ADDENDUM NO. 1 TO THE PROJECT MANUAL

NEW RIVER CANAL TILTING WEIR
ASCENSION PARISH, LOUISIANA

PARISH PROJECT NO. EAD 15-004
HDCA PROJECT 20121-14

Prepared For:

EAST ASCENSION CONSOLIDATED GRAVITY DRAINAGE DISTRICT NO.1
42077 CHURCHPOINT ROAD
GONZALES, LOUISIANA 70737

Prepared by:

HPC
H. Davis Cole &
Associates, LLC
Consulting Engineers

STATE OF LOUISIANA
HOWARD DAVIS COLE
License. No. 30219
REGISTERED
PROFESSIONAL ENGINEER
CIVIL ENGINEERING

H. DAVIS COLE & ASSOCIATES, LLC
1340 POYDRAS STREET, SUITE 1840
NEW ORLEANS, LA 70112
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www.hdaviscole.com

OCTOBER 31, 2022

ADDENDUM NO. 1 TO THE
PROJECT MANUAL

FOR

NEW RIVER CANAL TILTING WEIR
ASCENSION PARISH, LOUISIANA

EAD PROJECT NO. EAD-15-004
HDCA PROJECT NO. 2021-14

H. DAVIS COLE & ASSOCIATES, LLC (HDCA)
1340 POYDRAS STREET, SUITE 1850
NEW ORLEANS, LOUISIANA
(504) 836 - 2020

This addendum forms a part of the Contract Documents and modifies Specification sections and Drawings as denoted below. Acknowledge receipt of this addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to disqualification. Bidder is responsible to disseminate this addendum to all subcontractors and material suppliers concerned.

This Addendum No. 1 supersedes any contrary or conflicting information in any previously-issued addenda. This Addendum shall be part of the Contract Documents. The following items are issued to add, delete, modify, and clarify the Contract Documents. These items shall be part of and shall have full force and effect as the Contract Documents and the cost involved shall be included in the bid price.

SEALED BIDS will be received by Ascension Parish Government, Purchasing Department, 615 E. Worthey, Gonzales, Louisiana, 70737 at **10:00 a.m., on Tuesday, November 8, 2022** for the above referenced project. Bids will be publicly opened and read aloud. Any bid received after closing time will be returned unopened.

ATTACHMENTS

A1. "Project Manual" entitled "New River Canal Tilting Weir" consisting of 441 pages
A2. "Project Drawings" entitled "New River Canal Tilting Weir" consisting of 30 sheets

CLARIFICATIONS

C1. **Question:** Please confirm that bid item 10 is the rebar for the concrete stem walls. **Answer:** The bid form has been revised so that all structure related items are contained within one lump sum bid item.

C2. **Question:** Detail A on Sheet 17 appears to show a concrete edge where the tilting weir hinge(s) attach to the concrete foundation. There is no concrete recess detail on the structural drawings. Please advise if there should be. **Answer:** A concrete recess will be required for the tilt weir hinges. Since each manufacturer's details for this item will vary, no structural detail was provided in the drawings. This detail will be provided by the

selected manufacturer of the tilt weir.

C3. **Question:** Are there additional details showing the location of the hose bibs and backflow preventer? **Answer:** Additional details are provided in the attached drawings.

C4. **Question:** Is there a plan sheet that better shows the chain-link fence? **Answer:** Additional details are provided in the attached drawings.

C5. **Question:** Detail A on Sheet 17 appears to show a vent tube. Are there any additional details on this? **Answer:** The vent tube details will be provided by the selected tilt weir manufacturer.

C6. **Question:** The special provisions are referenced on several different occasions but are not attached to this RFP. Will they be issued in an addendum? **Answer:** Yes, the supplemental conditions / special provisions are provided in the attached re-issued Project Manual.

CHANGES TO CONTRACT SPECIFICATIONS

SP1. **REPLACE entire "Project Manual" with attached "Project Manual"**

CHANGES TO CONTRACT DRAWINGS

D1. REPLACE entire "Project Drawings" with attached "Project Drawings"

PROJECT MANUAL

NEW RIVER CANAL TILTING WEIR
ASCENSION PARISH
HDCA PROJECT NO. 2021-14

Prepared For:

ASCENSION PARISH GOVERNMENT
DEPARTMENT OF PUBLIC WORKS
42077 CHURCHPOINT ROAD
GONZALES, LA 70737

Prepared By:

10/31/2022

STATE OF LOUISIANA
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www.hdaviscole.com

RELEASED FOR CONSTRUCTION
ADDENDUM NO. 1 RE-ISSUE

REVISION HISTORY

Date	Description
01/2022	50% Submittal
03/2022	100% Submittal
09/2022	Released for Construction

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Parish of Ascension

Clint Cointment
Parish President

Jim Buras
Purchasing Director

BID NOTICE

Sealed bids will be received by Ascension Parish Government at the Ascension Parish Government Purchasing Office, 615 E. Worthey Street, Gonzales, Louisiana 70737 (mailing address PO Box 2392, Gonzales, LA 70707-2392) until **November 8, 2022 at 10:00 a.m.** local time. The bids will be publicly opened and read aloud for the following:

New River Tilting Weir Structure
EAD-15-004
East Ascension consolidated Gravity Drainage District No.1
Parish of Ascension

Statement of Work:
This project consists of construction of a new reinforced concrete structure and mechanical tilting weir gates within the New River Canal, and other items as required by the plans, contract documents and technical specifications.

All bids must be in accordance with the Contract documents on file at the Ascension Parish Purchasing Department, 615 E. Worthey, Gonzales, Louisiana 70737.

Copies of Specifications, Bid Documents, Contract Documents and Construction Drawings for use in preparing bids may be obtained from H. Davis Cole & Associates, LLC (HDCA) 1340 Poydras Street, Suite 1850, New Orleans, LA 70112, (504) 836-2020 upon payment of Three Hundred ($300.00) per set made payable to H. Davis Cole & Associates, LLC (HDCA). Documents can be mailed to bidders with a provided shipping account number. No refunds will be made for returned drawings. Bid documents may be obtained from www.centralauctionhouse.com.

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.

Contractors desiring to bid shall submit to the Engineer, 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.

Parish of Ascension

Clint Cointment
Parish President

Jim Buras
Purchasing Director

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

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 October 27, 2022. Responses will be coordinated with the Project Engineer and posted on the www.centralauctionhouse.com website by 5:00 pm on Tuesday November 1, 2022.

A mandatory pre-bid meeting will be held on Tuesday October 25, 2022 at 10:00 a.m. the Ascension Parish Department of Public Works (DPW), 42077 Churchpoint Road, Gonzales, Louisiana 70737. Only those in attendance at the pre-bid meeting will be considered responsive bidders. The pre-bid meeting may include a non-mandatory visit to the project site.

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 (CST) on Tuesday November 8, 2022 all bids will be downloaded. No bids are accepted after 10:00 AM.**

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 of 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, 70737).

Parish of Ascension

Clint Cointment
Parish President

Jim Buras
Purchasing Director

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

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.**

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 advertisement listings. This listing is titled **"New River Tilting Weir Structure-EAD-15-004".** 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 Engineer for a response.

The U.S. Department of Transportation (DOT) operates a toll free "Hotline" Monday through Friday, 8:00 a.m. to 5:00 p.m., Eastern Time. Anyone with knowledge of possible bid rigging, bidder collusion, or other fraudulent activities should call 1-800-424-9071. All information will be treated confidentially and caller anonymity will be respected.

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

The Parish of Ascension reserves the right to disqualify any Bid, response to a Request for Qualifications, or Request for Proposals if it is determined that the submitting business entity is not in good standing with the Louisiana Secretary of State or is not authorized to do business in the State of Louisiana.

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

ASCENSION PARISH GOVERNMENT
CLINT COINTMENT, PARISH PRESIDENT

CHIEF - Please publish 10/13/22, 10/20/22, 10/27/22

Parish of Ascension

Clint Cointment
Parish President

Jim Buras
Purchasing Director

WEEKLY- Please publish 10/13/22, 10/20/22, 10/27/22

Division 3 – Article 1
LOUISIANA UNIFORM
PUBLIC WORKS BID FORM

TO: ***Ascension Parish Government*** **BID FOR: NEW RIVER TILTING WEIR**
P.O. Box 2392
Gonzales, Louisiana 70707

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: *H. Davis Cole & Associates, LLC (HDCA)* and dated: *September, 2022* .
(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:

N/A Dollars ($ N/A)

Alternate No. 2 *(Owner to provide description of alternate and state whether add or deduct)* for the lump sum of:

N/A Dollars ($ N/A)

Alternate No. 3 *(Owner to provide description of alternate and state whether add or deduct))* for the lump sum of:

N/A Dollars ($ N/A)

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 RS 38:2218.A is attached to and made a part of this bid.

