI/ASTM D 1784 with a hydrostatic-design-basis (HDB) rating of 4000 psi stress in water at 73.4 degrees F (23 degrees C) as determined by ANSI/ASTM D 2837 and as established by PPI and designated as PVC 1120.

2. The pipe thickness shall be designed in accordance with AWWA C900 as modified hereinbefore. Unless designated otherwise on the Drawings or in the Bid Proposal, the pipe shall be Pressure Class 165.

3. Each length of pipe and each coupling shall be hydrostatically tested at a pressure of 2.0 times the rated class pressure, as evidenced by manufacturer's certified test report or UL approval label on each piece.

4. Furnish pipe in standard lengths of twenty (20) feet. Pipe shall have outside diameters equivalent to cast iron (CI-OD) sizes.

B. Joints: shall be of the elastomeric gasket type in conformance with ANSI/ASTM D 3139 and shall be either of the integral bell type or the double bell coupling type.

1. The wall thickness of PVC couplings using elastomeric seals shall be adequate to withstand pressure equal to that of the pipe with which they are designed to be used. Rubber gaskets shall comply with ANSI/ASTM F 477.

2. Restraint type joints shall be designs which are tested and certified by the manufacturer to meet or exceed the pressure rating of the system.

a. Restraint devices shall be wrapped with 8 mil polyethylene wrap taped to the pipe.

b. Glands, bolts and nuts for PVC joint restraint devices shall be Teflon-coated ductile iron with a cathodic protection anode cap on each bolt.

C. Fittings: for PVC pressure class pipe shall be gray or ductile iron.

1. Sizes three through twenty four inch (3" - 24") shall be ductile iron and conform with ANSI/ASTM C153 for compact bodied fittings.

2. Fittings shall be mechanical joints in cast iron pipe diameters (CI-OD).

3. The fitting pressure rating for sizes twelve inches (12") and less shall be 350 psi for ductile iron.

4. Fittings shall have an exterior 1-mil thick bituminous coating.

5. For corrosion protection, polywrap all ductile iron fittings.

6. Line iron fittings with standard thickness cement mortar lining and bituminous seal coating on the inside in accordance with ANSI/AWWA C 104 or use fusion bonded epoxy coating on the inside and outside in accordance with AWWA C116.

2.3 PVC PRESSURE RATED PIPE (PVC-PR)

A. PVC pressure rated pipe in sizes thirty-six inches (36") and smaller shall be less than one year old and comply with ANSI/ASTM D 2241 for Pressure-Rated pipe (SDR Series) and ANSI/ASTM D 1785 for Schedule pipe.

1. Pipe compound shall conform to ANSI/ASTM D 1784 with a hydrostatic-design-basis (HDB) rating of 4,000 psi stress in water at 73.4 degrees F (23 degrees C) as determined by ANSI/ASTM D 2837 and as established by PPI and designated as PVC 1120.

2. The pipe thickness design shall be determined by the method specified hereinbefore, except with zero surge pressure and with de-rating the pipe for operating temperatures above 73 degrees F. and below 140 degrees F. as recommended by PPI.

3. Pressure ratings allowed for PVC-PR pipe shall be in accordance with the following table and as indicated on the Drawings or in the Bid Proposal.

		Schedule Pipe Sizes			
Pressure Rating (PR), psi	**Standard Dimension Ratio (SDR)**	**Threaded**		**Unthreaded**	
		Sch. 40	**Sch. 80**	**Sch. 40**	**Sch. 80**
200	21	None	2” & less	4” & less	All
160	26	None	4” & less	8” & less	All
125	32.5	None	6” & less	All	All
100	41	None	All	All	All

4. Unless designated otherwise, the minimum pressure rating for water piping shall be 160 psi with the standard dimension ratio of SDR 26 and Schedule 40 or 80, as appropriate.

5. Unless designated otherwise, all PVC plant and chemical feed piping in sizes 2 ½” and smaller shall be Schedule 80.

6. Furnish pipe in standard lengths of 20’ for gasketed joints and 20’ and 40’ for solvent cemented joints. Pipe shall have outside diameters equivalent to steel pipe (IPS) sizes.

7. Available manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated.

B. Joints: All sizes of water plant chemical feed lines in SDR/PR pipe or Schedule pipe shall have bell ends for solvent cemented joints conforming to ANSI/ASTM D 2672 or shall have plain ends for use with solvent cemented couplings and fittings specified hereafter.

1. Solvent cement: Solvent cements and primers for PVC pipe shall conform to ANSI/ASTM D 2564 and F 656, respectively.

   a. All sizes of water plant chemical feed lines in SDR/PR pipe or Schedule pipe shall have bell ends for solvent cemented joints conforming to ANSI/ASTM D 2672 or shall have plain ends for use with solvent cemented couplings and fittings specified hereafter.

   b. Water distribution or service piping in sized one and one-half to two and one-half inches (1 ½" – 2 ½") shall use either solvent cemented joints, as specified above, or gasketed joints at the Contractor's option, unless designated otherwise. Pipe in sizes one and one-quarter inch (1 ¼") and smaller shall use solvent cemented joints as specified above.

c. PVC pipe with solvent cemented joints which must be installed straight without snaking in a trench, or which are 3 in. and larger in size, shall utilize special expansion joints which are designed for 100 degree F temperature change.

2. Gasketed:

a. Gasketed joints shall comply with ANSI/ASTM D 3139 and for joints that do not maintain SDR throughout, submit manufacturer's proof of design test and joint dimensions data for Engineer's review prior to pipe shipment.

b. PVC water distribution piping in sizes three inch (3”) and larger shall use gasketed joints.

c. Rubber gaskets shall conform to with ANSI/ASTM F 477.

d. Restraint type joints shall be designs which are tested and certified by the manufacturer to meet or exceed the pressure rating of the system.

1) Restraint devices shall be wrapped with 8 mil polyethylene wrap taped to the pipe.

2) Glands, bolts and nuts for PVC joint restraint devices shall be teflon-coated ductile iron with a cathodic protection anode cap on each bolt.

C. Fittings:

1. Where solvent cement connections are permitted as specific above, fittings shall be of PVC 1120 material.

a. PVC fittings shall have approval by and bear the seal of the National Sanitation Foundation.

b. Schedule 40 fittings complying with ANSI/ASTM D 2466 shall be used with Schedule 40 pipe sizes eight-inch (8") and smaller, as well as with pressure rated PR 200 pipe sized four-inch (4") and smaller and PR 160 pipe sizes eight-inch (8") and smaller.

c. Schedule 80 fittings complying with ANSI/ASTM D 2467 shall be used with Schedule 80 pipe sizes eight-inch (8") and smaller, and pressure rated pipes in larger sizes than can be satisfied by Schedule 40 fittings.

2. Gasketed:

a. Iron fittings for PVC pipe in sizes three-inch (3") through (24") shall be ductile iron and conform to ANSI/AWWA C 153 for compact bodied fittings, and sizes thirty (30") and larger shall be gray or ductile iron and comply with ANSI/AWWA C 110 for standard short-bodied fittings.

b. Iron fittings shall have mechanical joints for cast iron pipe diameters (CI-OD).

c. All connections between plastic pipe in IPS size and other materials shall be made with pipe adapters or transition glands and gaskets as recommended by the manufacturer.

d. The pressure ratings of iron fittings for sizes twelve inches (12") and less shall be 350 psi for ductile iron, and for sizes fourteen-inch (14") and larger shall be 150 or 250 psi for gray iron or 350 psi for ductile iron, as appropriate.

e. Iron fittings shall have an exterior 1 mil thick bituminous coating.

f. For corrosion protection polywrap all ductile iron fittings.

g. Line iron fittings with standard thickness cement mortar lining and bituminous seal coating on the inside in accordance with ANSI/AWWA C 104 or use fusion bonded epoxy coating on the inside and outside in accordance with AWWA C116.

2.4 HIGH DENSITY POLYETHYLENE PIPE (HDPE)

A. Pipe: HDPE pressure pipe in sizes 4" through 63" shall comply with ANSI/AWWA C 906.

1. The pipe shall be manufactured using material code designation PE 3408 and minimum cell classification 345434C as referenced in ASTM D3350.

B. Joints: Polyethylene piping may be joined by thermal butt-fusion, flange assemblies, or mechanical methods.

1. Polyethylene piping shall not be joined by solvent cements, adhesives (such as epoxies), or threaded-type connections.

2. All joining methods shall be capable of conveying water at not less than the design pressure of the piping system and shall be recommended for use by the pipe manufacturer.

3. Joining methods are discussed in detail in AWWA Manual M55.

C. Fittings: Polyethylene fittings may be molded, thermoformed from pipe sections, or fabricated by heat fusion joining polyethylene sheet or block.

1. Molded fittings shall meet the requirements of ASTM F1055 for electrofusion type fittings, ASTM D2683 for socket-type fittings, or ASTM D3261 for butt-type fittings.

2.5 STAINLESS STEEL PIPE

A. Pipes: Stainless steel pipe shall conform to AWWA C220, ANSI/ASTM A 312, Grade TP-304L or TP 316L with dimensions conforming to ANSI B 36.19.

1. Pipe sized thirty inch (30”) and smaller for operating pressures to 150 psi shall be austenitic stainless steel.

2. Pipe shall be lightweight Schedule 5 S with plain ends when used with Van-Stone flange ends.

3. Schedule 10 S with plain ends when used for shop prefabricated welded flanged sections.

   a. All welds shall be 100% penetration fusion type.

4. Standard weight Schedule 40 S when used for threaded ends for screwed connections.

5. Each length of pipe shall by hydrostatically mill tested in accordance with the respective standard.

B. Joints

1. Connecting joints for sizes one-half inch (1/2") and larger shall be either Van-Stone type using angle face rings and backing flanges, welded flanges, or screwed as applicable to the pipe thickness, and unless a preference is shown on the Drawings.

2. Flanged joints shall conform to ANSI B 16.5 for Class 150.

3. Threaded joints shall conform to ANSI B 2.1, American National Standard for Pipe Threads.

C. Fittings:

1. Butt-welded fittings for use with austenitic stainless steel pipe shall be Schedule 10 S and conform to ANSI/ASTM A 403, class CR 304, or CR 316L

2. Forged or rolled alloy-steel pipe flanges shall conform to ANSI/ASTM A 182 Grade F 304 or F 316L.

3. Special sections not included in AWWA C208 such as; maximum miter angle and centerline radius of elbows, special and treatments, and orientation of lateral are detailed on the Drawings.

2.6 SMALL NON-FERROUS METALLIC PIPE (NF)

A. Pipe: Non-Ferrous Metallic pipe either copper or brass is used for exposed plant piping or interior pressure plumbing.

1. Hard copper tubing, Type L shall conform to ASTM B 88.

2. Copper pipe shall conform to ASTM B 42.

3. Brass pipe shall conform to ASTM B 43.

4. Pipe for threaded connections shall be extra strength and pipe for solder connections shall be standard strength.

5. Furnish pipe or tubing in lengths of twelve feet (12’) minimum.

B. Joints:

1. Joints shall be sweat soldered in tubing and standard strength pipe.

2. Joints in extra strength pipe may be threaded or soldered.

3. Solders shall meet the current Safe Drinking Water Act.

C. Fittings:

1. Fittings for solder joints in copper water tubing shall be wrought copper and bronze conforming to ANSI B 16.22.

2. Fittings for solder to threaded joints shall be cast bronze conforming to ANSI B 16.18.

3. Threaded fittings shall be case bronze conforming to ANSI B 16.15.

2.7 SMALL CARBON STEEL PIPE (CS)

A. Pipe: CAUTION NOTE: The use of black or galvanized carbon steel pipe shall be prohibited for buried service. The use of galvanized coatings shall be prohibited for piping conveying air or compressed gasses.

1. Pipe sizes one-half through four inch (½" - 4") for conveying air or water at working pressures of 150 psi and less and which is not to be bent or welded onto in the field shall be standard weight (Schedule 40) conforming to ASTM A120.

2. Pipe for conveying water shall be hot dip galvanized and pipe for conveying low pressure air shall be black.

3. Pipe sizes one-half through four inches (½" - 4") for conveying chlorine liquid or chlorine gas at all pressures and for conveying water at pressures above 150 psi shall be seamless extra strength, Schedule 80 conforming to ASTM A 53.

4. Pipe shall be black for conveying chlorine and galvanized for conveying water.

5. Each length of pipe shall be hydrostatically tested in conformance with the respective standard specification.

6. Furnish pipe in lengths of twelve feet (12') minimum.

B. Joints: Shall be screwed or threaded and comply with ANSI B 2.1 for standard taper pipe threads.

C. Fittings

1. Fittings for use with Schedule 40 pipe conveying water or low pressure air shall be 150 lb malleable iron, screwed, conforming to ASTM A 338.

2. Fittings shall be galvanized for conveying water and black for conveying air.

3. Fittings for use with Schedule 80 pipe conveying water shall be Class 300 galvanized, malleable iron, screwed, conforming to ASTM A 338.

4. Fittings for use with Schedule 80 pipe conveying chlorine shall be forged steel, screwed conforming to manufacturers' standard rating 2000 pound cold water pressure.

2.8 COPPER SERVICE TUBING (CT)

A. Pipe: Copper tubing for buried water service shall be “Type K” soft (flexible) in conformance with ANSI H 23.1/ASTM B 88.

1. Furnish product in continuous coiled lengths.

B. Joints: Shall be made with flared couplings conforming to AWWA Standard C 800.

C. Couplings: Shall conform to AWWA C800 except the minimum pressure rating shall be 150 psi.

1. Cast brass shall be copper alloy UNS number C 83600 conforming to ASTM B 62 or ASTM B 584.

2.9 PLASTIC SERVICE PIPE AND TUBING

A. Pipe: Polyethylene Pipe and Tubing (PE)

1. Both pipe and tubing shall conform to AWWA C 901 or AWWAC 904 for sizes ½” through 3”.

2. PE service pipe shall conform to ASTM D 2239 or D 3035 and tubing shall conform to ASTM D 2737.

3. All pipe and tubing shall have a pressure rating or pressure class based on a 2.0 safety factor at 73 degrees F applied to the maximum static operating pressure with zero surge allowance and with derating for operating temperatures above 73 degrees F and below 100 degrees F, as recommended by PPI.

4. The polyethylene compound from which the pipe is manufactured shall be high density, ultra-high molecular weight conforming to ANSI/ASTM D 1248, and shall be either PE 2706 or PEX 1006 with HDB rating 1250 or PE 3608 with HDB rating of 1600 psi stress as established by PPI.

5. Unless designated otherwise, the minimum pressure rating or class shall be 160 psi. The resulting maximum dimension ratios shall be as follows:

Material	PE 2706	PE 3608	PEX 1006
ID Based Pipe	DR 7.0	DR 9.0	NA
OD Based Pipe & Tubing	DR 9.0	DR 11.0	SDR 9

B. Joints:

1. Joining methods and fittings used on service line applications shall be insert stiffener type complying with the material and performance requirements of ANSI/AWWA C800.

2. Only compression type bronze connectors with split ring external clamp and with stainless inserts shall be allowed. Hot flared, insert hose type, or stab type connections shall be prohibited.

2.10 SPECIAL PIPE FITTINGS

A. Ductile-Iron Rigid Expansion Joints:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. EBAA Iron, Inc.

   b. U.S. Pipe and Foundry Company.

2. Description: Three-piece, ductile-iron assembly consisting of telescoping sleeve with gaskets and restrained-type, ductile-iron, bell-and-spigot end sections complying with AWWA C110 or AWWA C153. Select and assemble components for expansion indicated. Include AWWA C111, ductile-iron glands, rubber gaskets, and steel bolts.

   a. Pressure Rating: 250 psig.

   b. Expansion Required: 4”

B. Ductile-Iron Flexible Expansion Joints:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. EBAA Iron, Inc.

   b. Hays Fluid Controls; a division of ROMAC Industries Inc.

   c. Star Pipe Products.

2. Description: Compound, ductile-iron fitting with combination of flanged and mechanical-joint ends complying with AWWA C110 or AWWA C153. Include two gasketed ball-joint sections and one or more gasketed sleeve sections. Assemble components for offset and expansion indicated. Include AWWA C111, ductile-iron glands, rubber gaskets, and steel bolts.

    a. Pressure Rating: 250 psig.

    b. Offset: **4"**

    c. Expansion Required: **4"**

C. Ductile-Iron Deflection Fittings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. EBAA Iron, Inc.

2. Description: Compound, ductile-iron coupling fitting with sleeve and 1 or 2 flexing sections for up to 15-degree deflection, gaskets, and restrained-joint ends complying with AWWA C110 or AWWA C153. Include AWWA C111, ductile-iron glands, rubber gaskets, and steel bolts.

    a. Pressure Rating: 250 psig.

2.11 PIPING SPECIALTIES

A. Transition Fittings: Manufactured fitting or coupling same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.

B. Tubular-Sleeve Pipe Couplings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Cascade Waterworks Manufacturing.

    b. Dresser, Inc.; Dresser Piping Specialties.

    c. Ford Meter Box Company, Inc.; Pipe Products Div.

    d. Hays Fluid Controls; a division of ROMAC Industries Inc.

    e. JCM Industries.

    f. Smith-Blair, Inc.

    g. Viking Johnson.

2. Description: Metal, bolted, sleeve-type, reducing or transition coupling, with center sleeve, gaskets, end rings, and bolt fasteners and with ends of same sizes as piping to be joined.

    a. Standard: AWWA C219.

    b. Center-Sleeve Material: **Manufacturer's standard**

    c. Gasket Material: Natural or synthetic rubber.

    d. Pressure Rating: 150 psig

    e. Metal Component Finish: Corrosion-resistant coating or material.

C. Split-Sleeve Pipe Couplings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Victaulic Depend-O-Lok.

2. Description: Metal, bolted, split-sleeve-type, reducing or transition coupling with sealing pad and closure plates, O-ring gaskets, and bolt fasteners.

    a. Standard: AWWA C219.

    b. Sleeve Material: **Manufacturer's standard**

    c. Sleeve Dimensions: Of thickness and width required to provide pressure rating.

    d. Gasket Material: O-rings made of EPDM rubber, unless otherwise indicated.

    e. Pressure Rating: 150 psig **minimum**.

    f. Metal Component Finish: Corrosion-resistant coating or material.

D. Flexible Connectors:

1. Nonferrous-Metal Piping: Bronze hose covered with bronze wire braid; with copper-tube, pressure-type, solder-joint ends or bronze flanged ends brazed to hose.

2. Ferrous-Metal Piping: Stainless-steel hose covered with stainless-steel wire braid; with ASME B1.20.1, threaded steel pipe nipples or ASME B16.5, steel pipe flanges welded to hose.

E. Dielectric Fittings: Combination of copper alloy and ferrous; threaded, solder, or plain end types; and matching piping system materials.

1. Dielectric Unions: Factory-fabricated union assembly, designed for 250-psig minimum working pressure at . Include insulating material that isolates dissimilar metals and ends with inside threads according to ASME B1.20.1.

2. Dielectric Flanges: Factory-fabricated companion-flange assembly, for 150 minimum working pressure to suit system pressures.

3. Dielectric-Flange Insulation Kits: Field-assembled companion-flange assembly, full-face or ring type. Components include neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.

    a. Provide separate companion flanges and steel bolts and nuts for 150 minimum working pressure to suit system pressures.

4. Dielectric Couplings: Galvanized-steel couplings with inert and noncorrosive thermoplastic lining, with threaded ends and 300-psig minimum working pressure at 225 deg F.

5. Dielectric Nipples: Electroplated steel nipples with inert and noncorrosive thermoplastic lining, with combination of plain, threaded, or grooved end types, and 300-psig minimum working pressure at 225 deg F.

2.12 CORROSION-PROTECTION PETROLATUM TAPE

A. Materials

1. Primers

    a. The Primer shall be comprised of saturated petroleum hydrocarbons (petrolatum) inert fillers and passivating agents.

    b. The primer will be an integral component of the Tape system for the preparation of metal surfaces prior to wrapping. Primers shall displace moisture, passivate surface oxides, fill surface imperfections and ensure intimate contact between Petrolatum Tapes.

2. Mastics

    a. The Mastics shall be comprised of saturated petroleum hydrocarbons (petrolatum) inert fillers, reinforcing fibers and thermal extenders. Variations may contain beads of cellular polymer and flow control additives.

    b. Mastics shall be cold applied self-supporting Mastics for molding around irregular shaped fittings to provide a suitable profile for applying anti-corrosion tapes.

3. Petrolatum Tapes

    a. Petrolatum tapes shall have a character stable in composition and plasticity over a wide temperature range. The tape shall be non-hardening and non-cracking. The

tape shall accommodate vibration and extreme movement of substrate. Superficial oxidation renders surface less tacky. The tape is highly resistant to mineral acids and alkalis.

b. Shall meet NACE RP0375-2006 and AWWA C217 Standards

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Denso North America, Inc.

2.13 CORROSION-PROTECTION PIPING ENCASEMENT (POLY WRAP)

A. Encasement for Underground Metal Piping and Fittings :

1. Standards: AWWA C105/A21.5 and AWWA C600.

2. Form: Tube.

3. Material: 3 layers of co-extruded linear low density polyethylene fused into a single thickness of not less than 0.008-inch minimum thickness.

4. Characteristics: Interior of polyethylene wrap in contact with the pipe exterior shall be infused with a blend of antimicrobial biocide to mitigate microbiologically influenced corrosion and a volatile corrosion inhibitor to control galvanic corrosion. Manufacturer shall include historical performance data of the poly wrap and biocide/volatile corrosion inhibitor with pipe submittal information.

5. Color: Per manufacturer

2.14 TRACERS FOR BURIED PIPE

A. A non-corrosive continuous metallic wire shall be installed over all underground pipes to facilitate their future location detection. Splice wire with Direct Bury Splice Kit by 3M, King Innovation, Snake Bite Splicers by Copper Head Industries, or equal.

B. The wire shall be either of the following.

1. Stainless Steel Wire – shall be .040” or larger bare stainless steel wire.

2. Copper Wire – shall be type TW, AWG #10 gauge solid copper wire with blue insulation, 30 mil for open cut and mil for bored pipe.

3. Copperhead Industries Reinforced Tracer Wire, #10 AWG with blue insulation, 30 mil for open cut and 45 mil for bored pipe.

4. Copperhead Industries Reinforced Tracer Wire, #10 AWG with blue insulation.

2.15 LEAK CLAMPS

A. Damaged or defective pipe shall be replaced and the use of leak clamps shall be used only to repair existing systems.

B. Bell joint leak clamps shall be heavy malleable or ductile iron with rubber gaskets and high-strength, low-alloy steel or stainless steel bolts.

C. Pipe barrel repair clamps shall be Type 302/304 stainless steel full circle bands with neoprene gasket and high-strength, low alloy steel or stainless steel bolts, in accordance with AWWA C230.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Refer to Division 31 Section "Earth Moving" for excavation, trenching, and backfilling.

3.2 PIPE JOINING

A. General: Joints shall be of the type specified for the pipe used, and all joints shall be made in strict compliance with the published recommendations of the joining component manufactures.

B. Field Cuts: Make all field cuts in pipe at right angles. Use jigs, guide boxes or templates. Ream, scrape, file, grind or bevel ends as required for the joint.

C. Screwed or Threaded Joints:

1. Threads shall be American National Taper Pipe Threads and shall be neatly cut with sharp tools and jointing procedure shall comply with best practice. Before jointing, remove all scale and cuttings from pipe.

2. Screw metallic piping together with an application of two (2) layers of 0.003 inch thick T.F.E. tape or a stiff mixture of graphite and engine oil or linseed oil to male threads only.

3. Screw plastic piping together only within T.F.E. tape and do not use pipe compounds which contain engine, mineral, linseed or other oils.

4. Use only strap wrenches where required to prevent damage to plastic, non-ferrous or polished tubing.

5. Where pipe wrenches are used, file smooth any gouges and repair damaged coatings.

6. Once a joint has been screwed up it shall not be backed off unless the threads are re-cleaned and new compound or tape applied.

7. Wipe off any excess oil and graphite or dirt after joining.

D. Gasketed or Slip-On Joints

1. Inspect spigot pipe ends for freedom from damage. End field bevels shall be equal to factory bevels in angle, length and uniformity.

2. Clean all joining components and orient non-locked-in gaskets properly and seat the gasket firmly in the groove. Lubricate the spigot only with lube supplied by the manufacturer and in accordance with his published recommendations.

3. Use a pry bar or hand operated mechanical assistance for joining pipe as recommended, and do not use motor powered equipment, such as a backhoe.

4. Make joints in general accordance with ANSI/AWWA C 600 for ductile iron pipe, and ANSI/AWWA C605 for PVC.

E. Mechanical Joints

1. Install joints in compliance with ANSI/AWWA C 600. Tighten bolts uniformly to the range of torque recommended by the manufacturer and for ductile iron pipe comply with ANSI/AWWA C111. After all bolts have been inserted and the nuts have been made up finger tight, diametrically opposite nuts shall be progressively and uniformly tightened all around the joint to the proper tension, preferably by means of a torque wrench.

2. The correct range of torque as indicated by a torque wrench and the length wrench (if not a torque wrench) used by an average man to produce such range or torque, shall not exceed the values as follows:

Nominal pipe size, in.	**Bolt diameter, in.**	**Range of torque, ft. – lb.**	**Length of wrench, in.**
3	5/8	45-60	8
4-24	¾	75-90	10
30, 36	1	100-120	14
42, 48	1 ¼	120-150	16

F. Flanged Joints

1. Inspect flange faces and repair or reject damaged pieces.

2. Field welded flanges shall have faces normal to the pipe axis and pipe ends shall be faced as required. Reject iron pipe flanges that are not flush faced and have pipe projections or raised flange face.

3. Flange contact faces shall bear uniformly on the gasket. Torque bolts to uniform stress.

4. Bolt holes between adjacent flanges or between flanges and equipment shall be in alignment so as to induce no stress in the piping or equipment by the joint.

5. Lap joint stubs and flanges or filler flanges may be required to facilitate alignment.

G. Solvent Cemented Joints

1. All solvent cementing shall be done by proficient workers who have been trained and instructed by the manufacturer of the pipe or cement.

2. Do all solvent cementing for all plastic pipes in general compliance with ANSI/ASTM D2855, as for PVC.

3. Mating surface temperature shall be between 40 degrees and 110 degrees F. Apply cleaner to both components and apply solvent cement only to the spigot or male end. Fully coat, but do not apply an excess.

4. Insert spigot, hold together, and turn cemented components ¼ turn and complete joining within 20 seconds after last application of cement. Wipe off excess.

5. After joining, do not disturb pipe or joint within the recommended set time. Do not apply pressure within the recommended cure times which for PVC pipe are as follows:

SET TIMES FOR PVC PIPE SIZES				
Temperature Range	**PIPE SIZES**			
	½” to 1 ¼”	1 ½” to 3”	4” to 8”	10” to 20”
60° - 100° F	15 minutes	30 minutes	1 hour	2 hours
40° - 60° F	1 hour	2 hours	4 hours	8 hours
0 - 40° F	3 hours	6 hours	12 hours	24 hours

CURE TIMES FOR PVC PIPE SIZES AND PRESSURES								
Temperature Range	½” to 1 ¼”		1 ½” to 3”		3 ½ ” to 8”		10” to 14”	16” to 24”
	to 180 PSI	over 180 PSI	to 180 PSI	over 180 PSI	to 180 PSI	over 180 PSI	up to 180 PSI	up to 100 PSI
60° - 100° F	1 hr	6 hrs	2 hrs	12 hrs	6 hrs	24 hrs	24 hrs	48-72 hrs
40° - 60° F	2 hrs	12 hrs	4 hrs	24 hrs	12 hrs	48 hrs	72 hrs	5 days
0 - 40° F	8 hrs	48 hrs	16 hrs	48 hrs	48 hrs	8 days	8 days	10-14 days

H. Welded Steel Pipe Joints:

1. Welded joints shall be in compliance with AWWA standard C206. Repair any coating or lining damaged by welding.

a. Manual welding operators shall be currently qualified under the Standard Qualification Procedure of the AWS. The Engineer shall have the right at any time to call for and witness the making of test specimens by any welder. If he requires that any welder shall requalify by making such tests or by other test that may be agreed upon, the expense of such tests shall be borne by the Contractors.

b. Equipment for welding and flame cutting shall be of the design and construction and be in such condition so as to permit qualified welding operators to follow the procedure of the AWS and obtain the results described in these Specifications.

c. Rods for all welding, including tack welds, shall be Lincoln Electric Company's Fleetweld No. 5 or No. 5P with a maximum rod size of 3/16 inch.

d. The edges of all plate more than 3 inch thick that are to be joined by butt welding shall have a bevel of not less than 30 degrees. All cut edges shall be uniform, smooth, and free from scale and slag accumulations, and cleaned to bright metal. The edges to be welded that are prepared by flame cutting shall be made smooth before any welding operation. Plates being welded shall be accurately matched and retained in position during the welding operation. The maximum permissible parallel misalignment of circumferential joints shall be 20 percent of the plate thickness.

e. Make welds by the electric shielded arc method. In making butt and fillet welds, deposit weld metal in successive layers so that there will be as many passes as there are complete multiples of 1/8 inch in plate thickness. Welds shall have thorough fusion and complete penetration. Finished weld beads shall be control to the seam, and the finished joints shall be smooth and free from depressions, cut edges, burrs, irregularities and alleys. Hammer and wire brush each deposited layer of welded material and remove all slag, scale, and other loose material before additional weld metal is applied. Fillet welds shall have full penetration into the corner of the fillet, and obtained with a minimum cutting back of the edge of the outside plate. Make butt welds by adding weld metal to both sides of the joint. The reverse side of the joints for butt welds shall be chipped out, removing all slag and unsound metal, and obtaining a clean surface for the application of weld metal to the side. Butt welds shall not protrude more than 1/16 inch beyond the plate surface of the inside of the pipe and not more than 1/8 inch on the outside of the pipe.

f. Fillet welds shall be of the size specified or as shown on the Drawings, and if not designated, shall have a thickness of not less than that of the thinnest member to be joined.

g. Tack welds shall have a thickness of not over 2/3 of the adjacent plate thickness and be removed, if required.

h. Welding of circumferential joints or seams on pipe with a wall thickness of less than 2 inch shall be by the "down-hill" method. For welding on pipe with a wall thickness of 2 inch or greater, use either the "down-hill" or the "up-hill" method.

i. Welds deficient in quality or made contrary to these Specifications shall be removed by chipping or cutting and shall be remade. Remove weld metal throughout its depth to expose clean base metal, but in no case shall the chipping or cutting extend into the base metal beyond the depth of weld penetration.

I. Soldered Joints

1. Prepare copper tubing for solder joints by cleaning the ends of the tubing and the inner surfaces of the fittings with steel wool or abrasive cloth until they are bright.

2. Give the cleaned surfaces a thin coating of acceptable soldering flux, and insert the tubing end into the fitting as far as possible.

3. Heating and finishing of the joint shall be done in accordance with the recommendations of the manufacturer of the fittings, using solid string or wire solder composed of 95 percent tin and 5 percent antimony.

4. The use of cored solder will not be permitted.

5. The use of lead solders will not be permitted in potable water systems.

J. Sleeve-Type Couplings

1. Clean the pipe ends prior to the installation of sleeve-type couplings. Soapy water may be used as a gasket lubricant.

2. A follower and gasket, in that order, shall be slipped over each pipe to a distance of about 6" from the end, and the middle ring shall be placed on the already laid pipe end until it is properly centered over the joint.

3. Insert the other pipe end into the middle ring and bring to proper position in relation to the pipe already laid. Press the gaskets and followers evenly and firmly into the middle ring flares.

4. After the bolts have been inserted and all nuts have been made up finger tight, diametrically opposite nuts shall be progressively and uniformly tightened all around the joint, preferably by use of a torque wrench of the appropriate size and torque for the bolts. The torques shall not exceed 75 ft. - lbs. for 5/8" bolts and 80 ft. - lbs. for 3/4" bolts.