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LOUISIANA UNIFORM PUBLIC WORKS BID FORM
UNIT PRICE FORM

TO: ***Ascension Parish Government*** **BID FOR: NEW RIVER TILTING WEIR**
P.O. Box 2392
Gonzales, Louisiana 70707

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:	✠ Base Bid or ❑ Alt.# REMOVE EXISTING WEIR			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
1	1	LUMP SUM		

DESCRIPTION:	✠ Base Bid or ❑ Alt.# RIP RAP – 30 POUND CLASS			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
2	350	SQUARE YARD		

DESCRIPTION:	✠ Base Bid or ❑ Alt.# WEIR GATE STRUCTURE (INCLUDING FOUNDATION AND SHEET PILES)			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
3	1	LUMP SUM		

DESCRIPTION:	✠ Base Bid or ❑ Alt.# CARBON STEEL WEIR GATE ASSEMBLIES			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
4	5	EACH		

DESCRIPTION:	✠ Base Bid or ❑ Alt.# GENERAL ELECTRICAL WORK			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
5	1	LUMP SUM		

DESCRIPTION:	✠ Base Bid or ❑ Alt.# CONSTRUCTION LAYOUT			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
6	1	LUMP SUM		

DESCRIPTION:	✠ Base Bid or ❑ Alt.# MOBILIZATION / DEMOBILIZATION			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
7	1	LUMP SUM		

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.

Preference will be given to bidders domiciled in Louisiana as stated in Louisiana Public Contract Law (38:2281).

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 H. DAVIS COLE & ASSOCIATES, LLC (HDCA), 1340 POYDRAS STREET, SUITE 1850, NEW ORLEANS, LA 70112, (504) 836 – 2020, 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. All questions about the meaning or intent of the Specifications and Contract Documents shall be submitted to the Engineer in writing. Replies will be issued by Addenda mailed or delivered to all parties recorded by Engineer 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 3:00 p.m. on October 27, 2022. Responses will be coordinated with the Engineer and posted on the centralauctionhouse web site by 5:00 PM on Tuesday, November 1, 2022.

A mandatory pre-bid meeting will be held on Tuesday, October 25, 2022 at 10:00 A.M. in the Ascension Parish Department of Public Works (DPW), 42077 Churchpoint Road, Gonzales, Louisiana 70737. Only those in attendance at the pre – bid meeting will be considered responsive bidders. The pre-bid meeting may include a non-mandatory visit to the project site.

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 10:00 AM CDT (CST) on November 8, 2022 all bids will be downloaded. No bids are accepted after 10:00 AM CDT

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
120 East Railroad Street, Gonzales, Louisiana (P.O. Box 2392, Gonzales, Louisiana 70707)

and identified on the outside with the Bidder's name, Louisiana Contractor License Number and the words "***NEW RIVER TILTING WEIR STRUCTURE – EAD 15-004"***.

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 Engineer 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:

H. Davis Cole & Associates, LLC (HDCA)
1340 Poydras Street, Suite 1850
New Orleans, Louisiana 70112
504-836-2020
Three Hundred Dollars ($300.00)

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).

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MASTER CONTRACT
for
PUBLIC WORKS/CONSTRUCTION

BE IT KNOWN that on this ____ day of _____, 20__,

Ascension Parish Government, by and through the Office of the Parish President (hereinafter sometimes referred to as the "OWNER"), as approved by Resolution adopted by the Parish Council of Ascension on the 17th day of January, 2008.

And

_____, qualified to do and doing business in this State and Parish (hereinafter referred to as "CONTRACTOR") and authorized to enter into this contract;

do hereby enter into contract under the following terms and conditions:

NOTE: This Contract or Agreement governs the relationship and rights between the Parties. While there may be other Documents (for example, General Conditions) which might exist between the Parties, those documents **do not** control in the event or to the extent that there is any conflict or contradiction with the terms of this Agreement or Contract. In the event that there is any conflict between the terms of this Agreement/Contract and any other document between the parties, THE PARTIES AGREE THAT THIS AGREEMENT/CONTRACT SHALL CONTROL AND GOVERN.

1. SCOPE OF SERVICES/WORK

A. CONTRACTOR shall complete all WORK as specified or indicated in the Contract Document in conjunction with:

"NEW RIVER TILTING WEIR STRUCTURE, EAD-15-004"

B. The Scope of services to be provided by the Consultant may be entered as a scope document, or written proposal signed by both parties to this contract. The Scope shall be attached hereto as an Exhibit and made a part hereof as if written herein in full. All work shall be under the direction of the Director of the Public Works Department, hereinafter called the PROJECT MANAGER, and all plans, specifications, and the like shall be submitted to him, and all approvals and administration of this contract shall be through him.

C. The compensation to the Provider for these services shall be set out in the attached scope document, Task Order, or written proposal signed by both parties to this contract.

D. There will be absolutely no fees or charges paid to Provider to cover overhead costs, general expenses, capital expenses, expenses for principal/branch/field offices, employees' salaries, direct and indirect costs, additional costs or profit of any nature whatsoever. In each case, the work is initiated only upon receipt of a written work order from the PROJECT MANAGER, all which must include the maximum fee to be charged.

2. TERM OF CONTRACT

A. The Work will be substantially completed within 365 calendar days from the date identified on the Notice to proceed from the Engineer.

B. The Notice to Proceed shall be issued within thirty (30) days from the execution of this contract unless the Owner or Owner's representative and the Contractor agree in writing to another specified date.

C. This construction contract shall remain in full force and effect until all work has been completed and accepted by OWNER and all payments required to be made to Contractor.

D. However, this contract may be terminated for any of the following:

1. As per the terms and conditions of Paragraph 15 and/or
2. As per operation of law, and/or
3. As per agreement between the parties, and/or
4. As per the Parish Charter.

3. ENGINEER

A. The Drawings have been prepared by H. Davis Cole & Associates, LLC; 1340 Poydras Street, Suite 1850, New Orleans, LA 70112 who is hereinafter call 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.

4. PROJECT SCHEDULE

A. CONTRACTOR shall submit and strictly adhere to a project construction schedule throughout the allocated contract and associated time frame. CONTRACTOR is aware that OWNER may have a representative at each site where WORK is being performed and that CONTRACTOR needs to coordinate with the OWNER'S REPRESENTATIVE or PROJECT MANAGER 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 (*email address of contact*) and (*email address of contact*) and other contacts including testing company that is a team for member for the project.

B. 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.

5. LIQUIDATED DAMAGES

A. 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 section 2 above, plus any extensions thereof allowed in accordance with the contract conditions and approved time changes thereto. There are delays, expenses and difficulties involved in proving in a legal arbitration preceding 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 **Eight Hundred Fifty ($850.00) Dollars** for each day that expires after the time specified in section 2 for Substantial Completion until the Work is substantially complete.

6. CONTRACT PRICE

A. OWNER shall pay CONTRACTOR for completion of the Work completed in accordance with the Contract Documents in the amount specified therein, subject to adjustment as provided in the Contract Documents or amendments thereto. This is unit price contract based on the estimated quantities and unit cost awarded with an estimated total of $_____.

7. PAYMENT PROCEDURES

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

B. Invoices for services shall be submitted by CONTRACTOR to the FINANCE DEPARTMENT for review and approval:

Ascension Parish Government
P.O. Box 2392
Gonzales, LA 70707-2392

C. **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 Unite 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. Payment will be made on work that that been installed, inspected, tested, verified, and done so to the satisfaction of the engineer.

D. 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.

E. **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.

F. **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.

G. There shall be no fees charged by, nor paid to, CONTRACTOR for consultation with the Parish.

H. CONTRACTOR hereby agrees that the responsibility for payment of taxes from the funds thus received under this agreement shall be said CONTRACTOR'S obligation and identified under Federal Tax Identification Number as listed in the Scope.

I. The Parish agrees to make payment to CONTRACTOR for services upon receipt and approval of each invoice. The Parish will pay CONTRACTOR the amount due and payable within thirty (30) days or unless a conflict results in a delay of payment. Upon receipt of each invoice, the Parish shall have the right and opportunity to review, confirm or otherwise determine the accuracy of each invoice and performance of service. In the event that the Parish disputes or otherwise may question the accuracy of each invoice or quality of all work performed, the Parish may withhold payment of any invoice until a successful and satisfactory resolution can be had between the parties. Parish agrees to not unreasonably withhold payments of any invoice.

J. Other than the fee schedule herein, there will be absolutely no additional fees due CONTRACTOR to cover its overhead costs, general expenses, capital expenses, expenses for principal/branch/field offices, employees' salaries, direct and indirect costs, additional costs or profit of any nature whatsoever in excess of the previously agreed hourly rate.

8. CONTRACTOR'S REPRESENTATIVES

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

A. 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.

B. 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 date 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.

C. 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.

D. CONTRACTOR has given ENGINEER 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.

9. CONTRACT DOCUMENTS

The Contract Documents which comprise of 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. CONTRACTOR Bid Documents
b. Bid Bonds
c. Agreement
d. Payment Bond
e. Performance Bond
f. Notice of Award
g. Notice to Proceed
h. Technical Specifications prepared by engineer
i. Standard General Conditions
j. Drawings prepared by engineers

10. CONTRACTOR DOCUMENTS

A. The CONTRACTOR shall also furnish sufficient as-built sets of plans, specifications & contract document.

B. All data collected by the CONTRACTOR and all documents, notes, drawings, tracings, and files shall remain the property of the Owner except as otherwise provided herein. The CONTRACTOR shall furnish to the PROJECT MANAGER originals of any project documents used in completion of the project or in any way related to this project to the Project Manager.

C. The Owner shall furnish without charge all standard plans and specifications and any other information which the Owner now has in its files which may be of use to the CONTRACTOR. CONTRACTOR has the duty to and must confirm and verify all information contained therein.