5. After assembly and inspection and before being backfilled, all exterior surfaces of buried sleeve-type couplings, including the middle and follower rings, bolts, and nuts, shall be thoroughly coated with an acceptable heavy-bodied bituminous mastic. Care shall be taken and appropriate devices used to ensure that the undersides, as well as the more readily accessible parts, are well coated.

K. Miscellaneous Joints

1. Install joints such as cold flared or compression as recommended by the manufacturers of the joining components and joining tools.

2. Take care not to crack or split tubing flares.

3. Assemble components, insert pipe to full depth, and tighten compression nuts, grip clamps and bolts to the recommended torques.

4. Make diaper joints over exposed steel rings in concrete pipe and fill with grout or bitumen as recommended by the pipe manufacturer.

3.3 AUGER TRENCHING, JACKING AND BORING, OR HORIZONTAL DIRECTIONAL DRILLING (HDD) CARRIER PIPE AND CASING PIPE

A. General: Auger trenching, jack and boring, or horizontal directional drilling shall be used where required by the Drawings as the method of excavation to install pipe, either casing pipe or direct carrier pipe, under Federal or State Highways, railroad tracks, water crossings, or concrete pavements without open trenching and disturbing the surfacing or road bed.

B. Auguring or jack and boring shall be done dry without the use of fluids or drilling mud, unless otherwise approved as a condition of the permit issued to the Owner by the approving authority.

1. The augured hole diameter for casing pipe shall be essentially the same as the outside diameter of the pipe plus the thickness of any protective coating.

2. The augured hole diameter for carrier pipe, where allowed and required without casing, shall be essentially the same as the outside diameter of the bell or coupling of the carrier pipe.

3. If voids should develop or if the bored hole diameter is greater than the diameter of the pipe barrel plus coating by more than approximately one inch (1”), the annulus shall be pressure grouted with cement grout for metal pipes and with chemical grout for plastic pipes.

4. Take care not to damage the pipe nor coating during pipe jacking operations.

C. Horizontal Direction Drilling is a three stage process where the first stage drills a pilot hole on prescribed bore path; the second stage enlarges the hole by passing a larger cutting tool known as the back reamer; the third stage pulls in the pipe.

1. HDD uses a drilling fluid. The entry and exit areas of the directional drilling area shall be constructed to completely contain the drill fluid.

2. Grout annulus between pipe and bore hole, if required by permit or Drawings.

D. Installing Casing Pipe

1. Casing pipe, joints, carrier runners and seals shall be as specified hereinbefore.

2. Casing pipe and joints shall be of leakproof construction and sloped to one end. The ends shall be sealed.

E. Carrier Pipe Supports

1. Supports for carrier pipe in casing shall be installed at each joint on ductile iron pipe and rigid pipes (R.C.C.P.). On flexible carrier pipes install supports as follows:

MAX. SUPPORT SPACING, FT.		
Carrier Size, In.	**Steel Pipe**	**PVC or GFR Pipe**
4	18	5.7
6	18	7.5
8	18	9.1
10	22	10.6
12 or 14	22	11.9
15 or 16	23	13.6
18	24	14.4
20 & Larger	25	16.1

Note: This table is conservatively and generally based on water filled pipe with 2" maximum deflection for steel carrier with D/t of 115 or less and on stress limit for PVC carrier with DR of 35 or less at 140 degrees F.

3.4 INSTALLING TRACERS ON ALL BURIED PIPE

A. Directly over and on the centerline of all underground pipe, both mains and services, shall be installed a continuous non-corrosive metallic wire to facilitate locating the pipe in the future.

B. Loop a half-hitch periodically around the pipe at bells or couplings and use pressure sensitive tape periodically to secure the wire at the top centerline of the pipe.

C. Make splices in tracer wire with a Direct Bury Splice Kit as manufactured by 3M or equal.

D. Splice tracer wire to a #10 solid wire at all valves as detailed on Drawings.

E. Connect the tracer between mains and services at each corporation stop and to each meter or curb stop.

F. Leave excess tracer coiled inside the meter box or curb box.

G. Test tracers for electrical continuity at all leads after installation with batteries and lights or bells or by Ohmmeter.

3.5 INSTALLATION OF MAINS AND APPURTENANCES

A. Main Pipe Installation

1. Installation of water pipe shall comply with provisions of applicable standards including AWWA C600 for iron pipe, AWWA C605 and ANSI/ASTM D2774 for PVC, AWWA C604 for steel, and AWWA manual M-9 for concrete pressure pipe, except in cases of conflict with these Specifications, in which case these Specifications will govern.

2. Use proper and suitable tools and appliances for the safe and convenient handling and laying of pipe and take care to prevent damage to pipe coating.

3. If required by the size pipe being used, mechanical pullers (or spreaders) shall be used in compliance with the pipe manufacturer's instruction.

4. Use cushioned slings to lower pipe components in the trench.

5. Inspect, swab and disinfect pipe while suspended, if it is dirty.

6. While laying buried pipe is in progress, keep the trench free of water.

7. When work is suspended either for the night or for other reason, securely plug open ends of pipe to prevent the entrance of soil, water, animals or obstruction. Dead ends of pipe and unused branches of crosses, tees, valves, etc. shall be closed with plugs suitable to the type of pipe used.

8. Buried solvent cemented joint PVC pipe size 2 ½ inches and smaller shall be snaked in the trench to allow for contraction based upon a minimum design requirement of 100 degrees F. temperature change.

9. Solvent cemented joint in PVC pipe size 3 inches and larger shall use special expansion joints at each structure and bend and with spacing and piston travel design for both 100 degrees F. expansion and 100 degrees F. contraction.

10. Where excavated soils exhibit odors of organic chemicals, such as gasoline, no plastic pipe shall be used in that location for mains or services, due to plastics being permeable to organic chemicals which may contaminate the water. The piping material to be used at that location shall be selected by the Engineer and installed under Change Order, if necessary.

    Trenches for water lines shall be of a depth to provide a minimum cover over the top of the pipe as follows:

    Minimum Cover By Pipe Size

Location	**8” & Smaller**	**10” & Larger**
South of 35 degrees N. Latitude	30”	36”
North of 35 degrees N. Latitude	36”	36”

11. Where lines are within rights-of-way belonging to railroads or state highway departments, the requirements of the agency involved shall be met where their requirements for minimum cover exceed the above minimums.

12. Where water line trenching encounters a sanitary or storm sewer, pipeline or other subsurface utility or other obstruction, it will be permitted to lay water pipe above the obstruction provided a minimum cover of eighteen inches (18") can be obtained over the water pipe while providing a specified cushion between the water pipe and the obstruction, otherwise the obstruction shall be bypassed or tunneled under.

13. Where the separation between sanitary sewer and water lines is not clearly defined by dimensions on the Drawings, a sewer shall not be closer horizontally than ten feet to the water supply main or service line, except that where the bottom of the water pipe will be at least eighteen inches above the top of the sewer pipe, the horizontal spacing may be a minimum of six feet.

B. Thrust Restraint and Anchorage

1. For push-on or slip-joint pressure pipe and expansion joints, size and furnish adequate thrust restraint as detailed on the Drawings or furnish equivalent substitute special designs which are acceptable to the Engineer. The following methods of restraint or any combination thereof may be used.

   a. Thrust blocks

   b. Anchor rods

   c. Restrained joints

   d. Thrust collars

   e. Friction Slabs

   f. Thrust piles

2. All waterline deflections shall have thrust restraint to firmly secure the pipe from any joint separation.

3. Tees, caps, plugs, valves, hydrants and other fittings shall be properly restrained.

4. External thrust restraint shall not be required for continuously welded steel piping, flanged piping, threaded piping or solvent cemented plastic piping, within the limitations of the joint.

5. Design of special thrust restraints that are not in accordance with the Drawings and Specifications shall be done by the Contractor and pipe component manufacturer with approval of the Engineer.

6. Concrete for thrust restraints shall have a compressive strength of not less than 2,000 psi at 28 days. High-early-strength cement may be used where accelerated pressurization of the piping is desired.

7. Allowable soil bearing values, according to soil type, are shown on the Drawings. Tests for soil values and coefficients that may be required for restraint designs shall be determined by the Contractor and the pipe manufacturer at no cost to the Owner.

8. Anchor all buried valves size two-inch (2") and larger, as shown on the Drawings, against both operator torque and thrust.

C. Corrosion Protection

1. Installing All-Purpose Petrolatum Tape on Ductile Iron Fittings where shown on the Drawings

   a. Install in compliance with ANSI/AWWA C217

   b. Prepare surfaces by removing all loose scale, rust or other foreign matter in accordance to SSPC SP2 “Hand Tool Cleaning” or SP3 “Power Tool Cleaning”. High pressure water wash of 3,000 - 7,000 psi (20.68 - 48.26 MPa) is also suitable.

   c. Apply a thin film of Paste, which serves as a primer.

   d. Spirally wrap the tape with a minimum 1" overlap. For severely corrosive environments, a 55% overlap is required. While wrapping, press air pockets out and smooth all lap seams.

   e. For additional mechanical protection, an overwrap shall be used to increase impact strength and electrical resistance.

   f. Irregular surfaces such as valves, flanges, etc. require the use of Mastic or Profiling Mastic.

2. Installing Polyethylene Encasement On Buried Iron Pipe

   a. Where polyethylene encasement is required on the Drawings for buried iron pipe, install it in compliance with ANSI A 21.5/AWWA C105.

   b. Protect the polyethylene from direct sunlight when it is stored for periods longer than a few weeks.

   c. Do not use angular granular pipe bedding and backfill materials within 12 inches of polyethylene encasement.

   d. Take care to make the polyethylene film continuous, with adequately lapped and taped splices, and repair any rips, punctures or other damages.

3. Coating of Buried Steel Pipe

   a. Steel pipe for burial shall be plant coated as specified hereinbefore.

   b. After field joining the ends of plant coated steel pipe, coat the exterior of connections by cleaning, primer or hot-applied coal tar tape in compliance with

ANSW/AWWA C203. Repair damaged shop coating and test entire pipe before burial with high voltage detector in compliance with ASTM G 62.

4. Cement Mortar Lining of Buried Pipelines in Place

   a. Where the Drawings indicated in-place cement mortar lining of newly buried steel pipeline or rehabilitation of old ferrous pipeline, sizes four-inch (4") and larger, comply with AWWA C 602.

5. External Cathodic Protection of Underground Coated Steel Transmission Pipeline

   a. General

      1) Coated steel transmission pipeline shall be provided with external cathodic protection utilizing sacrificial metal anodes. The design shall be based on field tests with an assured minimum effective service life of 25 years. The system shall be designed by a qualified corrosion engineer in accordance with NACE Standard RP-01-69.

   b. Isolation

      1) The steel transmission pipeline shall be electrically isolated from all foreign and connecting metallic structures.

      2) All connecting metallic piping, including blow-offs and vents shall be isolated at the closest fitting to the transmission pipeline that is feasible. Use flange insulation sets with double end bolt insulation or other suitable insulating pipe fittings, installed in accordance with the recommendations of the manufacturer of the insulating kit or fitting.

      3) All metallic casing pipes shall be isolated by use of suitable casing insulators with skid blocks.

      4) Wherever the transmission pipeline enters or exists a metallic casing pipe or other metallic or reinforced concrete structure, it shall be isolated and sealed by use of a suitable rubber compression or neoprene link type seal.

      5) Wherever a buried foreign metallic pipe or cable or other metallic structure crosses or parallels the transmission pipeline, maximum feasible spacing shall be maintained. If less than six inches (6") of clearance can be achieved, insulating blocks with minimum thickness of 2" shall be placed between the foreign structure and the transmission pipeline, to provide effective isolation after backfilling and compaction.

      6) Wherever the transmission pipeline is supported on a bridge or any other metallic or concrete structure, it shall be isolated by use of suitable pipe cradles or hangers with insulating support rollers, installed at intervals in accordance with the recommendations of the manufacture.

c. Continuity

1) The steel transmission pipeline shall be electrically continuous from end to end.

2) All in-line flanged or other non-threaded and non-welded joints and fittings shall be assured of permanent low electrical resistance across the joint and between the transmission piping and the fitting by use of suitable metallic connectors and a suitable covering of protective coating or plastic insulation to prevent oxidation of the pipe, fittings or connectors.

3) The electrical resistance of any such connector across in-line joint in the transmission pipeline shall not exceed the electrical resistance of five linear feet of the transmission pipeline. The electrical resistance of any connector between the transmission piping and fitting which is not the primary connector across an in-line joint in the transmission pipeline shall not exceed 0-.005 ohm.

4) In flanged connections, the steel flanged bolts may be considered the electrical connectors across the joints, provided that all mating surfaces of the flanges with the bolts, nuts and washers are clean, bright metal when the bolts are installed, and that the joints of those mating surfaces are sealed with a suitable covering of protective coating. If copper wires are used for connectors, then each connector shall be comprised of two insulated wires in parallel, attached separately with suitable thermite brazes in accordance with the recommendations of the manufacturer of the brazes.

d. Test Stations

1) Test stations shall be installed at each end and at maximum intermediate intervals of 1,000 linear feet along the transmission pipeline. Test stations shall generally be located at the right-of-way line for optimum protection from damage and convenience of us. A test station shall be installed at each insulating fittings, and at each valve, crossing of foreign metallic pipe or cable, casing, pipe, bridge, and all other supporting or enclosing metallic or reinforced concrete structures.

2) Each test station shall include two test wires connected to the transmission pipeline, two test wires connected to each isolated connecting or foreign metallic structure, if any. All test wire shall be provided with suitable terminating lugs and attached by rosin core solder to separate brass terminals mounted on a suitable plastic terminal board.

3) Wherever feasible, the terminal board shall be mounted in, or may be the cover of a suitably sized “Type E, Crouse-Hinds” conduit, or equal, mounted on a creosoted or penta treated 4” x 4” wood post approximately five feet long, projecting about 30” out of the ground. Rigid steel electrical conduit of suitable size, provided with an insulation end bushing and attached to the wood post, shall protect the test wires from the conduit to a point twelve inches below grade.

4) Where post mounted test stations are not feasible, the terminal boards shall be mounted in cast iron valve box type enclosures with locking cast iron covers bearing the letter "CP" in bold relief. The enclosures shall be installed flush with grade in a concrete slab with a minimum surface area of two feet square and a minimum thickness of six inches.

5) The test wires shall be stranded copper with type TW, RHW, or CP electrical insulation. The two wires from the transmission pipeline and from each connecting and foreign structure shall be No. 12 and No. 4 AWG, or larger.

6) The test wires shall be connected to the transmission pipeline and to each connecting and foreign metallic structure by means of a thermite braze. The type and size of thermite charge, type mold, type and size of copper reinforcing sleeve, if any, and the procedure for preparing the surface, making and testing the attachment shall all be in accordance with the latest recommendations of the manufacturer of the thermite braze.

7) All thermite braze connections shall be suitably sealed with an epoxy or coal tar epoxy coating, mixed and applied in accordance with the latest recommendations of the manufacturer of the coating, and allowed to cure tack free before backfilling.

e. Coating/Isolation Inspection

1) After the steel transmission pipeline has been backfilled for a minimum of sixty (60) days, a surface survey shall be conducted to determine the effectiveness of the external pipe coating system and the electrical isolation of the transmission pipeline.

2) A type "PD" electronic test instrument manufactured by Tinker & Rasor, or equal, shall be used to perform the survey. This test instrument shall be operated in accordance with the manufacturer's latest recommendation by personnel skilled in its use.

3) All coating and isolation defects located during the survey shall be excavated and suitable repaired, so that the defects cannot be located by a similar re-surveyed test.

f. Sacrificial Anodes

1) The steel transmission pipeline shall be protected with sacrificial metal anodes.

2) The quantity, size, type and grade of sacrificial metal anodes to be installed shall be determined by the Contractor as specified hereinbefore.

3) Each sacrificial metal anode shall be surrounded with two inches minimum of a special backfill mixture consisting of 75% gypsum, 20% bentonite and

5% anhydrous sodium sulfate, prepackaged with the anode in a permeable, quick wetting cloth bag.

4) The sacrificial metal anodes shall be electrically connected to the transmission pipeline by a suitable insulated metallic connected wire having a maximum electrical resistance of 0.02 ohm.

5) A minimum of 5% of the anode connector wires shall be provided with an 0.01 ohm shut, silver soldered in series into the connector. The shunt body and connections shall be sealed with vinyl electrical tape. The shunt shall be mounted in a test station with the two shunt terminals exposed for ease of test connection. The shunted anodes shall be distributed at reasonably uniform intervals along the entire length of the transmission pipeline.

6) The packaged anodes shall be presoaked in water so that the special backfill is saturated before installation. The anodes may be installed before, during or after the transmission pipeline is installed in compacted earth backfill within the designated pipeline right-of-way at such depts. And locations as the Contractor may choose; provided, however, that no anode should be installed less than two feet below finish grade.

g. Testing

1) Before acceptance of the cathodic protection system, test surveys shall be performed and a written report of the surveys, presenting all test data and other pertinent information, shall be provided to the Engineer in six (6) copies. The tests shall be performed by experienced personnel who are currently accredited as corrosion specialists in the field of cathodic protection by the NACE.

2) A minimum of sixty (60) days after the installation of all anodes provided with shunts, a current output survey shall be conducted. An accurate 0-2 millivolt range potentiometer shall be used to perform the survey. The meter terminals shall be connected across the terminals of each anode shunt, adjusting the voltage readings for lead wire resistance, temperature, and any other significant factors, the current output of each tested anode shall be calculated, using Ohm's law. On the basis of good engineering practice and the anode manufacturer's written guaranteed minimum average ampere-hour output per pound of anode metal, it shall be demonstrated to the satisfaction of the Engineer that the minimum service life of each tested anode at 50% consumption shall be 25 years at the measured output current of the anode.

3) Insulated nichrome resistance wire may be silver soldered into some or all of the anode connection wires to achieve this specified service life; provided, however, that if this is done, then every anode must be provided with a shunt and test station, and the current output of every anode must be read and recorded, and must be adjusted, if necessary, to meet this service life requirement. The joints of the resistance wire, if used, shall be sealed with vinyl electrical tape.

4) A minimum of thirty (30) days after all anode current output adjustments are completed, a pipe-to-soil potential survey shall be conducted. An accurate 0-2 volt range volt meter – potentiometer shall be used to perform the survey. The meter terminals shall be connected between a test station wire from the transmission pipeline and the copper-copper sulfate reference half cell placed in contact with the soil directly (or as close as feasible) over the transmission pipeline. The pipe-to-soil potentials shall be observed and recorded at every test station. As the discretion of the Engineer, additional pipe-to-soil potential tests may be required with the half cell located over the transmission pipeline at intermediate points selected by the Engineer between test stations; provided, however, that the total of such additional tests shall not exceed an average of twenty per linear mile of transmission pipeline. It shall be demonstrated to the satisfaction of the Engineer that the transmission pipeline potential is a minimum of 850 millivolts negative to the copper-copper sulfate half cell at all test points along its entire length.

5) During the pipe-to-soil potential survey, the test personnel shall be alert for any signs of interference effects from stray electrical currents which might corrode the transmission pipeline. Any such interference effects shall be satisfactorily resolved in accordance with good engineering practice.

D. Connecting New Water Mains with Existing Lines

1. Where indicated on the Drawings, new water mains shall be connected with existing water lines.

2. Small connections shall be screwed or adapted directly into a tapped plug in the new main with the necessary pipe, valves, and fittings.

3. Connections to existing lines size three inch (3") and larger shall be made by the method shown on the Drawings of either tapping tee and valve, or a cut-in sleeve with necessary connectors.

4. Special line stopples or tapping machines and fittings shall be used in compliance with manufacturer's recommendations, where it is not possible or practical to completely valve off the existing line pressure for a cut-in connection. Provide temporary thrust restraint for the line when using stopples.

5. Connect small diameter pipes as applicable with threads, connectors or couplings.

6. Plug cap or valve off and restrain thrust on lines to remain in service.

E. Cleaning Existing Pipelines

1. Where indicated on the Drawings, clean existing lines size four inch (4”) and larger. Clean the pipelines in general accordance with AWWA C 602. Use one or more passes of various sized fluid-propelled scrapers or pipeline pigs to clean and to remove sediment, tuberculation, and encrustation from the main until the inside of the pipe is restored to at least 95% of its original factory diameter and condition with a minimum Hazen-Williams flow coefficient as follows based upon the nominal pipe diameter.

Pipe Diameter (in.)	4”	6”	8”	10”	12”	14-20”	24” & Over
Flow Coefficient	90	100	110	115	120	125	130

2. All valves necessary for the cleaning operation and for isolation shall have workable condition confirmed and be exercised from full open to closed and the number of required turns recorded.

3. Determine effectiveness of cleaning by before and after random physical diameter sampling and measurement, by interior photographs, and by furnished accurately instrumented flow measurement and calculations for each section. Flow measurement after the cleaning operation shall not be required where the pipeline is to be subsequently flow tested after it is cement mortar lined in-place. Flow measuring devices shall be accurate to within plus or minus five percent (+ or -5%) maximum. Submit three (3) copes of written report tests and data for flows and dimensions.

4. Initially, use a self-destructing pig to insure freedom from line obstructions. Use successive pigs of increasing diameter for difficult lines. Generally use propelling speeds of more than one (1) foot per second. Prevent water hammer surge at velocities over two (2) feet per second.

5. Do not over clean lines and terminate cleaning before erosion or grooving. Where the line is not to be subsequently cement mortar lined in-place, leave a smooth protective coating or interior in the line which consists of the original cement mortar lining, a residual calcium or magnesium protective film of not less than 10 mils, or a pipe wall ferrous oxide thickness of not less than 2 to 4 mils, whichever is greater. Where the line is to be subsequently cement mortar lined in-place, clean the inside to bare metal with 100% of its original inside diameter without erosion or grooving.

6. Where existing fire hydrants are used for launching pigs, the Contractor shall furnish necessary fittings and make necessary temporary connections in the lines for entry and retrieval of cleaning equipment. Any permanent facilities for retrieval or launching of pigs shall be as shown on the Drawings. Generally, in water distribution systems, pipeline pigs can be launched and retrieved from fire hydrants for cleaning lines up to eight inch (8") size, and larger sizes require excavation and installation of required fittings and stoppers or valves. The Contractor shall verify the existence of pipe obstructions, such as butterfly valves. Fittings and valves which are to remain in place shall conform to these Specifications.

7. The Contractor shall have all special tools required for disassembly and assembly of fire hydrants. All fire hydrants which are disassembled shall be reassembled with the following all new parts for the specific manufacture and model of hydrant:

   a. Main valve seal (rubber composition).

   b. Drain valve facing.

   c. Gaskets for bonnet, standpipe, safety flange and shoe or drain ring.

   d. Stem packing or O-rings.

e. O-rings for hold-down nut, bonnet, upper seat ring, lower seat ring.

f. Bonnet reservoir lubricating oil.

g. Thrust bearing or washer.

8. Also repair or replace any broken or damaged parts. Verify hydrant proper operation and freedom from leaks after reassembly.

9. Water for reasonable use in non-wasteful quantities shall be furnished by the Owner at no charge to the Contractor, unless specified otherwise.

10. Interruption of water service to customers shall comply with this Part 3, Division IW of these Specifications. Comply with Division (Section) 2 of these Specifications, Sitework, for items of work including, but not limited to notices, permits, conflicts, public access and convenience, protection, excavation and backfill, and disposal of wastewater.

11. Open all outlets during main cleaning. Flush all individual water service branches after cleaning until flow is free of turbidity from the cleaning. Disinfect cleaned portions of potable water supply systems, as specified hereafter, exercise all valves to insure proper operation, open isolation valves and restore piping to service.

12. Repair or replace any pipe, fittings or appurtenances which are damaged by the cleaning operation.

F. Cleaning New Pipelines

1. All newly constructed water lines shall be cleaned. Use one or more passes of various sized fluid-propelled pipeline pigs to clean and to remove sediment, and construction debris from the main.

2. All valves necessary for the cleaning operation and for isolation shall have workable condition confirmed and be exercised from full open to closed and the number of required turns recorded.

3. Initially, use a self-destructing pig to insure freedom from line obstructions. If necessary, use successive pigs of increasing diameters for difficult lines. Generally use propelling speeds of more than one (1) foot per second. Prevent water hammer surge at velocities over two (2) feet per second.

4. Where fire hydrants are used for launching pigs, furnish necessary fittings and make necessary temporary connections in the lines for entry and retrieval of cleaning equipment. Any permanent facilities for retrieval or launching of pigs shall be as shown on the Drawings.

5. Generally, in water distribution systems, pipeline pigs can be launched and retrieved from fire hydrants for cleaning lines up to eight inch (8") size, and larger sizes require excavation and installation of required fittings and stoppers or valves. Verify the existence of pipe obstructions. Fittings and valves which are to remain in place shall conform to these Specifications.

6. Open all outlets during main cleaning.

7. Flush all individual water service branches after cleaning until flow is free of turbidity from the cleaning.

8. Disinfect cleaned portions of potable water supply systems, as specified hereafter, exercise all valves to insure proper operation, open isolation valves and restore piping to service.

9. Repair or replace any pipe, fittings or appurtenances which are damaged by the cleaning operation.

G. Miscellaneous Existing System Work

1. Abandoning Pipe**:** Where indicated on the Drawings, abandon existing piping in place after divorcing the supply and distribution connections. No direct payment shall be made for this item and the cost shall be included in various pay items for the Work.

2. Salvaging Water Pipe and Fittings: Where shown on the Drawings, pipe and fittings from the existing water distribution system shall be salvaged, cleaned, and stockpiled as directed by the Owner. The cost of this item shall be included in other pay items unless a pay item is listed in the Bid Proposal.

3. Replacing Existing Fire Hydrants: Where required by the Drawings or in the bid Proposal, shall consist of removing the existing fire hydrant and replacing it with a new fire hydrant of the type and in the manner as specified herein.

   a. The existing fire hydrant shall be cleaned and delivered to the Owner at a location to be designated.

4. Relocation of Existing Fire Hydrants: Where required by the Drawings or in the Bid Proposal, shall consist of removing an existing fire hydrant and relocating it as required by the Drawings. The fire hydrant shall be installed in the manner specified herein for installation of new hydrants.

   a. The abandoned hydrant lead shall be suitably plugged and thrust blocked.

   b. Install additional pipe for fire hydrant leads or additional fittings, as required.

5. Repairs to Existing Valves: Where required by the Drawings or in the Bid Proposal, shall consist of excavation and removal and replacement of the valve box and concrete pad and removing the stem, bonnet and movable parts of the valve interior. Clean internal parts, replace seat rings, disc rings, resilient seat or seal, thrust collar, bushings, broken or worn shafts, and stem seals or packing, and coat the interior and parts. Reassemble valve. If the valve is found to be damaged to the point where it cannot be repaired, in the Engineer's opinion, it shall be removed and replaced with a new valve and payment shall be made only for the new valve.

6. Installing Leak Clamps on Existing Mains**:** Where required by the Drawings or in the Bid Proposal, shall consist of locating the joints or leaks, pavement removal and replacement, excavation and backfill, and furnishing and installing the clamp.

7. Grouting in Place**:** All waterlines/valves that are located under any existing structure and/or roadway shall be grouted in place. The grout must consist of at least a 500 psi cementitious grout. All lines must not contain a void and must be grouted in one continuous pumping operation. Vents shall be installed at the opposite end from the grout pump to allow air and water to escape and shall be used to verify that the grout has completely filled the pipe to be abandoned. Vents shall be placed at the top of the pipe and shall remain open for not less than five (5) minutes after grout is discharged. This time frame shall not start until all air and water has escaped.

3.6 SERVICE PIPING INSTALLATION

A. General: All service pipe or tubing shall be laid between the water main and the meter or curb stop near the property line in one continuous piece without splicing.

B. The quantity and type of service installation shall be as indicated on the Proposal or on the Drawings. Generally service installations will be made at each existing occupied property.

C. The exact locations will be determined after verifying the side of the building at which the water plumbing is located. Measure and record the exact location on record drawings.

D. The depth of trenches for service piping shall provide a minimum cover over the piping of twenty-four inches (24") under heavy traffic, eighteen inches (18") under the bottom of ditches, and elsewhere as follows:

Location	**Minimum Cover**
South of 35 degrees N. Latitude	12"
North of 35 degrees N. Latitude	18"

E. Service pipes which cross at approximately right angles under a concrete curb, curb and gutter, or sidewalk which have a total width of six feet (6') or less shall be installed by either tunneling, jetting, auger trenching or insertion in a driven hole without removal of the curb, curb and gutter or sidewalk.

F. When excavating in rock, provide at least four inches (4") of clearance under and on each side of the piping. Bed the piping uniformly throughout its length in firm native soil or imported granular materials which are free of angular particles larger than 3" (No. 4) or rounded particles larger than three-eighths inch (3/8") size. Densify the bedding and backfill to four inches (4") minimum cover above the piping and to provide firm and complete support.

G. Keep the inside of service piping clean and the trench free of water during installation.

H. Snake all flexible piping in the trench and provide an extra "S" loop at the main to allow for contraction based upon a minimum design requirement of 100 degrees F temperature change as follows:

Material	Contraction, inches per 100 ft.
Copper	1 ½
Polyethylene	9
PVC	4

I. Where excavated soils exhibit odors of organic chemicals, such as gasoline, no plastic pipe shall be used in that location for mains or services, due to plastics being permeable to organic chemicals which may contaminate the water. The piping materials to be used at that location shall be selected by the Engineer and installed under a Change Order, if no suitable pipe material and unit price are established by the Contract Agreement.

J. Copper Tubing: Cut, ream, flare, join and install copper tubing in conformance with standard practice.

1. Flux connections and make sweat soldered joints for the full joint depth.

2. Make bends to a uniform, radius of not less than four (4) times the outside tube diameter, provided that radii of less than twelve (12) diameters shall be made by care with a tubing bender to minimize deformation.

K. Plastic Pipe and Tubing:

1. Install plastic piping in compliance with the following standards and make bends of 45 degrees or less in plastic pipe or tubing by hand without kinking to a uniform radius of not less than the following times the piping outside diameter:

Material	Min. Bending Radii
PE	60 x O.D
PEX	30 x O.D.
PVC	200 x O.D

2. Make all ninety (90°0 degree bends only by using an elbow fitting or connector.

3. Insert the proper size stiffener inside PEX tubing to full depth. Connect the compression couplings or external split grip clamps as recommended by their manufacturer to prevent piping or insert movement during use.

L. Service Sizes: Unless designated otherwise, sizes of service pipe or tubing shall be as follows:

Meter size or Service Assembly Description	Max. Oper. Capacity gpm	Service Size

5/8" X 3/4" small residential and commercial (up to 2 baths)	20	¾"
5/8" X 3/4 large residential and commercial (more than 2 baths)	20	1"
3/4" or two 5/8" X 3/4"	30	1 ½"
1" or two 3/4"	50	2"
1 1/2" or two 1"	100	2 ½"
2"	160	3"

3.7 FIELD QUALITY CONTROL

A. Pressure and Leakage Testing of Water Piping

1. Furnish a suitable portable test assembly, subject to approval of the engineer, with taps, piping, pump, drive, gauges or pressure recording charts and flow meter or measuring device for performing all pressure and leakage tests.

2. The meters have straight reading registers and pressure recorders shall be portable spring-wound or battery driven with not less than four inch (4”) recording charts.

3. No pressure tests shall be made until all concrete thrust blocks have cured at least 7 days for Type I normal Portland cement or 3 days for Type III high early strength type cement.

4. Fill all water lines at flow rates less than 1.0 feet per second, open air valves, and take care to expel all air from the pipes during filling. If permanent air valves are not required, the pipes shall be tapped at all high points to vent air. Do not tap pipes or open vent valves while the pipe is pressurized.

5. Where cement mortar lined metal pipe, concrete pipe, or asbestos cement pipe is used, the pipe shall be filled 24 hours in advance of the pressure test.

6. After the pipe is completely filled initially with water, measure the additional volume of water required to bring the pipe to test pressure. Should that additional volume exceed two percent (2%) of the calculated volume of the pipe being tested, then entrapped air in the piping is indicated. Depressurize the piping, located the entrapped air and vent through sufficient taps.