D. Construction Documents. The CONTRACTOR shall use the most current versions of the standard forms of documents adopted and specified by the Owner in the performance of the Contract, all as of the date of the signing of this contract. Notwithstanding anything to the contrary in any other provision of this contract, none of the contract documents provided by the Owner are or will become the property of the CONTRACTOR but shall remain the property of the Owner to the extent the Owner has a property interest therein.

E. Notwithstanding any Section hereinafter, there will be retention of all related records:

(1) All records, reports, documents and other material delivered or transmitted to CONTRACTOR by Parish shall remain the property of Parish, and shall be returned by CONTRACTOR to Parish, at CONTRACTOR'S expense, at termination or expiration of this contract. All records, reports, documents, exhibits or other material related to this contract and/or obtained or prepared by CONTRACTOR in connection with the performance of the services contracted for herein shall become the property of Parish, and shall be returned by CONTRACTOR to Parish, at CONTRACTOR'S expense, at termination or expiration of this contract.

(2) The Parish and CONTRACTOR acknowledge and agree that the Parish has the right to review retain all records, reports, worksheets or any other material of either party related to this contract. CONTRACTOR further agrees that CONTRACTOR will furnish to the Parish copies of any and all records, reports, worksheets, bills, statements or any other material of CONTRACTOR or Parish related to this contract.

(3) CONTRACTOR shall maintain all books, documents, papers, accounting records and other evidence pertaining to costs incurred and shall make such materials available at its offices at any reasonable time for inspection and copying by the Parish.

(4) CONTRACTOR shall retain all of its records and supporting documentation applicable to this contract with the Parish for a period of five (5) years after termination of the contract in accordance with state law, except as follows:

(a) Records that are subject to Federal Funds and/or audit findings shall be retained for five (5) years after such findings have been resolved, close out has been issued.

(b) All such records and supporting documentation shall be made readily available for inspection, copying or audit by representatives of the Parish. In the event the CONTRACTOR goes out of existence, it shall turn over to the Parish all of its records relating to

this contract to be retained by the Parish for the required period of time.

F. In the event there is re-use of any documents created by CONTRACTOR, CONTRACTOR invokes the privileges afforded it as per La. Revised Statute R.S. 38:2317.

G. The Parish agrees not to use CONTRACTOR'S work product on any other project without the express written notice to the CONTRACTOR.

H. All of CONTRACTOR'S pre-existing or proprietary computer programs, software, information, standard details or material developed by CONTRACTOR outside of this agreement shall remain the exclusive property of the CONTRACTOR.

11. NON-ASSIGNABILITY

A. CONTRACTOR shall not assign nor transfer any interest in this contract (whether by assignment or novation) without prior written consent of the Parish, provided however, that claims for money due or to become due to the CONTRACTOR from the Parish under this contract may be assigned to a bank, trust company, or other financial institution without such prior written consent. Notice of any such assignment or transfer shall be furnished promptly to the Parish.

B. 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 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.

C. 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.

12. BUDGET LIMITATION

A. It is the responsibility of the CONTRACTOR to advise the Parish in advance if contract funds or contract terms may be insufficient to complete contract objectives. CONTRACTOR understands and specifically warrants that it assumes the sole responsibility to advise the Parish in advance if contract funds or contract terms may be insufficient to complete contract objectives. In providing opinions of probable construction cost, the Parish understands that the CONTRACTOR has no control over costs and price of labor, equipment or materials or over the general CONTRACTOR'S method of pricing, and that the opinion of probable costs provided herein are made on the basis of the CONTRACTOR'S qualifications and experience.

B. The continuation of this contract is contingent upon the appropriation of funds by the Parish to fulfill the requirements of the contract. If the Parish fails to appropriate sufficient monies to provide for the continuation of this or any other related contract, or if such appropriation is reduced by the veto of Parish President by any means provided in the appropriations Ordinance to prevent the total appropriation for the year from exceeding revenues for that year, or for any other lawful purpose, and the effect of such reduction is to provide insufficient monies for the continuation of the contract, the contract shall terminate on the date of the beginning of the first fiscal year for which funds are not appropriated.

13. INSURANCE

A. The CONTRACTOR shall secure and maintain at its expense such insurance that will protect it and the Parish from claims under the Workmen's Compensation Acts and from claims for bodily injury, death or property damage which may arise from the performance of services under this agreement. All certificates of insurance shall be furnished to the Parish and shall provide that insurance shall not be canceled without thirty (30) days prior notice of cancellation given to the Parish of Ascension, in writing, on all of the required coverage provided to Ascension Parish. Where possible, all policies and notices should name the CONTRACTOR and Parish. The Parish may examine the policies at any time.

B. All policies and certificates of insurance shall contain the following clauses:

1. The CONTRACTOR'S insurers will have no right of recovery or subrogation against the Parish of Ascension, it being the intention of the parties that the insurance policy so affected shall protect both parties and be the primary coverage for any and all losses covered by the below described insurance.

2. The Parish of Ascension shall be named as additional named insured with respect to automobile and general liability.

3. The insurance companies issuing the policy or policies shall have no recourse against the Parish of Ascension for payment of any premiums or for assessments under any form of policy.

4. Any and all deductible in the described insurance policies shall be assumed by and be at the sole risk of the CONTRACTOR.

C. Prior to the execution of this agreement, the CONTRACTOR shall provide at its own expense, proof of the following insurance coverage required by the contract to the Parish of Ascension by insurance companies authorized to do business in the

State of Louisiana. Insurance is to be placed with insurers with an A.M. Best rating of no less than B+.

1. Worker s compensation Insurance: As required by Louisiana State Statute exception; employer's liability shall be at least $500,000 per occurrence.

2. Commercial General Liability Insurance in an amount not less than $1,000,000.00 per occurrence, and $2,000,000.00 aggregate combined single limit for bodily injury and property damage. This insurance shall include coverage for bodily injury and property damage, and indicate on the certificate of insurance the following:

    a) Premises - operations;
    b) Broad form contractual liability;
    c) Products and completed operations;
    d) Personal Injury;
    e) Broad form property damage;
    f) Explosion, collapse and underground coverage. Not needed for design

3. Business Automobile Liability Insurance with a Combined Single Limit of $1,000,000 per Occurrence for bodily injury and property damage, unless otherwise indicated. This insurance shall include for bodily injury and property damage the following coverage:

    a) Any automobiles;
    b) Owned automobiles;
    c) Hired automobiles;
    d) Non-owned automobiles;
    e) Uninsured motorist.

4. An umbrella policy or excess policy may be used to meet minimum requirements where applicable.

5. All policies of insurance shall meet the requirements of the Parish of Ascension prior to the commencing of any work. The Parish of Ascension has the right, but not the duty, to approve all insurance policies prior to commencing of any work. If at any time, it becomes known that any of the said policies shall be or becomes unsatisfactory to the Parish of Ascension as to form or substance; or if a company issuing any such policy shall be or become unsatisfactory to the Parish of Ascension, the CONTRACTOR shall promptly obtain a new policy, timely submit same to the Parish of Ascension for approval and submit a certificate thereof as provided above. The Parish agrees to not unreasonably withhold approval of any insurance

carrier selected by CONTRACTOR. In the event that Parish cannot agree or otherwise authorize said carrier, CONTRACTOR shall have the option of selecting and submitting new insurance carrier within 30 days of said notice by the Parish. In the event that the second submission is insufficient or is not approved, then the Parish shall have the unilateral opportunity to thereafter select a responsive and responsible insurance carrier all at the cost of CONTRACTOR and thereafter deduct from CONTRACTOR'S fee the cost of such insurance.

6. Upon failure of CONTRACTOR to furnish, deliver and/or maintain such insurance as above provided, this contract, at the election of the Parish of Ascension, may be forthwith declared suspended, discontinued or terminated. Failure of the CONTRACTOR to maintain insurance shall not relieve the CONTRACTOR from any liability under the contract, nor shall the insurance requirements be construed to conflict with the obligation of the CONTRACTOR concerning indemnification.

7. WAIVER: Except as otherwise provided by law, the coverage requirements of this section may be waived in whole or in part on agreements under $50,000.00, and the Parish is authorized to use its discretion in regard to insurance requirements for such contracts. Except as otherwise provided by law, the Parish President or the Parish Chief Administrative Officer is authorized to omit in whole or in part the insurance requirements of this section in connection with such contracts.

D. CONTRACTOR shall maintain a current copy of all annual insurance policies and provide same to the Parish of Ascension on an annual basis or as may be reasonably requested.

14. OTHER TERMS AND CONDITIONS

A. **Licenses and Commissions.** The CONTRACTOR shall, at all times during the term of this contract, maintain valid Louisiana licenses and commissions as are customarily required of such a CONTRACTOR, including but not limited to those that may be required by this State and/or Parish. The CONTRACTOR agrees to renew and or keep current all licenses and commissions herein. The CONTRACTOR agrees to maintain a copy of all such licenses or commissions on file at all time and make same available for review as may be reasonably requested by the Parish of Ascension.

B. The professional and technical adequacy and accuracy of designs, drawings, specifications, documents, and other work products furnished under this agreement will be conducted in a manner consistent with that level of care and skill ordinarily exercised by members of the profession in the Baton Rouge Metropolitan area

including the parishes surrounding Ascension Parish. In the event the Parish must have work done by change order or addition resulting from an error or omission by the CONTRACTOR, CONTRACTOR shall provide, at no cost to Parish, all professional services attributable to the change order. This is in addition to Parish's right to recover from CONTRACTOR any damages for its errors and omissions.

C. The CONTRACTOR shall defend, indemnify, and hold the Parish harmless from against any and all actions, claims, demands, complaints, or lawsuits of any kind (whether in tort or in contract) for any sums of money, costs, liabilities, judgments, fines, or penalties asserted or alleged by any person, party, entity, firm or generation for any damage, injury, claim, or cause of action (of any kind) including, but not limited to, pecuniary and non-pecuniary damages/losses to person or property which are alleged to have been caused by or which were caused by or (wholly or partially), which grow out of, which arise from, or which result from any negligent acts, errors, or omissions by CONTRACTOR, its agents, servants, or employees while engaged in connection with services required to be performed by the CONTRACTOR under this agreement. This paragraph is to be broadly interpreted to include any and all causes of action which result wholly or partially from the conduct or the CONTRACTOR.

D. This agreement shall be binding upon the successors and assigns for the parties hereto.

E. This agreement represents the entire Agreement between Parish and CONTRACTOR.

F. If there is any dispute concerning this agreement, the laws of Louisiana shall apply. The exclusive venue and jurisdiction for all lawsuits, claims, disputes, and other matters in questions between the parties to this agreement or any breach thereof shall be in the 23rd Judicial District Court for the Parish of Ascension, State of Louisiana. It is also understood and agreed that the laws and ordinances of Ascension shall apply.

G. In the event that the CONTRACTOR modifies the Parish's contract documents without the expressed prior written consent of the Parish, the CONTRACTOR shall indemnify and hold harmless the Parish from any claims, lawsuits, or damages that arise out of or are attributable to the modification. This indemnification and hold harmless obligation shall include not only the damages suffered by the Parish but also all reasonable expenses including, but not limited to, any and all litigation or other dispute resolution costs and any and all professional fees incurred by the Parish as a result of the CONTRACTOR'S deviation from the Parish's contract documents.

H. CONTRACTOR agrees to a covenant against contingent fees. CONTRACTOR

warrants that it has not employed or retained any company or person, other than a bona fide employee working solely for the CONTRACTOR, to solicit or secure this Contract, and that it has not paid or agreed to pay any company or person, other than a bona fide employee working solely for the CONTRACTOR, any fee, commission, percentage, brokerage fee, gifts, or any other consideration, contingent upon or resulting from the award or making of this Contract. For breach or violation of this warranty, the Parish shall have the right to annul this contract without liability.

I. This contract may be amended only by mutual written consent of the respective parties.

J. Third Party Beneficiary: it is specifically agreed by and between the parties to this contract that no person or party is intended, deemed, considered, or construed to be a third party beneficiary of this contract.

K. Neither party will be liable for failure to fulfill its obligations when due to causes beyond its reasonable control.

L. Any failure or delay by either party in exercising any right or remedy will not constitute a waiver.

M. Severability: if any provision or item in this contract is held invalid or unenforceable for any reason, then such invalidity or unenforceability shall not affect other provisions or items of this contract. In such event, the remaining portions shall be given full force and effect without the invalid provision or item, and to this end the provisions or items of this contract are hereby declared severable.

N. It is specifically understood that the terms "agreement" and "contract" may be used interchangeably. It is specifically understood that the terms “Owner”, “PROJECT MANAGER” and "Parish" and "the Parish of Ascension" may be used interchangeably.

O. Conflict of Interest: it is understood and agreed between the parties hereto that CONTRACTOR is not retained exclusively by the Parish but that the Parish may retain other CONTRACTORS during the term of this Contract. In the event of reasonably known conflicts of interest or potential conflicts of interest between the Parish and other parties who have engaged CONTRACTOR, the CONTRACTOR agrees to make full disclosure of the same, and that they will take no action on behalf of any other client directly adverse to the Parish, nor will CONTRACTOR take any action on behalf of the Parish directly adverse to any other client.

P. CONTRACTOR warrants that CONTRACTOR is qualified to perform the intended purposes of this agreement. In the event that CONTRACTOR becomes

not fit nor qualified for any reason whatsoever, then CONTRACTOR agrees to withdraw from work herein at no cost to the Parish. In the event that the Parish determines that CONTRACTOR is not suited for Parish purposes or otherwise fails to represent Parish policies to the satisfaction of the Parish, then CONTRACTOR agrees to withdraw from this agreement.

Q. CONTRACTOR specifically agrees and understands that CONTRACTOR shall not maintain or otherwise claim that it possesses any security interest in any aspect of the work that forms the basis of this agreement.

R. CONTRACTOR agrees to ensure that its personnel are, at all times, educated and trained, and further, that CONTRACTOR and its personnel will perform all work and services in a workmanlike and professional manner.

S. CONTRACTOR recognizes and understands that time is of the essence. CONTRACTOR agrees to perform and provide services in accordance with this agreement and all incorporated attachments.

T. CONTRACTOR shall be responsible for any and all losses and damages suffered or incurred by the Parish, including but not limited to all costs, attorney's fees, out of pocket expenses, any & all Parish employee time, and any other expenditure by the Parish to defend, remedy, repair, replace, correct, or cure any condition or liability created or arising out of the actions or omissions to act of the CONTRACTOR, it's agents, officer, servants, or employees. This includes the payment of any cost or fees of any type or kind incurred by the Parish in defending any lawsuit, complaint, claim, claim filed or arising out of the action or omission to act of the CONTRACTOR.

U. CONTRACTOR agrees that it will be responsible for all of its own actual and reasonably related expenses for its on & off-site office work. CONTRACTOR further agrees that Parish will not be responsible for or in any way liable for CONTRACTOR'S payroll costs, indirect or direct expenses, overhead, or any other amounts associated with CONTRACTOR'S business other than the specific fees & costs generated under the terms of this agreement.

15. TERMINATION AND SUSPENSION

A. Termination for Cause

The Parish may terminate this Contract for cause based upon the failure of the CONTRACTOR to comply with the terms and/or conditions of the Contract, provided that the Parish shall give the CONTRACTOR written notice specifying the failure. If within thirty (30) days after receipt of such notice, the CONTRACTOR shall not have corrected such failure and thereafter proceeded

diligently to complete such correction, then the Parish may, at its sole and exclusive option, place the CONTRACTOR in default and this contract shall terminate on the date specified in such notice. Work to be performed during this 30-day period shall not proceed without the actual knowledge of the Parish and specifically supervised by the Parish. Any work performed by CONTRACTOR during this period without the actual knowledge of the Parish and not under the supervision of the Parish shall not be compensated nor honored; CONTRACTOR specifically waives and forfeits any and all claims to payment, compensation, quantum merit, and/or reimbursement from the Parish of any work performed during this period in violation of this paragraph. CONTRACTOR agrees and understands specifically that satisfactory performance shall be unilaterally and exclusively determined by the Parish.

B. Termination for Convenience

Notwithstanding any other section herein, the Parish may terminate this contract at any time for any reason whatsoever by giving thirty (30) days written notice to the CONTRACTOR. The CONTRACTOR shall be entitled to payment for deliverables in progress; to the extent work has been actually and satisfactorily performed.

C. Right to Cancel

(1) The continuation of this contract is contingent upon the appropriation of funds to fulfill the requirements of the contract by the Parish. If the Parish fails to appropriate sufficient monies to provide for the continuation of this or any other contract, or if such appropriation is reduced by the veto of Parish President by any means provided in the appropriations Ordinance to prevent the total appropriation for the year from exceeding revenues for that year, or for any other lawful purpose, and the effect of such reduction is to provide insufficient monies for the continuation of the contract, the contract shall terminate on the date of the beginning of the first fiscal year for which funds are not appropriated. It is understood and agreed that the paragraph below may preempt this paragraph, all at the exclusive and unilateral option of the Parish.

D. Additional Causes for Termination or suspension:

1. By mutual agreement and consent of the parties hereto.
2. By the Parish as a consequence of the CONTRACTOR'S failure to comply with the terms, progress or quality of work in a satisfactory manner, proper allowances being made for circumstances beyond the control of the CONTRACTOR.
3. By either party upon failure of the opposing party to fulfill its obligations

as set forth in this contract, provided that written notice of said non-fulfillment is given to the opposing party and said obligation is not properly fulfilled within fifteen (15) days of said notice.

4. In the event of the abandonment of the project by the Parish.
5. A Stop Work Order can be immediately issued by the Parish if they deem it necessary to protect the health, safety, and welfare of the community.

E. Upon termination, the CONTRACTOR shall be paid for actual work performed prior to the notice of termination on a pro-rata share of the basic fee based on the phase or percentage of work actually completed.

F. Upon termination, the CONTRACTOR shall deliver to the Parish all original documents, notes, drawings, tracings, computer files, and files except the CONTRACTOR'S personal and administrative files.

G. Should the Parish desire to suspend the work, but not definitely terminate the contract, this may be done by thirty (30) day notice given by the Parish to that effect, and the work may be reinstated and resumed in full force & effect upon receipt from the Parish of thirty (30) day notice in writing to that effect. CONTRACTOR shall receive no additional compensation during the suspension period. The parties agree to revisit the terms of this contract during the suspension period which shall not exceed six (6) months, unless mutually agreed upon.

H. There is a right to cancel by the Parish by giving thirty (30) day notice to Provider and paying undisputed fees due for services on that portion of the work that has been satisfactorily, timely and/or professionally completed, all in the exclusive discretion of the Parish at any time herein.