7. Before any water lines will be accepted, all lines shall be subjected to a hydrostatic pressure test of 150 psi, unless required otherwise by the Specifications. The test pressure shall be maintained by additional pumping if necessary, for a period of not less than one (1) hour where all joints are exposed and visible and for six (6) hours where the joints are concealed or buried. Repair visible leaks. All defective work revealed by the test shall be located and repaired or replaced by the Contractor and the system re-tested until acceptable.

8. After pressure test, a separate leakage test shall be conducted for not less than two (2) hours at 150 psi plus or minus 5 psi, unless specified otherwise, and the amount of leakage measured to maintain that pressure shall not exceed ten (10) gallons per day for each mile of pipe for each inch of diameter. All visible leaks shall be located and stopped. Where leakage exceeds the allowable, leaks shall be stopped, defects corrected, and pipe shall be retested.

9. Notify the Engineer in advance of leakage tests so that all tests may be witnessed.

10. A written report of each and all test locations, pressures, duration and leakage shall be submitted to the Engineer for approval.

B. Disinfection

1. Following the pressure and leakage tests, all lines shall be flushed, pigged and disinfected in compliance with the LA Sanitary Code and AWWA Standard C651, except as follows:

   a. Flush all portions of the system to be disinfected with potable water at a minimum velocity of two and one half (2 ½) feet per second for three (3) complete water changes to clean the lines.

   b. Insert and clean the pipeline using a single pass with a properly sized pipeline pig. If subsequent flushing continues to show turbidity in the discharge of water from newly installed pipeline then pig the pipeline as many times as necessary at no additional cost until the flushed water runs clear with no visible turbidity.

   c. Where available, a velocity as high as five (5) feet per second is desirable for distribution mains and twelve (12) feet per second may be required to remove sand from river crossings or subsurface inverts.

   d. Open and close flushing valves or hydrants very slowly and uniformly to prevent surge pressures.

   e. Provide additional permanent fittings and temporary piping for pigging at no additional payment for insertion and removal of the pig and wastewater discharge.

2. Exposed portions of existing water lines and all new potable water lines, including piping and appurtenances, shall be disinfected prior to being placed in use by the "continuous feed method" unless directed and agreed otherwise, containing not less than fifty parts per million (50 ppm) of available chlorine.

3. Furnish suitable plugs or caps for the pipe, injection pumps, pipe connections, and other equipment together with all labor required.

4. While the disinfectant is being applied to any section of the system, the water shall be allowed to escape at all extremities of this section until an orthotolidin test shows a deep orange color.

5. The disinfectant shall be allowed to remain in the pipe for twenty-four (24) hours, at which time the free chlorine residual shall be not less than 10 ppm and the lines shall be

thoroughly flushed until the chlorine residual is not more than 4.0 mg/l; and not less than 0.5 mg/l, or the amount normal for the system.

6. After a time frame of no less than sixteen (16) hours, two (2) samples shall be collected from each sampling station by the Contractor who will also deliver the samples to a certified laboratory. Chain of Custody forms must be utilized for all samples and submitted to the Engineer. The two samples shall be taken fifteen minutes apart with the water flowing from the sample tap continuously between collection of both samples. Samples shall be collected at each end of the main and at locations along the main at distances no greater than 1,200 feet and at each branch that has a pipe length greater than 20 feet. If trench water has entered the pipe during construction, the maximum distance between sampling stations shall be reduced to 200 feet. AWWA C651 shall be following during this disinfection phase. Water being collected for testing shall not have a chlorine residual higher than is normally maintained in other parts of the distribution system. No chlorine shall be present which is a result of line disinfection. A sample showing "No Coliform Present" shall constitute a satisfactory sample when analyzed by a laboratory certified by the Louisiana Department of Health and Hospitals/ (**enter STATE**). Each section of the system shall be disinfected and redisinfected, if necessary, until sample passes the certified laboratory analysis.

7. Dispose of waste used in flushing and disinfecting in an acceptable manner. If necessary, neutralize heavily chlorinated water with suitable chemicals. Use diffusers where required to prevent damage and erosion from flushing discharge.

C. Deflection Test

1. Deflection Test of Large Flexible Main Pipes

a. For flexible mains larger than twelve inch (12") size, the Engineer will have the right to require the Contractor to perform deflection tests with a mandrel after pipe backfilling and pipe flushing at three (3) sections between valves for each pipe size which are randomly selected by the Engineer. The Contractor shall re-excavate and re-bed the pipe at excessive deflection locations to achieve acceptable deflection. The maximum allowable deflection shall be two-thirds (2/3) of the maximum ultimate design deflection specified hereinbefore for design of the respective type pipe. Should two (2) out of three (3) sections between valves fail, the Contractor shall test all of the pipe in that size. The Mandrel OD shall be sized by the minimum pipe ID, less the allowable deflection. The minimum ID shall be determined by the Engineer using the standard OD or ID, as applicable, the standard thickness, if applicable, lining thickness, and the standard manufacturing tolerances on diameter and thicknesses.

b. Pipe sleeve couplings required for removal and replacement of pipe roll-out or nipple sections for insertion and removal of mandrels shall be paid for as fittings. No other payment shall be made for this item of work, except under pipe.

3.8 ADJUSTING AND CLEAN-UP

A. Perform final field measurements of the work as constructed and furnish record drawings of Field Changes with final locations of pipes, valves, service, hydrants, etc.

B. Complete all lists of defects or deficiencies, inspect all Work for conformance with Drawings and Specifications and verify such items as follows:

1. Valves fully open.
2. Sunken trenches refilled.
3. Restoration of removed or damaged pavement.
4. Proper orientation of fire hydrants.
5. Hydrant bury line flush with finished surface.
6. Existence of concrete pads and lids on valve boxes.
7. Valve box and meter box lids flush with finished surface.
8. Pressure reducing valves and altitude valves are properly adjusted.
9. Erosion protection effective and seeding established.

C. Fill all water lines

END OF SECTION 33 11 00

SECTION 33 12 00 WATER UTILITY DISTRIBUTION EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes water-distribution valves, fire hydrants, meters, pumping stations and related components for water utility service.

1.3 DEFINITIONS

A. TFE: Teflon

B. NPT: National Pipe Thread

C. IPS: Iron Pipe Size

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Affidavit of Compliance, manufacturers shall provide an affidavit that delivered materials comply with requirements of this specification.

C. Layout and shop drawings for fabricated pipe, fittings, and specials along with brochures, dimensions and data on pipe, fittings, valves, linings, and cathodic protection. Data shall include printed assembly, application and installation recommendations.

D. Certified dimension drawings for all valves, certificate and report of bi-directional leakage and proof of design tests for butterfly valves, and design calculations for stop, slide or sluice gates.

E. Thrust restraint design for approval prior to use, where the device used is other than the ordinary concrete thrust block sized in accordance with the Drawings.

F. Meter certificate of specification compliance or test report of accuracy and capacity for each meter, as specified.

G. Field quality – control test reports.

H. Operation and Maintenance Data: For water valves and specialties to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Comply with requirements of utility company supplying water. Include tapping of water mains and backflow prevention.

2. Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.

3. Comply with standards of authorities having jurisdiction for fire-suppression water-service piping, including materials, hose threads, installation, and testing.

4. Comply with Louisiana Administrative Code Title 51, Sanitary Code.

B. Piping materials shall bear label, stamp, or other markings of specified testing agency.

C. NSF Compliance:

1. Comply with NSF 61 Drinking Water System Components – Health Effects in addition to the requirements of the Safe Drinking Water Act.

2. Comply with NSF 372 for drinking water components lead content, certified to be lead-free.

1.6 DELIVERY, STORAGE, AND HANDLING

A. All piping, valves, fittings, services, and accessories shall be stored, handled, laid, and place in accordance with the manufacturer's recommendations.

B. Preparation for Transport: Prepare valves, including fire hydrants, according to the following:

1. Ensure that valves are dry and internally protected against rust and corrosion.

2. Protect valves against damage to threaded ends and flange faces.

3. Set valves in best position for handling. Set valves closed to prevent rattling.

C. Handling: Use sling to handle valves and fire hydrants if size requires handling by crane or lift. Rig valves to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

D. Protect stored equipment from moisture and dirt. Elevate above grade.

E. Protect flanges, fittings, and specialties from moisture and dirt.

F. Shield plastic materials, both thermoplastic and thermoset, from direct sunlight when stored for longer than two months. Provide adequate ventilation under any covering. Support to prevent sagging and bending.

G. Rubber gaskets shall be stored as recommended by their manufacturer in a cool, dry location away from direct sunlight, petroleum products, strong oxidants, or electric equipment.

1.7 PROJECT CONDITIONS

A. Interruption of Existing Water-Distribution Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water-distribution service according to requirements indicated:

1. Where interruption of service will be along a main servicing not more than fifty (5)) residential and small commercial customers who will be affected by said interruption, and where the duration of said interruption is to be four (4) hours or less, interruption will be permitted provided the Contractor has notified the Resident Project Representative, the Owner, and each customer at least twenty-four (24) hours in advance of the contemplated interruption of service.

2. Where interruption of service will affect area fire protection, more than fifty customers, a large industrial customer, or the main business district, or will be of greater duration than four (4) hours, or a combination of the above conditions, interruption of service will be permitted only after the Resident Project Representative, the Owner, and the local fire department have approved such cases, and the Contractor has posted and published public notice at least seven (7) days in advance. The Owner reserves the right to require the Contractor to perform such work between the hours of 10:30 P.M. and 5:30 A.M. Any overtime pay required to be disbursed by the Contractor shall be included in the prices bid for the work.

1.8 COORDINATION

A. Locate surface and subsurface features and conflicts; locate or cause to be located all underground utilities; and Coordinate necessary Field Changes in locations of the work with the Resident Project Representative.

B. Contractor shall inspect all piping components before placing in the trench. It is the Contractor’s responsibility to reject and replace all materials which are broken or damaged so as to impair their strength, function or durability. Use of repaired materials shall only be allowed with the Engineer's approval.

C. Coordinate connection to existing water main with utility company.

PART 2 - PRODUCTS

2.1 VALVES

A. General:

1. Valves shall be suitable for their service, location, and operating position as indicated.

2. Line and coat all ferrous valves in conformance with applicable AWWA Specifications. Line the interior of valves sized three inches (3") and larger in conformance with AWWA C 550 with fusion bonded epoxy or thermoplastic lining to 6 to 12 mils in one coat or with high-build catalyzed epoxy in 2 coats to 8 to 16 mils total thickness. Coat valve exteriors with 1 mil minimum thickness of asphalt varnish for buried service or one coat of paint primer for exposed service and subsequent field painting.

3. Buried iron-bodied gate valves shall have an inside screw and non-rising stem.

4. Buried gate, plug, butterfly, or ball valves, size two inch (2") and larger shall have a two-inch (2") square operating nut.

5. Provide an appropriate length extension stem for valves buried on lines deeper than the minimum specified so that the valve operating nut shall not be more than thirty-six inches (36") below finished grade. Coordinate extension stem lengths with the lengths of valve wrenches furnished.

6. Buried bronze-bodied ball valves size two inch (2") and smaller shall have a tee-head operating key.

7. For buried valves furnished valve boxes as specified hereafter.

8. Shall generally be as follows, unless otherwise specified or shown: Valves above ground exposed, or in pits shall be flanged for size three inches (3") and larger, and shall be threaded for size two and one-half inches (2 ½") and smaller.

9. Buried valves size two inches (2") and larger shall be restrained mechanical joint and buried valves smaller than two inches (2") shall be threaded.

10. Face and drill flanged valves having iron bodies in conformance with ANSI B 16.1, Class 125 and steel bodies in conformance with ANSI B 16.5, 150 lb. pressure rating.

11. Opening direction of all valve operators shall be counterclockwise and an indicating arrow and the word OPEN shall be cast on all operators.

12. Exposed valves for isolation or throttling functions shall have a manual operator unless another type operator is indicated.

13. Valve actuators, limit switches and control accessories shall be as shown on the Drawings and as specified in other sections of the Specifications.

14. Where indicated on the Drawings or necessary due to size or location, valves shall be provided with chain operators and, where required, angle drives with chains extending to within three feet (3') of the floor or operating platform.

    a. Chains shall be galvanized.

    b. Sprocket wheels shall be provided with chain guides.

    c. Valve hand wheel centerlines located more than six feet, six inches (6' - 6") above the floor or operating platforms shall be considered as being inaccessible and shall be provided with chain operators as described above.

15. Quick opening valves shall be provided with a quick opening lever and cam or other acceptable positive action operators in lieu of the stem and hand wheel.

B. Gate Valves

1. Gate valves size three through thirty inch (3" – 30") shall be resilient seated gate valves with 200 psi rating and conform to ANSI/AWWA C509 or ANSI/AWWA C515.

2. Sizes thirty through forty-eight inches (30" - 48") shall be double disc parallel seat gate valves with 150 psi rating and conform to ANSI/AWWA C 500.

3. Valves designated as gate valves sized two and one-half inch (2 ½") and smaller shall be ball valves as specified hereinafter.

4. Exposed and accessible manually operated gate valves sizes twelve inch (12") and smaller shall be non-rising stem (NRS) with handwheel operator, and sizes fourteen inch (14") and larger shall be outside screw and yoke with rising stem (OS&Y) with handwheel operator.

5. All gate valves shall be fully equal in area to the pipes upon which they are placed. Valves shall be suitable for the location in the position shown. They shall be iron-bodied with internal bronze or stainless steel trim and mounting, and have seals which can be changed while fully open and under pressure, and be complete with accessories.

6. Seals for non-rising stem gate valves shall be double O-ring type and for rising stem valves and low pressure service such as gravity filters shall have replaceable packing. Stuffing box follower bolts shall be steel and the nuts shall be of bronze.

7. Metal-seated gate valves 14 inch and larger installed in vertical pipelines with their stems horizontal shall be fitted with slides to assist the travel of the gate assembly. Slides, tracks and shoes shall be of bronze.

8. Metal seated gate valves 14 inch and larger installed in horizontal pipelines with their stems horizontal shall be equipped with bronze rollers, tracks and scrapers to assist the travel of the gate assembly.

C. Ball Valves

1. Valves designated as either ball, gate, globe, or angle type in sizes two and one-half inch (2 1/2”) and small shall be ball type.

2. Ball valves size five inch (5") and smaller shall be internal bronze, TFE (Teflon), or stainless steel trimmed, with replaceable seats, and have iron, stainless steel or bronze body with bronze or stainless stems, handwheel or key operator, 150 psi rating, and test pressure at least 2 times the pressure rating.

3. Ball valves size six through forty-eight inch (6” – 48”) shall conform to AWWA C 507.

   a. They shall be bi-directional seating and pressure rating Class 150, unless 250 or 300 is shown on the Drawings.

   b. Valve end connections shall be compatible with the valve pressure rating class.

D. Butterfly Valves

1. Butterfly valves shall be for the type service indicated (buried or exposed) with the type operators and with the type end connections as indicated on the Drawings.

2. Sizes three through seventy-two inch (3" - 72") shall conform to AWWA C 504 for rubber seated valves.

3. All valves shall be bi-directional and provide bubble-tight seal in both directions against flow and differential pressure across the seat from zero to full rated pressure.

4. Buried Valves in Distribution and Transmission Service.

   a. Operating conditions, unless designated otherwise, are 150 psi pressure rating, velocities under two (2) feet per second for distribution and five (5) feet per second for transmission service, position either open or closed without throttling, infrequent operation, and restrained mechanical joint ends.

   b. Design features which are preferred but not mandatory are double O-ring seals, seat on the disc, eccentric shaft and disc and one piece shaft.

c. Operator shall be as specified hereinbefore and be sealed and permanently lubricated.

5. Exposed Valves

a. Exposed valves for accessible pit, pump piping, or plant piping service are those that are usually required to seal against pressure in only one direction, but may occasionally be required to seal bi-directionally, operate at pressure of 75 psi or less, operate at velocities over 2 feet per second, may be used for throttling, and be operated at high cycle frequencies.

b. Design features which are preferred but not mandatory are stuffing box and pull-down packing gland, seat in the body, concentric shaft and disc, and one piece shaft.

c. Unless indicated otherwise, operators shall be locking lever type on valves which have maximum operating torques of 36 foot-pounds or less in 6” and smaller size and shall be gear operated crank type on valves with over 36 foot-pounds maximum operating torque in 6” or 8” and larger sizes.

d. End connections shall be as shown on the Drawings with either flanged ends of short body, or wafer body or lug body of laying length complying with either AWWA or the manufacturer's standard.