I. In the event of a default and/or breach of this agreement and this matter is forwarded to legal counsel, then the prevailing party may be entitled to collect a reasonable attorney fees and all costs associated therewith whether or not litigation is initiated. Attorney fees shall be based upon the current, reasonable prevailing rate for counsel as provided on the fee schedule of the Louisiana Attorney General or in the private sector, whichever is greater. The parties agree to be responsible for such attorney fees, together for all with legal interest from date of agreement breach, plus all costs of collection.

J. Termination or cancellation of this agreement will not affect any rights or duties arising under any term or condition herein.

K. As to the filing of bankruptcy, voluntarily or involuntarily, by CONTRACTOR, CONTRACTOR agrees that if any execution or legal process is levied upon its interest in this contract, or if any liens or privileges are filed against its interest, or if a petition in bankruptcy is filed against it, or if it is adjudicated bankrupt in

involuntary proceedings, or if it should breach this contract in any material respect, the Parish shall have the right, at its unilateral option, to immediately cancel and terminate this contract. In the event that CONTRACTOR is placed in any chapter of bankruptcy, voluntarily or involuntarily, or otherwise triggers any provision of the preceding sentence herein, it is understood and agreed that all materials, goods and/or services provided shall be and remain the property of the Parish. All rights of CONTRACTOR as to goods, wares, products, services, materials and the like supplied to Parish shall be deemed forfeited.

16. AUDITORS

Notwithstanding other Sections herein, CONTRACTOR shall maintain all records for a period of three years after the date of final payment under this contract. It is hereby agreed that the Parish Department of Finance or its designated auditor shall have the sole, unilateral and exclusive option of auditing all accounts of CONTRACTOR which relate to this contract. Such audit may be commenced at any reasonable time. CONTRACTOR agrees not to delay, retard, interrupt or unduly interfere with commencement and completion of such an audit. If in the exclusive and unilateral opinion of the Parish that CONTRACTOR delays, retards, interferes with or otherwise interrupts such an audit, the Parish may seek such relief as per law. In such an event, CONTRACTOR agrees to be liable for all reasonable attorney fees, costs of auditors, court costs, and any other reasonably related expenses with such litigation.

17. DISCRIMINATION CLAUSE

CONTRACTOR agrees to comply with the Americans with Disabilities Act of 1990 and any current amendments thereto. All individuals shall have equal access to employment opportunities available to a similarly suited individual. CONTRACTOR agrees not to discriminate in its employment practices, and will render services under this contract without regard to race, color, religion, sex, national origin, veteran status, political affiliation, or disabilities. Any act of discrimination committed by CONTRACTOR, or failure to comply with these statutory obligations when applicable shall be grounds for termination of this contract. CONTRACTOR agrees to abide by the requirements of all local, state, and/or federal law, including but not limited to the following: Title VI and VII of the Civil Rights Act of 1964, as amended by the Equal Opportunity Act of 1972, Federal Executive Order 11246, the Federal Rehabilitation Act of 1973, as amended, the Vietnam Era Veteran's Readjustment Assistance Act of 1974, Title IX of the Education Amendments of 1972, the Age Act of 1975, and the requirements of the Americans with Disabilities Act of 1990. CONTRACTOR warrants and guarantees that it is an Equal Employment Opportunity employer. In all hiring or employment made possible by or resulting from this Contract, there shall not be any discrimination against any person because of race, color, religion, sex, national origin, disability, age or veterans status; and where applicable, affirmative action will be taken to ensure that CONTRACTOR’S employees are treated equally during employment without regard to their race, color,

religion, sex, national origin, disability, age, political affiliation, disabilities or veteran status. This requirement shall apply to 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. All solicitations or advertisements for employees shall state that all applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, disability, age or veteran status.

18. INDEPENDENT CONTRACTOR

A. While in the performance of services or carrying out obligations herein, the CONTRACTOR shall be acting in the capacity of an independent contractor and not as an employee of the Parish. The Parish shall not be obliged to any person, firm or corporation for any obligations of the CONTRACTOR arising from the performance of its services under this agreement. The CONTRACTOR shall not be authorized to represent the Parish with respect to services being performed, dealings with other agencies, and administration of specifically related contracts, unless done so in writing by the Parish.

B. CONTRACTOR hereby agrees to be responsible for payment of taxes from the funds thus received under this Contract. CONTRACTOR agrees to be responsible for and to pay all applicable federal income taxes, federal social security tax (or self-employment taxes in lieu thereof) and any other applicable federal or state unemployment taxes. CONTRACTOR agrees to indemnify and hold the Parish harmless for any and all federal and/or state income tax liability, including taxes, interest and penalties, resulting from the Parish's treatment of CONTRACTOR as independent contractor.

C. CONTRACTOR further agrees to reimburse Parish for any and all costs it incurs, including, but not limited to, accounting fees and legal fees, in defending itself against any such liability.

D. CONTRACTOR agrees and acknowledges that it (and its employees) is an **independent contractor** as defined in R.S. 23: 1021 (or any other provision of law) and as such nothing herein shall make CONTRACTOR an employee of the Parish nor create a partnership between CONTRACTOR and the Parish.

E. CONTRACTOR acknowledges exclusion of Workmen's Compensation Coverage. CONTRACTOR acknowledges of the exclusion of Unemployment Compensation coverage.

F. CONTRACTOR agrees to a waiver of any and all sick and annual benefits from the Parish. It is expressly agreed and understood between the parties entering into this personal service contract, that CONTRACTOR, acting as an independent

agent, shall not receive any sick and annual leave from the Parish.

19. NOTICES

All notices shall be by certified mail, return receipt requested, and sent to the following individuals at the following addresses. Changes of person and addresses are to be exchanged in a like manner:

Parish of Ascension: Office of the Parish President
P.O. Box 1659
Gonzales, LA 70707

Contractor: (insert company name)

20. AUTHORITY TO ENTER CONTRACT

The undersigned representative of CONTRACTOR warrants and personally guarantees that he/she has the requisite and necessary authority to enter and sign this contract on behalf of the corporate entity. The undersigned parties warrant and represent that they each have the respective authority and permission to enter this agreement. The Parish shall require, as an additional provision, that CONTRACTOR provide a certified copy of a corporate resolution authorizing the undersigned to enter and sign this agreement in the event that CONTRACTOR is a member of a corporation, partnership, LLC, LLP, and any other juridical entity.

This agreement is executed in two (2) originals. IN TESTIMONY WHEREOF, they have executed this agreement, the day and year first above written.

WITNESSES

_____ _____

Title: Parish President
Ascension Parish Government
Date: _____

_____

WITNESSES

_____ _____

Title: _____
Company Name
License No.
Date: _____

_____

DIVISION 1

STANDARD CONDITIONS OF THE CONSTRUCTION CONTRACT

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

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

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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

1.01 *Defined Terms*

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

30. *PCBs*—Polychlorinated biphenyls.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

47. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or Subcontractor.

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

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

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

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

1.02 *Terminology*

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

B. *Intent of Certain Terms or Adjectives:*

1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

C. *Day:*

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

D. *Defective:*

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

a. does not conform to the Contract Documents; or

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

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

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

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

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

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

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

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

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

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

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

2.02 *Copies of Documents*

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

2.03 *Commencement of Contract Times; Notice to Proceed*

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

2.04 *Starting the Work*

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

2.05 *Before Starting Construction*

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

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

2. a preliminary Schedule of Submittals; and

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

2.06 *Preconstruction Conference; Designation of Authorized Representatives*

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

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

2.07 *Initial Acceptance of Schedules*

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

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

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

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

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

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

B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that reasonably may be inferred from the Contract Documents or from prevailing custom or trade usage as

being required to produce the indicated result will be provided whether or not specifically called for, at no additional cost to Owner.

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

3.02 *Reference Standards*

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

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

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

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies:*

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

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

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

B. *Resolving Discrepancies:*

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

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

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

3.04 *Amending and Supplementing Contract Documents*

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

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

1. A Field Order;

2. Engineer's approval 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.

3.05 *Reuse of Documents*

A. Contractor and any Subcontractor or Supplier shall not:

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

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

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

3.06 *Electronic Data*

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

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

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

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

4.01 *Availability of Lands*

A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

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

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

4.02 *Subsurface and Physical Conditions*

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

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

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

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

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

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

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

4.03 *Differing Subsurface or Physical Conditions*

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

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

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

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

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

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

further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

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

C. *Possible Price and Times Adjustments:*

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

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

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

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

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

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

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

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

4.04 *Underground Facilities*

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

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

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

a. reviewing and checking all such information and data;

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

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

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

B. *Not Shown or Indicated:*

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

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

Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

4.05 *Reference Points*

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

4.06 *Hazardous Environmental Condition at Site*

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

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

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

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

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

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

D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental

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

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

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

G. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

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

charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

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

ARTICLE 5 – BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

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

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

C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

5.02 *Licensed Sureties and Insurers*

A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required.

Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.03 *Certificates of Insurance*

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

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

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

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

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

5.04 *Contractor's Insurance*

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

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

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

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

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

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

b. by any other person for any other reason;

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

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

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

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

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

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

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

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

6. include completed operations coverage:

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

b. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been

issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

5.05 *Owner's Liability Insurance*

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

5.06 *Property Insurance*

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

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

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

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

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

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

6. include testing and startup; and

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

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

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

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

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

5.07 *Waiver of Rights*

A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the 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.

5.08 *Receipt and Application of Insurance Proceeds*

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

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

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

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

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

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

ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

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

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

6.02 *Labor; Working Hours*

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

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

6.03 *Services, Materials, and Equipment*

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

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

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

6.04 *Progress Schedule*

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

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

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

6.05 *Substitutes and "Or-Equals"*

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

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

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

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

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

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

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

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

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

2. *Substitute Items:*

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

b. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute 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.

6.06 *Concerning Subcontractors, Suppliers, and Others*

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

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

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

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

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

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

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

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

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

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

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

6.07 *Patent Fees and Royalties*

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

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

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

6.08 *Permits*

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

6.09 *Laws and Regulations*

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise

expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

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

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

7.01 *Related Work at Site*

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

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

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

B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other

work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between owner and such utility owners and other contractors.

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

7.02 *Coordination*

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

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

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

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

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

7.03 *Legal Relationships*

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

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

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

ARTICLE 8 – OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

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

8.02 *Replacement of Engineer*

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

8.03 *Furnish Data*

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

8.04 *Pay When Due*

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

8.05 *Lands and Easements; Reports and Tests*

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

8.06 *Insurance*

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

8.07 *Change Orders*

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

8.08 *Inspections, Tests, and Approvals*

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

8.09 *Limitations on Owner's Responsibilities*

A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any

failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

8.10 *Undisclosed Hazardous Environmental Condition*

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

8.11 *Evidence of Financial Arrangements*

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

8.12 *Compliance with Safety Program*

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

ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *Owner's Representative*

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

9.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of

construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Project Representative*

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

9.04 *Authorized Variations in Work*

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

9.05 *Rejecting Defective Work*

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

9.06 *Shop Drawings, Change Orders and Payments*

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

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

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

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

9.07 *Determinations for Unit Price Work*

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

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

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

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

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

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

9.09 *Limitations on Engineer's Authority and Responsibilities*

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

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

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

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

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

9.10 *Compliance with Safety Program*

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

ARTICLE 10 – CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

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

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

10.02 *Unauthorized Changes in the Work*

A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in

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

10.03 *Execution of Change Orders*

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

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

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

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

10.04 *Notification to Surety*

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

10.05 *Claims*

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

B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared

in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Times shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).

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

1. deny the Claim in whole or in part;

2. approve the Claim; or

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

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

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

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

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

11.01 *Cost of the Work*

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

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents,

foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

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

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

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

5. Supplemental costs including the following:

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

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

    c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental

agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

11.02 *Allowances*

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.

11.03 *Unit Price Work*

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

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

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

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

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

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

3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

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

12.01 *Change of Contract Price*

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

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

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

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

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

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

1. a mutually acceptable fixed fee; or

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

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

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

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.

12.02 *Change of Contract Times*

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

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

12.03 *Delays*

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

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

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

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

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

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

13.01 *Notice of Defects*

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

13.02 *Access to Work*

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

13.03 *Tests and Inspections*

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

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

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

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

3. as otherwise specifically provided in the Contract Documents.

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

D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or

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

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

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

13.04 *Uncovering Work*

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

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

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

D. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 *Owner May Stop the Work*

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

Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

13.06 *Correction or Removal of Defective Work*

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

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

13.07 *Correction Period*

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

1. repair such defective land or areas; or

2. correct such defective Work; or

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

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

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.

13.08 *Acceptance of Defective Work*

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

13.09 *Owner May Correct Defective Work*

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

14.01 *Schedule of Values*

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

14.02 *Progress Payments*

A. *Applications for Payments:*

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments

received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

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

B. *Review of Applications:*

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

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

   a. the Work has progressed to the point indicated;

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

C. *Payment Becomes Due:*

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

D. *Reduction in Payment:*

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

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

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

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

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

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

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

14.03 *Contractor's Warranty of Title*

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

14.04 *Substantial Completion*

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

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

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to

Engineer as to any provisions of the certificate or attached list. If, after considering such objections, ngineer 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.

14.05 *Partial Utilization*

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

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

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

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

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

14.06 *Final Inspection*

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

14.07 *Final Payment*

A. *Application for Payment:*

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

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

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

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

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

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

3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an

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

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

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

C. *Payment Becomes Due:*

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

14.08 *Final Completion Delayed*

A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment

of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 *Waiver of Claims*

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

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

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

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

15.01 *Owner May Suspend Work*

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

15.02 *Owner May Terminate for Cause*

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

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);

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

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

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

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

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

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

3. complete the Work as Owner may deem expedient.

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

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

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

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

15.03 *Owner May Terminate For Convenience*

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

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

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

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

4. reasonable expenses directly attributable to termination.

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

15.04 *Contractor May Stop Work or Terminate*

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

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

ARTICLE 16 – DISPUTE RESOLUTION

16.01 *Methods and Procedures*

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

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

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

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

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

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

ARTICLE 17 – MISCELLANEOUS

17.01 *Giving Notice*

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

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

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

17.02 *Computation of Times*

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

17.03 *Cumulative Remedies*

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

17.04 *Survival of Obligations*

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

17.05 *Controlling Law*

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

17.06 *Headings*

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

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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:

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:

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

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

c. Employer's Liability: Statutory

3. 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:

   a. General Aggregate $300,000

   b. Products - Completed Operations Aggregate $300,000

   c. Personal and Advertising Injury $300,000

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

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

   f. Excess or Umbrella Liability

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

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

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

   b. Property Damage:
   Each Accident $300,000

   Or

   c. Combined Single Limit of $500,000

5. 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:

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

b. 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;

6. 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.

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

8. 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;

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

10. include testing and startup;

11. 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

12. 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:

D. 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.

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:

1. 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

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

3. 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."

DIVISION 3

BID FORMS

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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 corporatin 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.

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BID BOND FORM

Date: _____

KNOW ALL MEN BY THESE PRESENTS:

That_____ of _____, as Principal, and _____, as Surety, are held and firmly bound unto the _____ (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:

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)

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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_____.

_____
Notary Public

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)

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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:

NEW RIVER CHANNEL IMPROVEMENTS:, ***EAD-15-004*** consisting of municipal wastewater infrastructure construction 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

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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:

NEW RIVER CHANNEL IMPROVEMENTS:, ***EAD-15-004***, consisting of municipal street and lighting construction 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

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HOLD HARMLESS AGREEMENT

OWNER: **PARISH OF ASCENSION**
P.O. BOX 1659
GONZALES, LOUISIANA 70707-1659

ENGINEER: ***H. Davis Cole & Associates, LLC (HDCA)***
1340 Poydras Street, Suite 1850
New Orleans, LA. 70112

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:

_____

_____

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DIVISION 4

CONTRACT FORMS

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NOTICE OF AWARD

Date of Award: _____

TO: _____

ADDRESS: _____
_____

PROJECT: _____

Owner's Contract No.: _____ Engineer's Project No.: 2021-14_____
Contract For: ***NEW RIVER TILTING WEIR STRUCTURE***
ASCENSION PARISH
PROJECT # ***EAD-15-004***

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:
NEW RIVER TILTING WEIR STRUCTURE: ASCENSION PARISH

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.: _____Engineer's Project No.:__2017-14_____
Contract For: ***NEW RIVER TILTING WEIR STRUCTURE***
ASCENSION PARISH
PROJECT # EAD-15-004

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)

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APPLICATION FOR PAYMENT

NO. _____
TO Ascension Parish Government_____
Contract For: ***NEW RIVER TILTING WEIR STRUCTURE***
Owner's Contract No.: _____ Engineer's Project No.: ***2021-14***
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

Payment of the above AMOUNT DUE THIS APPLICATION is recommended.

Dated: _____ _____
ENGINEER

By: _____
Authorized Signature

NO._____

WORK CHANGE DIRECTIVE

PROJECT: NEW RIVER TILTING WEIR STRUCTURE
DATE OF ISSUANCE:_____ EFFECTIVE DATE: _____

OWNER: PARISH OF ASCENSION_____ OWNER'S CONTRACT NO.: __EAD-15-004_

ENGINEER: ***H. Davis Cole & Associates, LLC*** ENGINEER'S PROJECT NO.: ***2021-14***

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: _____

Method of determining change in Contract Times
_____Contractor's Records
_____Engineer's Records
_____Other: _____

Estimated increase (decrease) in Contract Price:
_____$_____-____

If the change involves an increase, the estimated amount is not to be exceeded without further authorization.

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)

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CLINT COINTMENT
ASCENSION PARISH PRESIDENT www.ascensionparish.net

CHANGE ORDER

CHANGE ORDER NO. _____

OWNER Ascension Parish Government_____ DATE _____

NAME OF PROJECT: ***NEW RIVER TILTING WEIR STRUCTURE***
PROJECT NUMBER: ***EAD-15-004***
ENGINEER: ***H. Davis Cole & Associates, LLC***

CONTRACTOR: _____ CONTRACT DATE _____

It is hereby mutually agreed that when this change order has been signed by the contracting parties, the following described changes in the work required by the Contract shall be executed by the Contractor without changing the terms of the Contract except as herein stipulated and agreed.

SCOPE OF CHANGES:

JUSTIFICATION FOR CHANGES:

CONTRACTOR'S PROPOSAL FOR THE ABOVE DESCRIBED CHANGES
I/We hereby agree to the modification of the Contract as described above and agree to furnish all materials, equipment and labor necessary to perform all work in connection therewith in accordance with the requirements for similar work in the existing Contract except as otherwise stipulated herein, for the following consideration.