E. Check Valves

1. Swing-check valves in size two through forty-eight inch (2" – 48") shall conform to AWWA C 508.

2. Swing-type check valves shall be full-open diameter.

3. Check valves three inches (3") and smaller shall be NPT threaded, and four inches (4") and larger shall be flanged. Flanges shall be ANSI B 16.1, Class 125.

4. Valves shall have minimum cold water design pressures as follows:

a. Size twelve inches (12") and smaller, 200 psi working pressure and 400 psi test pressure.

b. Fourteen inches (14") and larger, 150 psi working pressure and 300 psi test pressure.

c. Each valve shall be shop tested.

5. Valves smaller than two inches (2") shall be all brass or bronze with screw-on cap and renewable composition or Teflon seals.

6. Sizes two inches (2") and larger shall be iron body with bronze or stainless steel mounting and trim, bolted caps, and resilient seats.

7. Brass or bronze castings shall conform to ASTM B 61 or ASTM B 62.

8. Check valves, shall be of one of the following types, as designated on the Drawings:

   a. Swing check: plain or as indicated on the Drawings with spring and lever, lever and weight, air cushioned, or oil cushioned.

      Note: Use plain swing check only where flow velocity is less than 3 feet per second and operating pressure is less than 30 psi.

   b. Tilting disc or slanting disc check valves shall have disc position indicator on all valves size six-inch (6") and larger.

   c. Double flapper check valves shall be springloaded with resilient seats.

   d. Center guided disc check valves ("silent-type") shall be globe body with spring loaded poppet and resilient seats.

   e. Flexible disc check valves shall be of the flanged, flexible disc, full body check valve type with no internal moving parts except the closure disc.

      1) The valve body shall be constructed of ductile iron ASTM A-536 Grade 65-45-12 with flow equal to the nominal pipe inside diameter throughout the valve. Seat shall be constructed on a 45 degree angle to reduce disk travel and provide higher flow rates. The seat and internal body shall be fully coated with a two part thermosetting epoxy suitable for use in both water and wastewater applications.

      2) The domed bonnet shall be manufactured of ductile iron ASTM A-536 Grade 65-45-12. The bonnet-to-body seal shall be provided by a gasket to allow easy removal and replacement of the access bonnet. Bonnet bolting shall be SAE Grade 5.

      3) The flexible disc shall feature a fully encapsulated steel pressure plate with integral molded “O” ring on the face of the elastomer. Nylon reinforcements shall be provided in the flexible hinge area of the disc assembly. The flexible hinge portion of the disc shall be warranted for 25 years.

F. Air Valves: Air and vacuum valves, air release valves or combination air release valves.

1. Air valve shall be the type suitable for the service with properly sized orifices for the service usage and flows indicated.

2. Air release valves have small orifices which automatically release small pockets of air pressure from full pipelines as it accumulates at high points.

3. Air and vacuum valves automatically release large volumes of air, such as during initial filling, and provide vacuum protection for large diameter, thin-walled pipes during pipeline draining and they will not vent small air accumulations during pipeline operation.

4. Combination (also called dual or universal) air valves serve both functions of air release valves and of air and vacuum valves.

5. Working pressure rating shall be 150 psi, unless designated otherwise.

6. Valves shall be constructed of cast iron body, bronze, or stainless steel trim with stainless steel floats and shock-proof synthetic seats.

    a. All linkage, pins or levers shall be bronze or stainless steel and valves with components of plastic shall be prohibited.

    b. Valve design shall prevent jamming or damage to the float or seat during operating and closing.

7. Where the normal pipeline flow is greater than 1000 gpm or the inlet velocity is over 5 fps or the valve inlet size is three inch (3") or larger, the valve shall incorporate slow closing speed features by an auxiliary perforated check valve of either the center-guided spring loaded type or swing check with external adjustable weight type.

8. Air and vacuum valves on vertical turbine pump discharges shall have heavy duty floats and an adjustable throttling device.

9. All air valves shall have an isolation gate or butterfly valve below them.

10. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include but are not limited to:

    a. American Cast Iron Pipe Co

    b. Clow Corp.

    c. Crispin: Multiplex Mfg. Co.

    d. G. A. Industries

e. Val-Matic Valve & Mfg. Corp

G. Inserting Valves and Tapping Valves and Tees

1. Special valves for inserting into or tapping into pressurized lines shall be used where shown on the Drawings for locations in which it is not desirable or possible to valve off the line for connection by normal cutting-in methods.

2. The valves shall conform to the applicable provisions of gate valves as specified above, except with flanged inlet and appropriate outlet.

3. Fitting housings and bodies shall be either ductile iron or all stainless steel of manufacturer's standards applicable to the valve and with pressure ratings equal to the valve or the pipe.

4. All sleeves shall be of the type having mechanical joint ends with side and end gaskets. Plain end type sleeves shall only be used for small service line branches, as specified thereunder.

5. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include but are not limited to:

a. American Cast Iron Pipe Co.

b. Clow Corp.

c. M & H Valve Co., Division of McWane, Inc.

d. JCM Industries, Inc.

e. Mueller Co.

f. Rockwell International

g. U.S. Pipe and Foundry Co.

H. Flap Valves

1. Flap valves shall be cast iron with joint as required.

2. Valve shall have bronze or stainless steel bolts and resilient seat which shall fit tightly when closed.

3. A seat ring shall be provided in both the body and the flap of the valve.

I. Corporation Stops and Curb Stops: shall conform to AWWA C 800

1. Corporation stops and curb stops shall be brass body, either ball or plug type, with rubber O-ring seals, and either Teflon coated brass or plug with rubber seats, brass plug or ball with Teflon seats, or molded polymeric ball and seats.

2. Threads at main taps shall be AWWA Standard Threads conforming to AWWA C 800 and all other threads shall be tapered iron pipe threads conforming to ANSI B 2.1.

3. Stops shall conform to AWWA C 800 high pressure, with minimum pressure rating of 150 psi.

4. Unless shown otherwise on the Drawings, connections to polyethylene plastic service pipe or tubing, shall utilize a stainless steel stiffener insert and be pack-nut compression style.

2.2 HYDRANTS

A. Fire hydrants shall be cast iron bodies, full bronze mounted, suitable for working pressure of one hundred fifty (150) pounds per square inch, and conform to AWWA C 502.

1. Hydrants shall be conventional styles, except where the owner has standardized and has a published standard requiring the short modern top.

B. Hydrants shall have double O-ring seals, dry bonnets, oil or grease lubrication of operating nut, low operating torque, infinitely adjustable nozzle rotation from 0 to 360 degrees, and above-ground traffic breakaway design.

C. Each hydrant shall be given a 300 psi hydrostatic test in the shop.

D. Hydrant dimensions shall be as follows in accordance with the Drawings, as indicated for 2-way and 3-way hydrants:

	2-Way	**3-Way**
Hose Nozzle	2 @ 2 ½”	2 @ 2 ½”
Pumper Nozzle	None	1 @ 4 ½”
Main Lead Diameter	6”	6”
Min. Opening Diameter	5 ¼”	5 ¼”
Min. Barrel Diameter	7”	7”

E. Nozzles shall be bronze.

F. Unless noted otherwise on the Drawings, nozzle thread and operating nuts shall be as follows:

1. Threads for nozzle connections shall be ANSI B 26 for "National Standard Fire Hose Coupling Screw Thread," and shall be opened by turning in a counterclockwise direction.

2. The operating nut at the top of the hydrant and cap nuts shall be one and one-half inch (1 ½") pentagon nut (measured point to flat) and shall open counterclockwise.

3. Verify all pertinent hydrant features and dimensions with the Engineer, the Owner, and local fire chief prior to ordering any hydrants.

G. The hydrant main valve shall be of the compression type closing with pressure. The valve shall be faced with heavy rubber.

H. The thrust bearing shall be of the low torque type using TFE (Teflon) plastic, steel ball bearings, or nylon requiring significantly less operating torque than 200 ft-lbs allowed by AWWA C 502.

I. Line the hydrant base or shoe interior with epoxy or thermoplastic in compliance with AWWA C 550. Line and paint other parts in compliance with AWWA C 502.

J. The minimum distance from the ground line to the top of the hydrant lead (cover) and from ground line to bottom of hydrant lead (bury) shall be as follows:

Location	**Cover**	**Bury or Trench**
South of 35 degrees N. Latitude	30"	30" plus Pipe O.D
North of 35 degrees N. Latitude	36"	36" plus Pipe O.D.

K. Furnish hydrants with sufficient bury to accommodate the respective locations, or furnish hydrant extension pieces at no additional cost to the Owner.

L. After installation, exposed surfaces of hydrants shall be painted with one (1) finish coat of chrome yellow hydrant enamel (alkyd paint) unless the Owner has standardized on other colors.

M. Submit the final color to the Owner for approval.

2.3 FLUSHING OR YARD HYDRANTS (POST TYPE)

A. Flushing or yard hydrants, unless detailed otherwise on the Drawings, shall be single two and one half-inch (2 ½") minimum size NST hose connection outlet, nonfreezing, post type hydrants, with three foot (3') minimum bury and two-inch (2") minimum threaded or mechanical joint inlet.

B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include but are not limited to:

1. Clow Corp.

2. M & H Valve Co., Div. of McWane, Inc.

3. Mueller Co.

4. "Eclipse" by John C. Kupferle Foundry Co.

5. Zurn Industries, Inc.

2.4 VALVE BOXES

A. Buried valves that are not inside vaults or valve pits shall utilize a valve box with an inside diameter of not less than five inches (5") and an adjustable height. Covers and cover frames shall be cast gray or ductile iron. The cover shall have the word "WATER" printed in raised letters. Boxes shall be suitable for installation at the minimum depths specified. Provide extension shafts for deeper valves boxes made necessary by installation of mains at depths greater than the minimum depths specified.

B. Valve boxes in non-traffic areas shall be of the two-piece sliding or threading type with lower portions of either cast gray or ductile iron, reinforced structural plastic, or Schedule 40 PVC pipe. For traffic areas, boxes shall be of the three-piece sliding type with the appropriate base with lower portions of all cast gray or ductile iron.

2.5 SERVICE ASSEMBLIES, SADDLES, AND METER SETTINGS

A. Service assemblies, saddles, and meter settings shall conform to ANSI/AWWA C 800.

B. Saddles where required on main pipes for service line taps shall be bronze, brass or stainless steel construction with neoprene gaskets, flat straps, and all stainless steel or brass connectors.

C. Corporations stop threads shall be AWWA standard threads.

D. Saddles for plastic pipe shall be double strap or full width band type.

E. Saddles for other pipe materials may be single strap.

F. Saddles shall be rated for 150 psi minimum

G. Materials for meter settings and service assemblies shall be equal to that shown on the Drawings.

2.6 WATER METERS

A. General: Water meters shall be of the size and type shown on the Drawings. Magnetic flow meters are specified in other sections of the project manual.

B. All meters shall be rated for 150 psi operating pressure, unless designated otherwise, and have AWWA straight registers reading in U.S. gallons with a red test hand and text index circle divided into 100 equal parts.

C. Unless designated otherwise meters shall be as follows:

1. Residential and Small Commercial - 5/8" through 2" size, displacement type.

   a. Displacement meters shall conform to AWWA C 700 except that they shall be rotating plastic disc type with plastic or bronze body and chamber, stainless steel spindle thrust roller and thrust roller insert, magnetic drive, hermetically sealed register, threaded connections with spuds, and shall exceed AWWA requirements for accuracy, minimum test flow, maximum continuous capacity, allowable pressure loss and nutation speed.

   b. Meter nutation speeds in excess of AWWA maximum shall have a 10-year warranty on the chamber assembly. Furnish certificate of compliance.

2. Large Commercial - 2" through 10" size and compound type where designated.

   a. Compound meters shall conform to ANSI/AWWA C 702 except with bronze body, magnetic drive hermetically sealed single register and exceed AWWA requirements for accuracy, minimum test flow, maximum continuous capacity, allowable pressure loss, and laying length.

   b. Furnish flanged connections, bypass and strainer in conformance with Drawings. Furnish certificate of compliance.

3. Industrial or Small Plant - 2" through 6" size, turbine type.

   a. Turbine meters shall conform to AWWA C 701 except that they shall be copper alloy bronze body with straightening vanes, plastic rotor, sapphire and tungsten carbide thrust bearings, magnetic drive, hermetically sealed register, and ANSI 150 lb flanged connections, Class II (high velocity), unless designated otherwise.

      Furnish a separate in line accessible strainer with bronze housing and stainless steel screen.

4. Main Line and Large Plant - 4" and larger size propeller type.

   a. Propeller meters shall conform to AWWA C 704 except they shall be steel bodied with corrosion resistant lining and coating, with straightening vanes, magnetic

drive, hermetically sealed register with provision for transmitter addition, and ANSI 150 lb flanged connections, unless designated otherwise.

NOTE:

Note to specifier - other meters available

AWWA C 703 - Cold Water Meters - Fire Service Type (I, II, or III)

AWWA C 708 - Cold Water Meters - Multijet Type

AWWA C 710 - Cold Water Meters - Displacement Type, Plastic Main Case

AWWA C 712 - Cold Water Meters - Singlejet Type

AWWA C 713 - Cold Water Meters - Fluidic - Oscillator Type

AWWA C 750 - Transit Time Flowmeters in Full Closed Conduits

AWWA C 706 - Direct Reading, Remote Registration System for Cold Water Meters

AWWA C 707 - Encoder Type Remote - Registrations Systems for Colder Water Meters

2.7 METER BOXES

A. Meter boxes shall be cast iron, concrete, plastic, or light weight composite material as shown on the Drawings. The size, shape, and/or, model number will be listed on the Drawings or in the bid proposal.

2.8 BACKFLOW PREVENTION ASSEMBLIES

A. Backflow preventers shall be of the size and type indicated on the Drawings.

B. Backflow preventers shall conform to AWWA C 510-Double Check Valve Backflow Prevention Assembly or AWWA C 511-Reduced Pressure Principle Backflow Prevention Assembly.

C. Each backflow preventer shall be furnished as a unit with an isolation valve at both the inlet and the outlet.

a. Reduced pressure principle types shall be furnished with an upstream strainer.

D. Unless a double check valve type is required by the Drawings, backflow preventers shall be of the reduced pressure principle type.

1. Each unit shall have brass test cocks located as follows:

   a. On the inlet side of the inlet gate valve.

   b. Between the inlet gate valve and the first check valve.

   c. Between check valves.

   d. Between the last check valve and the discharge gate valve.

E. Each backflow preventer shall be furnished complete with a set of spare parts and a gauge method test kit which shall include all tubing and gauges necessary for field testing.

2.9 STRAINERS

A. Strainers shall be of the type (Y or basket) indicated on the Drawings. Plate type strainers shall be unacceptable, due to high friction losses.

B. Strainers in pipe sized 2 ½" and smaller shall have threaded ends and be of the Y type, and sizes 3" and larger shall have flanged ends and be of the basket type.

C. Strainers shall have inlet and outlet isolation valves and upstream and downstream pressure gauges.

D. Strainers shall be iron or bronze bodied with drain plugs, removable gasketed caps, perforated type 304 stainless steel screens, and be pressure rated at 200 psi.

E. Strainers shall have an effective open area at least double the inlet pipe area, have perforation of 1/8" diameter, and be sized to have a pressure drop of not more than 3 psi with clean water.

2.10 GAUGE ASSEMBLIES

A. Gauge assemblies shall be installed on the suction and discharge side of each pump. Gauge assemblies shall consist of threaded brass pipe taps, fittings, an isolation valve or gauge cock, and the pressure gauge.

B. Pressure gauges shall be bronze or stainless steel Boudon tube, stainless steel rack and pinion movement, mounted on socked independent of case, steel or aluminum alloy or phenol cased, black numerals on white background and long life plastic dial face, heavy glass or unbreakable plastic window, 4 ½" dial size, accuracy ± ½%, ¼" NPT connection.

C. Gauges shall be equal to Hellicoid by American Chain and Cable Co., Bridgeport, CT; Ashcroft by Dresser Industries, Stratford, CT; or U.S. gauge by Ametek, Sellersville, PA.

D. Discharge gauges shall be combination dials with a range of 0 to 80 psig and 140 feet of water. Suction gauges shall have compound dials with range from 34 ft. water vacuum to 35 ft head, unless designated otherwise.

2.11 STATIC MIXERS

A. Static mixers shall be of wafer type construction with the following characteristics:

a. Wafer mixer shall have a PVC mounting ring, designed to be mounted between 150# flanges

b. Mixer shall have PVC mixer plate with a Beta of 0.8 and a CoV of 0.01 after 10 pipe diameters.

c. Mixer shall have ½" PVC injection port and quill with check valve.

d. Mixer shall have EPDM gaskets.

e. Mixer shall have a maximum lay length of ½ the pipe diameter.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Refer to Division 31 Section "Earth Moving" for excavation, trenching, and backfilling.

3.2 VALVE INSTALLATION

A. Install valves in the closed position to prevent foreign materials from inadvertently entering the valve.

B. Each valve shall be properly supported, as indicated on the Drawings, to prevent settling and excessive strain on the connection to the pipe.

C. Install each underground valve with the operating stem pointed up and with a valve box and cover.

D. Comply with AWWA C 600, AWWA M 44, and the installation section of appropriate AWWA Standards of each valve.

E. Valves and boxes shall preferably be located out of any traffic area. In cases where conditions dictate placement of valves in streets, alleys, driveways or roadways, the valve boxes shall be

furnished with a dome type base and shall be set on bricks, concrete masonry or treated wood blocking over compacted backfill to prevent the box bearing against the valve or piping.

F. Boxes shall be set with covers flush with the surface. Plumb operator stems vertically.

G. Valves shall be set to grade on a concrete block, and anchored as indicated on the Drawings.

H. Upon completion of the work, verify that all normally open valves are in the fully opened position.

I. Furnish concrete cover pad on valve boxes in unpaved areas.

J. Where valve or pipeline markers are required by Drawings, locate the markers at the right-of-way line opposite the valve or pipe with a permanent metal tag showing the exact offset distance.

3.3 INSTALLING FIRE HYDRANTS, FLUSH HYDRANTS, POST-TYPE YARD HYDRANTS, BLOW-OFF VALVES, AND FLUSH VALVES

A. Place hydrants, blow-offs and flush valves in compliance with ANSI/AWWA C600 and AWWA Manual M-17, and as detailed on the Drawings, and at approximate locations as shown, with Field Changes as directed by the Owner and Engineer.

B. Locate blow-offs at low points and flush hydrants or valves at dead ends of lines in accessible locations near the right-of-way line.

C. Unless otherwise directed, set fire hydrants not closer than twenty feet (20’) nor more than thirty (30’) from the extended intersection of curb lines or edge of pavement lines at street corners.

D. Orient nozzles of 3-way fire hydrants so the pumper nozzle faces the street and set 2-way hydrants with nozzles toward the street with an angle of 45 degrees between each nozzle and the street centerline.

E. All portion of nozzles nearest the street shall be at least six inches (6") behind the back of curbs and on open-ditch streets set the hydrant centerline one foot (1') inside the right-of-ways line, or as near thereto as possible.

F. Set hydrants plumb on a concrete base so that the bury line is within a tolerance of plus or minus three inches (3") of the natural surface or the required finished surface elevation.

G. Hydrant extensions and vertical offsets in hydrant leads shall be used as required to make the bury line be at the finished surface while the specified cover is maintained on the main and the hydrant lead.

H. Hydrants shall be secured in place by concrete thrust blocks or hydrant anchoring tee with connection pieces, restraint joints, grooved and shouldered joints, or socket clamps and tie rods.

I. Devices other than concrete thrust blocks shall extend from hydrant to tee fitting in main.

J. All bolts for buried service shall be only low-alloy, high-strength steel or stainless steel.

K. Use only ductile iron pipe where restraint type joints are used for hydrant branches or leads from the main.

L. Tie or anchor rods shall be not less than three-quarter inches (3/4") in diameter, material shall be wrought iron or steel. Wrought iron and steel shall be protected against corrosion by painting with tar, asphaltum, or other suitable and approved material and also by covering the lead and anchor with polyethylene wrap as specified for ductile iron pipe.

M. Place a minimum of seven (7) cubic feet of clean washed gravel around each hydrant base, cover the gravel with Geotextile fabric, and thoroughly tamp native material above the gravel and fabric.

N. Paint installed hydrant with one (1) finish coat of chrome yellow or Owner's standard color, as specified for hydrants.

O. At post type flushing or yard hydrants, pour a concrete surface pad around the hydrant and beyond the discharge jet for erosion protection.

3.4 INSTALLING AIR VALVES AND VENTS

A. Install air valves on mains at approximate locations shown on the Drawings with Field Changes to be at the exact high point elevations.

B. Where high points occur in mains and the Drawings do not require an air valve, tap the line and provide a temporary vent by a corporation stop and vent air while filling the system.

3.5 BACKFLOW PREVENTER INSTALLATION

A. Install back flow preventers of type, size and capacity indicated. Include valves and test cocks. Install according to requirements of State Plumbing and Health Department requirements.

B. Do not install preventers that have relief drain in vault or in spaces subject to flooding.

C. Do not install bypass piping around backflow preventers.

3.6 Water Meter Box Installation

1. Install water meter boxes in paved areas flush with surface.

2. Install water meter boxes in grass or earth areas with top 2 inches above surface.

B. Connect tracer wire between mains and services at each corporation stop and to each meter or curb stop. Leave excess tracer wire coiled inside the meter.

3.7 SERVICE ASSEMBLIES AND METER SETTING INSTALLATIONS

A. General: Comply with AWWA C 800.

B. Direct Service Taps, Couplings and Service Saddles

1. All service taps, couplings and service saddles shall have AWWA standard threads at the water main. Taps for all service pipe or tubing shall be made in the side of the pipe between horizontal and not more than 22 1/2° above horizontal. Taps for plastic service pipe or tubing shall preferably be made not more than 15° above horizontal.

2. Taps shall be made with sharp cutters of the type designed for the pipe and in strict compliance with both the pipe and the tap machine manufacturer's recommendations. Wrap the threads with two layers of T.F.E. tape and torque corporation stops as recommended by the manufacturer.

3. Direct threaded taps shall be prohibited in fiberglass, composite or prestressed concrete pipes.

4. Direct threaded tapping of asbestos cement, PVC pressure rated, and ductile iron pipe shall be limited by sizes and those connections that are prohibited by direct tapping shall be made with threaded couplings or service strap clamps.

5. The maximum size direct threaded tap permitted in pipes shall be as follows:

TAP SIZE, MAXIMUM

Pipe Size	Asbestos Cement	Ductile Iron	PVC, D or DR
3"	--	½"	NONE
4"	NONE	¾"	NONE
6"	¾"	¾"	1"
8"	1"	1"	1"
10" & 12"	1"	1 ½"	1"

14" & LARGER	1"	2"	--

6. Where it is necessary to provide a service larger than the allowable tap size, multiple taps shall be employed by staggering the taps around the pipe and spacing the taps at least 12" apart and 12" from the end of the pipe length, otherwise service clamps shall be used.

7. Maximum size service strap clamp permitted shall be as follows:

TAP SIZE, MAXIMUM

Pipe Size	Asbestos Cement	Ductile Iron	Plastic, Fiberglass & Composition
2"	NONE	NONE	¾"
2 ½"	NONE	NONE	1"
3"	NONE	1 ½ "	1 ½ "
4"	1"	2"	1 ½ "
3	1 ½ "	2"	1 ½ "
8"	2"	3"	2"
10"	2"	3"	2"
12"	2"	4"	2"

8. Heavy duty threaded couplings or couplings with threaded bushings for use on asbestos cement pipe are permissible in sizes through 1".

9. Tapped bossed tees are permissible in cast iron or ductile iron with tap sizes of 2 ½" maximum.

10. Taps in prestressed concrete cylinder pipe shall be made in compliance with AWWA Manual M9 and the manufacturer's recommendations.

C. Meter Settings

1. Meter settings shall consist of a meter box, curb stop, meter yoke (if required) or meter connectors, and meter, as detailed on the Drawings. Water meter shall be included in the meter setting.

D. New Service Assemblies

1. New service assemblies (without meters) where required on the Drawings or in the Bid Proposal, shall each include service tap and saddle or fittings, corporation stop, required connectors, curb box, curb stop, service pipe and incidentals. Materials used in service assemblies shall be of the type and make as shown on the Drawings. Set curb stops at the right-of-way line, unless designated otherwise.

E. New Service Assemblies with Meter Setting

1. New service assemblies with meter setting where called for on the Drawings or in the Bid Proposal, shall each include a meter setting, service tap and saddle or fittings, corporation stop, the required connectors, water meter, and incidentals.

F. Meter Settings in Existing Service

1. Meter setting in existing services, where required on the Drawings or in the Bid Proposal, shall be as detailed on the Drawings and as specified above for meter settings and each include a meter box, curb stop, meter yoke (if required) or meter connectors and other required connectors necessary for installing a new meter into an existing service line, and the water meter where indicated.

G. Connection of Existing Services to New Mains

1. Connection of existing services to new mains where required on the Drawings or in the Bid Proposal, shall each include a service tap and saddle or fittings, corporation stop, service valves and caps for abandonment, service valves and plugs for testing, and any other connectors required. Provide adequate thrust restraint on dead-end valves, plugs and caps. Additional service piping may be required to make these connections.

H. Removing Existing Service Assembly

1. Removing existing service assemblies where required on the Drawings or in the Bid Proposal, shall include removing and salvaging existing water meter, meter box and lid, curb stop, curb box and all fittings, cleaned and furnished by the Owner. Existing service assembly shall be removed after new service assembly with meter setting has been installed and accepted.

I. Water Meter Box Installation

1. Install water meter boxes in paved areas flush with surface.

2. Install water meter boxes in grass or earth areas with top 2 inches above surface.

J. Connector tracer wire between mains and services at each corporation stop and to each meter or curb stop. Leave excess tracer wire coiled inside the meter.

3.8 FIELD QUALITY CONTROL

A. Pressure and Leakage Testing

1. Water Utility Distribution Equipment will be tested along with distribution piping. Comply with pressure and leakage testing requirements.

B. Disinfection.

1. Comply with disinfection requirements of AWWA C 651.

3.9 ADJUSTING AND CLEAN-UP

A. Perform final field measurements of the work as constructed and furnish record drawings of Field Changes with final locations of pipes, valves, service, hydrants, etc.

B. Complete all lists of defects or deficiencies, inspect all Work for conformance with Drawings and Specifications and verify such items as follows:

1. Valves fully open.
2. Sunken trenches refilled.
3. Restoration of removed or damaged pavement.
4. Proper orientation of fire hydrants.
5. Hydrant bury line flush with finished surface.
6. Existence of concrete pads and lids on valve boxes.
7. Valve box and meter box lids flush with finished surface.
8. Pressure reducing valves and altitude valves are properly adjusted.
9. Erosion protection effective and seeding established.

END OF SECTION 33 12 00

SECTION 33 12 10 PALO ALTO CONTROL VALVE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract apply to this Section.

B. Controls requirements on the P&IDs in the drawings.

C. See "McCall Booster System Control Narrative" in the appendix for control, coordination, and additional information about operation.

1.2 SUMMARY

A. This Section includes the control valve for installation at the Palo Alto Tank site.

B. Product Data: For each type of product indicated.

C. Provide dimensional drawings, wiring schematics, hydraulic schematics, and installation instructions.

D. Provide a certificate of proper installation by the manufacturer's representative.

E. Operation and Maintenance Data

1.3 QUALITY ASSURANCE

A. NSF Compliance:

1. Comply with NSF 61 Drinking Water System Components – Health Effects in addition to the requirements of the Safe Drinking Water Act.

2. Comply with NSF 372 for drinking water components lead content, certified to be lead-free.

1.4 DELIVERY, STORAGE, AND HANDLING

A. All piping, valves, fittings, services, and accessories shall be stored, handled, laid, and installed in accordance with the manufacturer's recommendations.

PART 2 - PRODUCTS

2.1 CONTROL VALVE

Control valve shall be a 6" one-way pressure sustaining valve that shall remain closed unless it receives a 120 volt control signal to open (energize to open) and regulate pressure. It shall be fitting with a limit switch indicating the fully closed condition.

a. The control valve assembly shall have the following technical characteristics:

   i. Valve Pattern: Center guided "Y" globe pattern. The valve shall have an unobstructed flow path, with no stem guides or bearings in the flow.

   ii. Seat: Seat shall be replaceable stainless steel.

   iii. Disc Assembly: V-port throttling plug.

   iv. Actuator: The actuator assembly shall be double chambered with an inherent separating portion between the lower surface of the diaphragm and the main valve. The entire actuator assembly shall be removable from the valve as an integral unit. All necessary repairs and/or modifications other than replacement of the main valve body shall be possible without removing the valve from the pipeline.

   v. Pressure rating shall be 250 psi

   vi. End connections shall be ASME/ANSI B16.5 Class 150 pattern flanges

   vii. Cv (Minimum): 2,240

   viii. Altitude valve shall be provided with a control filter provided by the valve manufacturer.

   ix. Pilots shall epoxy coated steel with stainless steel wetted parts.

   x. Solenoid valves shall be provided by altitude valve manufacturer and shall be suitable for intended outdoor service. Solenoid valves shall have NPT connections and be NEM4X rated. Manufacturer shall coordinate with contractor at submittal stage to ensure arrangement and voltage conforms to existing site requirements.

   xi. Limit switch shall be provided by altitude valve manufacturer and shall be suitable for intended outdoor service. Manufacturer shall coordinate with contractor at submittal stage to ensure arrangement and voltage conforms to existing site requirements. Limit switches shall be IP67 rated, with a metal housing and rated for 20 million cycles.

b. Materials shall be:

   i. Body: Ductile iron

   ii. Bolts, nuts, studs: Stainless steel

iii. External tubing: Stainless steel

iv. Internals: Stainless Steel, NSF 327 bronze

v. Seals: NSF 61 certified NBR or EPDM.

vi. Coating: Dark blue fusion bonded epoxy coating, factor applied.

vii. Lining: NSF 61 certified fusion bonded epoxy coating.

viii. All materials shall be suitable for insulation and heat tracing.

ix. Valve shall be NSF 61/327 certified.

c. Valve assemblies shall be complete with restrictors for opening speed control and closing speed control, control piping and a large control filter, 2-4 ½" diameter pressure gages (installed on the main control loop) 0 to 230 feet head and 0-100 psi range, exhaust bluffs, isolation valves, connections to system piping, pilots, and other operation equipment as described below and incidentals necessary to make the unit complete and operable. The control system shall consist of adjustable pilot valves as required, needle valves, isolation cock valves, solenoid valves, in line check valve, limit switch assembly. Valve shall be hydrostatically tested at the factory and functionally tested on site, once installed.

d. Valve Operation

i. See "McCall Booster System Control Narrative" for operation requirements

ii. Valve operation shall not induce harmful hydraulic transients.

e. Startup, Training and Initial Performance Period Services, Certificate of Proper Installation and O&M Manual

i. The valve manufacturer's representative shall provide a minimum of 4 hours on site installation assistance.

ii. The valve manufacturer's representative shall provide a Certificate of Proper Installation which shall be submitted to the Engineer.

iii. The valve manufacturer's representative shall provide an Operations and Maintenance manual which shall clearly show how to change the altitude and back pressure setting, and detail regular maintenance required.

iv. The valve manufacturer's representative shall perform the following Initial Performance Period Services:

1) The manufacturer's representative shall install a high-speed pressure recording or pressure recording and transmitting device that shall record the pressure at the valve a minimum of 256 times per second for a minimum of 30 days.

2) The manufacturer's representative shall provide this data and a summary analysis to the Engineer.