CONTRACT Amount –Add to –or- Deduct from- the Contract amount the sum of $_____
Time for Completion –Add to –or- Deduct from- the Contract Time: _____ Days.
The New Date for Completion is _____

CONTRACTOR:_____

SIGNATURE: _____ DATE _____

RECOMMENDED BY: Chief Engineer, Ascension Parish Engineering Department

BY: _____ DATE _____

CHANGE ORDER (Continued)

APPROVED BY:

PUBLIC WORKS BY: _____ DATE _____

PARISH PRESIDENT BY: _____ DATE _____

STATEMENT OF CONTRACT AMOUNT

ORIGINAL CONTRACT AMOUNT:	$_____
Previous Additions	$_____
Previous Deductions	$_____
Net Amount Prior to this Change	$_____
Amount of This Change ___Add ___Deduct...	$_____
CONTRACT AMOUNT TO DATE…….....	$_____

CERTIFICATE OF

SUBSTANTIAL COMPLETION

Project: ***NEW RIVER TILTING WEIR STRUCTURE***

Owner: Ascension Parish Government	Owner's Contract No.: EAD-15-004
Contract:	Engineer's Project No ***2021-14***

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

DIVISION 5

TECHINCAL SPECIFICATIONS

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SECTION 01010 – GENERAL REQUIREMENTS

PART 1 -- GENERAL

1.1 ABBREVIATIONS OF INSTITUTIONS

A. Wherever in these Specifications references are made to the standards, specifications, or other published data of the various international, national, regional, or local organizations, such organizations may be referred to by their acronym or abbreviation only. As a guide to the user of the Specifications, the following acronyms or abbreviations which may appear shall have the meanings indicated herein.

B. Abbreviations:

AA	Aluminum Association
AAMA	American Architectural Manufacturers Association
AASHTO	American Association of State Highway and Transportation Officials
AATCC	American Association of Textile Chemists and Colorists
ABMA	American Bearing Manufacturer's Association – ABMA
ACGIH	American Conference of Governmental Industrial Hygienists
ACI	American Concrete Institute
AF&PA	American Forest and Paper Association
AGA	American Gas Association
AGMA	American Gear Manufacturers Association
AHA	American Hardboard Association
AHAM	Association of Home Appliance Manufacturers
AI	The Asphalt Institute
AIA	American Institute of Architects
AIHA	American Industrial Hygiene Association
AIIM	Association for Information and Image Management
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Movement and Control Association International, Inc
ANS	American Nuclear Society
ANSI	American National Standards Institute, Inc.
APA	The Engineered Wood Association
API	American Petroleum Institute
APWA	American Public Works Association
ARI	Air-Conditioning and Refrigeration Institute
ASA	Acoustical Society of America
ASAE	American Society of Agricultural Engineers
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASNT	American Society of Nondestructive Testing
ASQ	American Society for Quality
ASSE	American Society of Sanitary Engineers
ASTM	American Society for Testing and Materials
AWCI	American Wire Cloth Institute
AWI	Architectural Woodwork Institute
AWPA	American Wood Preservers Association
AWPI	American Wood Preservers Institute

AWS	American Welding Society
AWWA	American Water Works Association
BBC	Basic Building Code, Building Officials and Code Administrators International
BHMA	Builders Hardware Manufacturer's Association
CABO	Council of American Building Officials
CDA	Copper Development Association
CEMA	Conveyors Equipment Manufacturer's Association
CGA	Compressed Gas Association
CLFMI	Chain Link Fence Manufacturer's Institute
CMAA	A division/section of the Material Handling Industry of America
CRSI	Concrete Reinforcing Steel Institute
DCDMA	Diamond Core Drilling Manufacturer's Association
DHI	Door and Hardware Institute
DIPRA	Ductile Iron Pipe Research Association
EASA	Electrical Apparatus Service Association
EI	Energy Institute
EIA	Electronic Industries Alliance
EPA	Environmental Protection Agency
ETL	Electrical Test Laboratories
FCC	Federal Communications Commission
FCI	Fluid Controls Institute
FEMA	Federal Emergency Management Association
FHWA	Federal Highway Administration
FM	Factory Mutual System
FPL	Forest Products Laboratory
HI	Hydronics Institute, Hydraulic Institute
HSWA	Federal Hazardous and Solid Waste Amendments
IAPMO	International Association of Plumbing and Mechanical Officials
ICBO	International Conference of Building Officials
IBC	International Building Code
ICC	International Code Council
ICEA	Insulated Cable Engineers Association
ICCEC	Electrical Code
ICC-ES	International Code Council Evaluation Service
IEEE	Institute of Electrical and Electronics Engineers
IESNA	Illuminating Engineering Society of North America
IFC	International Fire Code
IFGC	International Fuel Gas Code
IMC	International Mechanical Code
IME	Institute of Makers of Explosives
IPC	International Plumbing Code, Association Connecting Electronic Industries
IRC	International Residential Code
ISA	Instrument Society of America
ISDI	Insulated Steel Door Institute
ISEA	Industrial Safety Equipment Association
ISO	International Organization for Standardization
ITE	Institute of Traffic Engineers
ITU-T	Telecommunications Standardization Sector of the International Telecommunications Union
LDOTD	Louisiana Department of Transportation and Development
LPI	Lightning Protection Institute

LRQA	Lloyd’s Register Quality Assurance
MBMA	Metal Building Manufacturer's Association
MIL	Military Standards (DoD)
MPTA	Mechanical Power Transmission Association
MSS	Manufacturers Standardization Society
NAAMM	National Association of Architectural Metal Manufacturer's
NACE	National Association of Corrosion Engineers
DASMA	Door and Access Systems Manufacturers Association International
NAPF	National Association of Pipe Fabricators
NBBPVI	National Board of Boiler and Pressure Vessel Inspectors
NCCLS	National Committee for Clinical Laboratory Standards
NCMA	National Concrete Masonry Association
NEC	National Electrical Code
NEMA	National Electrical Manufacturer's Association
NETA	International Electrical Testing Association
NFPA	National Fire Protection Association or National Fluid Power Association
NISO	National Information Standards Organization
NIST	National Institute of Standards and Technology
NLGI	National Lubricating Grease Institute
NRCA	National Roofing CONTRACTORs Association
NSF	National Sanitation Foundation
NWWDA	National Wood Window and Door Association
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association
PCI	Precast/Prestressed Concrete Institute
PPI	Plastic Pipe Institute
RCRA	Resource Conservation and Recovery Act
RMA	Rubber Manufacturers Association
RVIA	Recreational Vehicle Industry Association
RWMA	Resistance Welder Manufacturer's Association
SAE	Society of Automotive Engineers
SDI	Steel Door Institute, Steel Deck Institute
SMA	Screen Manufacturers Association
SMACNA	Sheet Metal and Air Conditioning CONTRACTORs National Association
SPFA	Steel Plate Fabricator’s Association
SPIB	Southern Pine Inspection Bureau
SSPC	Society for Protective Coating
SSPWC	Standard Specifications for Public Works Construction
STLE	Society of Tribologists and Lubricating Engineers
TAPPI	Technical Association of the Worldwide Pulp, Paper, and Converting Industry
TFI	The Fertilizer Institute
TIA	Telecommunications Industries Association
TPI	Truss Plate Institute
UBC	Uniform Building Code
UL	Underwriters Laboratories, Inc.
WCLIB	West Coast Lumber Inspection Bureau
WDMA	National Window and Door Manufacturers Association
WEF	Water Environment Federation
WI	Woodwork Institute
WRI	Wire Reinforcement Institute, Inc.
WWPA	Western Wood Products Association

1.2 REFERENCE STANDARDS

A. **Titles of Sections and Paragraphs:** Titles and subtitles accompanying specification sections and paragraphs are for convenience and reference only, and do not form a part of the Specifications.

B. **Applicable Publications:** Whenever in these Specifications references are made to published specifications, codes, standards, or other requirements, it shall be understood that wherever no date is specified, only the latest specifications, standards, or requirements of the respective issuing agencies which have been published as of the date that the Contract is advertised for bids shall apply; except to the extent that said standards or requirements may be in conflict with applicable laws, ordinances, or governing codes. No requirements set forth in the Specifications or shown on the Drawings will be waived because of any provision of, or omission from, said standards or requirements.

C. References herein to "Building Code" shall mean The International Building Code (IBC) latest edition. Similarly, references to "Mechanical Code", “Plumbing Code" and, “Fire Code" shall mean International Mechanical Code, International Plumbing Code and International Fire Code of the International Conference of the Building Officials (ICBO). "Electric Code" or "National Electric Code (NEC)" shall mean the National Electric Code of the National Fire Protection Association (NFPA). The latest edition of the codes as approved by the Municipal Code and used by the local agency as of the date that the WORK is advertised for bids, as adopted by the agency having jurisdiction, shall apply to the WORK herein, including all addenda, modifications, amendments, or other lawful changes thereto.

D. In case of conflict between codes, reference standards, drawings, and the other Contract Documents, the most stringent requirements shall govern. All conflicts shall be brought to the attention of the ENGINEER for clarification and directions prior to ordering or providing any materials or furnishing labor. The CONTRACTOR shall bid for the most stringent requirements.