3) After the Engineer has reviewed the data and coordinated with the Owner, the Manufacturer's representative shall return to the site to modify or adjust the valve as need so that it achieves its intended operation.

f. Manufacturers

i. Valve shall be Model 730-55 by Bermad Control Valves, Inc.

ii. Preapproved equal

END OF SECTION 33 12 00

46 83 04 – BOOSTER PUMP STATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, apply to this Section.

B. Note controls requirements on the P&IDs in the drawings.

C. See "McCall Booster System Control Narrative" in the appendix for booster station control and system coordination requirements.

1.2 SUMMARY

A. This section specifies the new package booster pumping station at the McCall elevated storage tank site. It includes the pump skid and station enclosure, with appurtenances.

B. The Contractor shall furnish materials, equipment and labor to furnish, install and test the pumping system complete with the pumps, motors, mounting bases, piping, wiring, controls, valves and appurtenances, as indicated on the contract drawings and as herein specified.

1.3 REFERENCE STANDARDS

A. The work in this section is subject to the requirements of applicable portions of the following standards:

Hydraulic Institute Standards

IEEE Standards

NEMA Standards

OSHA Rules and Regulations

NEC Standards

SUBMITTALS

B. Product Data: For each type of product indicated.

C. Shop Drawings:

1. Detail dimensional drawings for the pump station and enclosure.

2. Wiring Diagrams: Power, signal, and control wiring.

3. Factory Pump Curve, showing minimum operating speed allowable and allowable operating ranges at all speeds above minimum allowable.

4. Component submittals, which shall include, piping, pumps, valves, instruments, control systems, electrical systems, building system components such as fans, lights, and heater, and appurtenances.

5. Skid coating system.

6. Certificate of Proper Installation by the pump manufacturer's representative, stating that the station has been installed according to the manufacturer's requirements.

D. Operation and Maintenance Data for pumps, valves, control valves, piping components requiring maintenance, and instruments.

1.4 QUALITY ASSURANCE

A. Package booster station shall be designed and manufactured by a single entity. The pump station shall be designed and constructed by the manufacturer of the pump used in the station, or the pump manufacturer shall issue a certificate saying the design and construction is acceptable.

B. The entire system, including the station enclosure, VFD, and pump station control system, shall be provided by a single supplier to facilitate coordination between the skid and enclosure requirements.

C. Components shall be suitable for the service indicated.

D. Manufacturer shall have a minimum of 5 years experience in the manufacture of package potable water booster stations.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store material and equipment in strict accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.1 GENERAL DESCRIPTION

A. The booster pump station shall pump chloraminated potable water, be a skid mounted, VFD driven, pre-piped and pre-wired duplex station with controls and feedback per the P&ID requirements in the drawings. The control panel and VFDs shall be mounted to the skid.

B. One VFD shall be dedicated to each pump.

C. Required valves and piping shall be provided such that the skid can be tied into the site piping as shown on the drawings with a skid-mounted 6" header.

D. The pumps shall be **Grundfos CR 95** vertical pumps or pre-approved equal. Pre-approval must be obtained a minimum of ten days before bid date.

E. The pump materials of construction must meet the NSF-372 lead free requirements for potable water service and shall be NSF 61 approved for potable water service.

F. The pump skid system shall allow a single pump to meet the design conditions. Pumps shall rotate each time a pump start is called.

G. See "McCall Booster System Control Narrative" for booster station control requirements and coordination with other control systems.

H. System Conditions:

1. The booster station will see suction pressures that may vary as indicated in the "Station Conditions" table below.

2. The station shall be provided with a pressure reducing valve which shall reduce the suction pressure as required when the suction pressure is too high for the pump to operate properly.

3. Suction and Discharge Pressures

The station shall be designed to operate within the following pressure ranges:

Station Head Conditions

Condition	**Minimum (FT)**	**Maximum (FT TDH)**
Suction Pressure at Station	81	162
Discharge Pressure at Station	104	176

I. Maximum Skid Dimensions:

1. Height: 72"

2. Width: 72"

3. Depth: 60"

J. The following conditions of service shall be strictly adhered to:

1. Flow at Design: 350 GPM

2. Dynamic head at design: 100 FT

3. Suction size: 4"

4. Discharge size: 4"

5. Number of stages: 1

6. System Efficiency at design: 64%

7. Rotative Speed, maximum: 3,600 RPM.

8. The pump, motor and VFD combination shall be designed such that it will operate at 40% speed or lower.

9. Power at Design: 12 HP

10. Driver Horsepower, Minimum: **20 HP**

11. NPSHR at Design 9.7 ft.

12. Curve Points – The pump shall provide the following:

100% Speed Curve		50% Speed Curve		Right Side of Curve Operation Envelope	
GPM	Ft Head	GPM	Ft Head	GPM	Ft Head
0	150	0	37	165	5
100	146	100	36	300	13
200	138	200	31	450	31
300	130	300	22	600	58
400	120				
500	104				

2.2 PUMP MOTOR

A. The motor shall have the following characteristics:
   1. 15 HP, 60 Hz, 208-230/460 V, 3,600 RPM with IP55 enclosure
   2. Service Factor: 1.15
   3. Premium efficiency
   4. Inverter duty

2.3 CONTROL VALVE

A. Provide a differential pressure reducing control valve installed in station piping down stream of each pump (two required), mounted inside the enclosure, but draining to the exterior as required.

B. The control valve operate as described in the control narrative.

C. The control valve shall act as a check valve and allow flow only one way.

D. It shall be solenoid actuated and be provided with a limit switch to indicate closes or not closed status.

E. The control valve shall be a 6” Bermad 743-12-06-03 with V-port disk or pre-approved equal.

2.4 STATION ENCLOSURE

A. General Description: The station enclosure shall be a fiberglass reinforced plastic enclosure with double (2) 36” x 85” doors at each end, with a sloped roof, lifting eyes, and exterior connection flanges. Door hardware shall allow for padlock. Exterior gel coat shall be off-white and shall be UV resistant. Station shall have thermostatically controlled vent fans and louvers as required with insect screens, thermostatically controlled heating, and lighting. Enclosure shall have a nominal wind rating of 110 MPH (141 ultimate, 3 second gust). Enclosure shall be by Dyer Fiberglass, Inc. or approved equal.

B. Dimensions

1. Length: 106” (Interior) 112” (Exterior, not counting flange)

2. Width: 107” (Interior) (110” Exterior, not counting flange)

3. Height 92: (Interior)

4. Roof: Length 120” x Width 118”

2.5 MATERIALS OF CONSTRUCTION

A. Pump

1. Pump components: Cast Iron (ASTM A536)/ 304 Stainless Steel Impeller

2. Support Bearing: Graflon

B. Control Valves

1. Body: Ductile Iron

2. Internals: stainless steel or NSF 327 bronze.

C. Pump Skid

1. Painted Carbon Steel, utilizing a primer and over coat system, by TNEMC or equal, with material and surface preparation as recommended by the coating manufacturer.

2. Pre-galvanized strut

D. Pump Station Enclosure

1. Fiberglass reinforced plastic

2. Stainless Steel

PART 3 - EXECUTION

3.1 Installation

A. Install per manufacturer's requirements and instructions.

B. Station floor slopes. Install skid plumb and level with grout as required.

3.2 Pump Start up and Certification

A. Provide a minimum of 8 hours startup and training services by manufacturer.

B. Manufacturer shall provide a Certificate of Proper Installation prior to startup. See submittal requirements.

3.3 Control Valve Start up, Certification and Initial Performance Period Services

A. The valve manufacturer's representative shall provide a minimum of 4 hours on site installation assistance.

B. The valve manufacturer's representative shall provide a Certificate of Proper Installation which shall be submitted to the Engineer.

C. The valve manufacturer's representative shall provide an Operations and Maintenance manual which shall clearly show how to change the altitude and back pressure setting, and detail regular maintenance required.

D. The valve manufacturer's representative shall perform the following Initial Performance Period Services:

1) The manufacturer's representative shall install a high-speed pressure recording or pressure recording and transmitting device that shall record the pressure at the valve a minimum of 256 times per second for a minimum of 30 days.

2) The manufacturer's representative shall provide this data and a summary analysis to the Engineer.

3) After the Engineer has reviewed the data and coordinated with the Owner, the Manufacturer's representative shall return to the site to modify or adjust the valve as need so that it achieves its intended operation.

END OF SECTION 46 83 04

MCCALL BOOSTER STATION SYSTEM NARRATIVE

I. MCCALL BOOSTER STATION CONTROL NARRATIVE

The McCall Booster Station System requires work at two sites. A new booster station will be installed at the McCall Tank site and a new control valve will be installed at the Palo Alto Tank site.

The McCall Tank Site will have new *McCall Site PLC with radio telemetry connection RTU* to the Water Treatment Plant SCADA system.

The McCall Site PLC/RTU is by others. It is described here for information, because it will interface with the contractor-supplied McCall Booster Station control panel. Information about the *McCall Site PLC/RTU* is in *italics* to differentiate scope.

The Palo Alto Tank site has an existing *Palo Alto Site PLC* with a radio telemetry connection *RTU* to the *Water Treatment Plant SCADA system*.

The control valve at the Palo Alto site will operate as described below. Its control will be via an existing *Palo Alto Site PLC/RTU*. Information about *the Palo Alto Site PLC/RTU* is in *italics* to differentiate scope.

A. MCCALLL BOOSTER SITE PLC/RTU (By others)

The McCall Site PLC/RTU will receive tank level input from a new level indicating transmitter (level indicating transmitter and writing by contractor) *at the McCall tank and* a new flow signal (wiring for flow signal by contractor) *from an* existing magnetic flow meter*. The Operator will control set point values in the McCall Site PLC from the Water Treatment Plant SCADA via radio.*

The McCall Site PLC/RTU will tell the McCall Booster Station *to run in Auto or Remote Manual.*

In Auto, logic in the McCall Site PLC/RTU will call the McCall Booster Station *station to run (RUN_STATION) based on tank level. When the tank reaches a set point level (FILL_LEVEL), set at the McCall Site PLC/RTU by the Operator vis SCADA the call will be released.*

In Remote Manual the Operator will be able to run either Pump 1 (PUMP_1_REMOTE_RUN) or Pump 2 (PUMP_2_REMOTE_RUN).

(The Plant SCADA system will also have an "OFF" setting for the McCall station, in which none of the above calls will be active.)

Values from McCall Site PLC/RTU to Booster Station Control Panel:

STATION RUN—Call and Release call based on McCall tank level (RUN_STATION)
MAX PUMP SPEED—Set the maximum allowable speed (MAX_ALLOWED)

MINIMUM ALLOWABLE SUCTION PRESSURE—This is the minimum allowable suction pressure with which the McCall Station will be allowed to run. (MIN_SUC_1)
REMOTE MANUAL CALL PUMP 1—Calls Pump 1 from SCADA (PUMP_1_REMOTE_RUN)
REMOTE MANUAL CALL PUMP 2—Calls Pump 2 from SCADA (PUMP_2_REMOTE_RUN)

The Site PLC will cause the SCADA to alarm if station flow is below an operator set point (LOW_FLOW).

The PLC will cause the SCADA to alarm if the suction pressure is below (MIN_SUC_1).

If the PLC receives the GENERAL_ALARM, the STATION_RUN call will be released. This will cause the Water Plant SCADA to change the station call status to OFF. The alarm must be acknowledged before the station can be returned to service.

So, if the STATION_RUN call is released for any reason other than reaching the fill level (TANK_FILL), the operator must manually re-engage.

The Water Plant can also call a pump to run in remote manual mode. The maximum pump speed (MAX_ALLOWED) will apply.

B. MCCALL BOOSTER PUMP CONTROL PANEL/CONTRACTOR SCOPE

Contractor is responsible to provide wiring, controls, instruments, pumps, etc. as described in the drawings and specifications. The Contractor is responsible for providing the Booster Pump Control Panel such that it receives input from the *McCall Site PLC/RTU* and operates in accordance with the description of the *McCall Site PLC operation.* The Booster Pump Control Panel shall also return to the *McCall Site PLC/RTU* feedback as shown on the P&ID.

The Booster Pump Control Panel will monitor the suction pressure. The VFD will ramp down to attempt to maintain the minimum pressure set point (MIN_SUC_1).

If the suction pressure falls below the set point (MIN_SUC_1), the pump call will be released, and the Booster Pump Control Panel will issue a general alarm (GEN_ALARM).

Note that as soon as the pumps stop taking suction, the suction line pressure will usually increase. Thus, appropriate delays must be built into the control system.

Each pump will have a differential pressure control valve that will also act as a check valve. Except operating as described below in high suction pressure operating mode, the control valve will be fully open an only act as a check valve.

When the suction pressure reaches a set point level (MAX_SUC_1), the station will change operating modes.

The VFD will no longer ramp up or down, but will switch to a high suction pressure operating mode.

The Booster Pump Control Panel will send a signal to the McCall Site PLC/RTU to alter to the change in operating mode.

In high suction pressure operating mode, the VFD will switch to a set point speed that is input at the Booster Pump Control Panel (HIGH_SUC_SPEED_1) and run at a constant speed. The Booster Pump Control Panel will energize a solenoid that will cause the pressure control valve for the online pump to act as a differential pressure control valve. The control valve will keep the online pump on its curve in the case of high suction pressure. Manually set pilots will allow the differential pressure to be adjusted.

Once in high suction pressure operating mode, if the pressure drops below (MAX_SUC_1), the mode will continue for a set point time, to be input at the Booster Pump Control Panel (HIGH_SUC_TIME_1). If the suction pressure exceeds (MAX_SUC_1) during (HIGH_SUC_TIME_1), (HIGH_SUC_TIME_1) will be reset.

The suction pressure may be above (MAX_SUC_1) at startup. If so, the pump called will start in high suction pressure mode and will run at least for (HIGH_SUC_TIME_1) in that mode.

The Booster Pump Control Panel must accommodate transitioning between operating modes.

(NOTE: An alternative means of managing the high suction pressure may be proposed by the pump skid manufacturer, but must be approved by the engineer.)

Only one pump will run at a time, and they will rotate. If one pump fails, or if a pump is called and the check valve limit switch fails to indicate the check valve is open within an adjustable time, the fail indication will be passed to the PLC, the first pump call will be released, and the next pump will be called to run.

Pump call will be released on high discharge pressure switch actuation.

Any time a pump call is released by the Booster Pump Control Panel (e.g., on low pressure or high pressure) the panel will send the GENERAL FAULT to the Site PLC.

The Booster Pump Control Panel will have a physical HOA switch for each pump and in hand will allow manual setting of VFD speed.

Pumps will ramp up slowly to speed and shutdown by ramping down to eliminate water hammer.

The Booster Pump Control Panel will pass the values shown to the PLC.

All wiring termination at the *Site PLC and Site PLC programming* is by others.

II. PALO ALTO CONTROL NARRATIVE

A. PALO ALTO SITE CONTRACTOR SCOPE

The Palo Alto site will be modified with: 1) a new self contained, battery operated auto flushing assembly; 2) a new pressure sustaining control valve that allows water from the McCall pressure plane into the PUA pressure plane at Palo Alto; and 3) a new check valve with bypass.

The pressure sustaining valve will be opened (typically) by the existing *Palo Alto Site PLC/RTU* based on operator set intervals (set via SCADA from the water plant).

The new pressure sustaining valve pressure setting will be controlled by a pilot on the valve that is manually set at the valve.

The solenoid valve that opens and closes the valve will be controlled by the existing *Palo Alto Site PLC/RTU* (as described below) but there will be a manual bypass on the valve to allow manual opening of the pressure sustaining valve.

A limit switch on the pressure sustaining control valve will feed back valve status (closed or not closed) to the *Palo Alto Site PLC/RTU*, as described below.

Termination of control wiring to the *Palo Alto Site PLC/RTU* and *Palo Alto Site PLC/RTU programming* is by others. Contractor must supply valves and wiring and other equipment as shown per the drawings and specification.

B. PALO ALTO BOOSTER SITE PLC/RTU (Existing or by others)

The Palo Alto Site PLC/RTU is existing. It will send a signal to the control valve to open. Upon release of the sign, the valve will close. The valve will also feed back to the Palo Alto Site PLC/RTU the status of the valve (close or not closed).

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