E. References herein to "OSHA Regulations for Construction" shall mean **Title 29, Part 1926, Construction Safety and Health Regulations,** Code of Federal Regulations (OSHA), including all changes and amendments thereto.

F. References herein to "OSHA Standards" shall mean **Title 29, Part 1910, Occupational Safety and Health Standards,** Code of Federal Regulations (OSHA), including all changes and amendments thereto

G. The CONTRACTOR shall be responsible that all work included in the Contract Documents, regardless if shown or not, shall comply with all EPA, OSHA, RCRA, NFPA, and any other Federal, State, and Local Regulations governing the storage and conveyance of hazardous materials, including petroleum products. Where no specific regulations exist, chemical, hazardous, and petroleum product piping and storage in underground locations shall be installed with double containment piping and tanks, or in separate concrete trenches and vaults, or with an approved lining which cannot be penetrated by the chemicals, unless waived in writing by the OWNER.

1.3 CONTRACTOR SUBMITTALS

A. Wherever submittals are required in the Contract Documents, submit them to the ENGINEER.

B. **Shop Drawings:** Wherever called for in the Contract Documents or where required by the ENGINEER, the CONTRACTOR shall furnish to the ENGINEER for review, a number and type of each Shop Drawing submittal as established by the OWNER or ENGINEER. Shop Drawings may include detail design calculations, shop-prepared drawings, fabrication and installation drawings, erection drawings, lists, graphs, catalog sheets, data sheets, and similar items. Whenever the CONTRACTOR is required to submit design calculations as part of a submittal, such calculations shall bear the signature and seal of an engineer registered in the appropriate branch and in the state wherein the project is located, unless otherwise indicated. Shop drawing submittals shall be accompanied by the CONTRACTOR's standard submittal transmittal form. Submittals shall be signed by the CONTRACTOR as an indication that they have been reviewed for completeness and organization.

1) **Organization**: A single submittal transmittal form shall be used for each technical specification section or item or class of material or equipment for which a submittal is required. A single submittal covering multiple sections will not be acceptable, unless the primary specification references other sections for components. Example: if a pump section references other sections for the motor, shop-applied protective coating, anchor bolts, local control panel, and variable frequency drive, a single submittal would be acceptable. A single submittal covering vertical turbine pumps and horizontal split case pumps would not be acceptable.

2) Unless indicated otherwise, terminology and equipment names and numbers used in submittals shall match those used in the Contract Documents.

3) Each submittal shall be assigned a unique number. Submittals shall be numbered sequentially, and the submittal numbers shall be clearly noted on the transmittal. Submittals shall be numbered in accordance with the numbers indicated in Section 01030 – Submittals, Sampling, and Testing Plan. Original submittals shall be assigned a numeric submittal number followed by a letter of the alphabet to distinguish between the original submittal and each resubmittal. For example, if submittal 09-01-A requires a resubmittal, the first resubmittal will bear the designation "09-01-B" and the second resubmittal will bear the designation "09-01-C" and so on.

4) Disorganized submittals that do not meet the requirements of the Contract Documents will be returned without review.

5) Except as may otherwise be indicated, the ENGINEER will return a copy of each submittal to the CONTRACTOR with comments noted thereon, within 30 Days following receipt by the ENGINEER. It is considered reasonable that the CONTRACTOR will make a complete and acceptable submittal to the ENGINEER by the first resubmittal on an item. The OWNER reserves the right to withhold monies due to the CONTRACTOR to cover additional costs of the ENGINEER's review beyond the first resubmittal. The ENGINEER'S maximum review period for each submittal or resubmittal will be 30 Days. Thus, for a submittal that requires 2 resubmittals before it is complete, the maximum review period could be 90 Days.

6) If a submittal is returned to the CONTRACTOR marked “REVIEWED-NO EXCEPTIONS," formal revision and resubmission will not be required. If a submittal is returned marked "REVIEWED- EXCEPTIONS NOTED," CONTRACTOR shall make the corrections on the submittal, but formal revision and resubmission will not be required. If a submittal is returned marked "REVISE AND RESUBMIT," the CONTRACTOR shall revise it and shall resubmit the required number of copies to the ENGINEER for review. Resubmittal of portions of multi-page or multi-drawing submittals will not be allowed. For example, if a Shop Drawing submittal consisting of 10 drawings contains one drawing noted as "REVISE AND RESUBMIT," the submittal as a whole is deemed "REVISE AND RESUBMT," and 10 drawings are required to be resubmitted. If a submittal is returned marked "REJECTED-RESUBMIT," it shall mean either that the proposed material or product does not satisfy the specification, the submittal is so incomplete that it cannot be reviewed, or is a substitution request not submitted in accordance with the requirements of the Contract Documents. In the first 2 cases, the CONTRACTOR shall prepare a new submittal and shall submit the required number of copies to the ENGINEER for review. In the latter case, the CONTRACTOR shall submit the substitution request according to the Contract Documents. Fabrication of an item may commence only after the ENGINEER has reviewed the pertinent submittals and returned copies to the CONTRACTOR marked either "REVIEWED-EXECPTIONS NOTED" or "REVIEWED-NO EXCEPTIONS." Corrections indicated on submittals shall be considered as changes necessary to meet the requirements of the Contract Documents and shall not be taken as changes to the contract requirements. Re -submittal of rejected portions of a previous submittal will not be allowed. Every change from a submittal to a resubmittal or from a resubmittal to a subsequent resubmittal shall be identified and flagged on the resubmittal.

7) Submittals shall be carefully reviewed by an authorized representative of the CONTRACTOR prior to submission to the ENGINEER. Each submittal shall be dated and signed by the CONTRACTOR as being correct and in strict conformance with the Contract Documents. In the case of Shop Drawings, each sheet shall be so dated and signed. Any deviations from the Contract Documents shall be noted on the transmittal sheet. The ENGINEER will only review submittals that have been so verified by the CONTRACTOR. Non-verified submittals will be returned to the CONTRACTOR without action taken by the ENGINEER, and any delays caused thereby shall be the total responsibility of the CONTRACTOR.

8) Corrections or or comments made on the CONTRACTOR's Shop Drawings during review do not relieve the CONTRACTOR from compliance with Contract Drawings and Specifications. Review is for conformance to the design concept and general compliance with the Contract Documents only. The CONTRACTOR is responsible for confirming and correlating quantities and dimensions, fabrication processes and techniques, coordinating WORK with the trades, and satisfactory and safe performance of the WORK.

C. **Certificates:** Where certificates are required, submit them to the ENGINEER as specified herein. For materials, regardless of an approved certificate, the ENGINEER may still test the material if in his opinion it is questionable upon delivery. The abbreviations and definitions of certificates are as follows:

1) **Certificate of Analysis**: Certificate from the manufacturer or supplier of actual test results of the material properties. (This also includes "mill test reports.") A Certificate of Analysis shall be furnished with each lot of material delivered to the work.

2) **Certificate of Compliance**: Certificate from the manufacturer or supplier stating that the material complies with the required specifications. A Certificate of Compliance shall be furnished with each lot of material delivered to the work.

D. **Technical Manuals:** The CONTRACTOR shall submit technical operation and maintenance information for each item of mechanical, electrical, and instrumentation equipment in an organized manner in the Technical Manual. It shall be written so that it can be used and understood by the OWNER's operation and maintenance staff. The Technical Manual shall be subdivided first by specification section number; second, by equipment item; and last, by "Category." The following "Categories" shall be addressed (as applicable):

1) **Equipment Summary**: A table shall indicate the equipment name, equipment number, and process area in which the equipment is installed.

2) **Operational Procedures**: Manufacturer – recommended procedures on the following shall be included: Installation, adjustment, startup, locations of controls, special tools, equipment required, or related instrumentation needed for operation, operation procedures, load changes, calibration, shutdown, troubleshooting, disassembly, reassembly, realignment, testing to determine performance efficiency, tabulation of proper settings and listing of all electrical relay settings.

3) **Preventative Maintenance Procedures**: Preventive maintenance procedures shall include manufacturer-recommended procedures to be performed on a periodic basis, both by removing and replacing the equipment or component, and by maintaining the equipment in place. Recommended frequency of preventive maintenance procedures shall be included. Lubrication schedules, including lubricant SAE grade, type, and temperature ranges, shall be covered.

4) **Parts List**: complete parts list shall be furnished, including a generic description and manufacturer's identification number for each part. Addresses and telephone numbers of the nearest supplier and parts warehouse shall be included. Cross-sectional or exploded view drawings shall accompany the parts list. Part numbers shall appear on the drawings with arrows to the corresponding part.

5) **Wiring Diagrams**: This shall include complete internal and connection wiring diagrams for electrical equipment items.

6) **Shop Drawings**: This category includes approved shop or fabrication drawings with ENGINEER comments and corrections incorporated, complete with dimensions.

7) **Safety**: This category describes the safety precautions to be taken when operating and maintaining the equipment or working near it.

8) **Documentation**: Equipment warranties, affidavits, certifications, calibrations, laboratory test results, etc. required by the Technical Specifications shall be placed in this category

E. **Record Drawings:** The CONTRACTOR shall maintain one set of Drawings at the Site for the preparation of record drawings. On these, it shall mark every project condition, location, configuration, and any other change or deviation which may differ from the Contract Drawings at the time of award, including buried or concealed construction and utility features that are revealed during the course of construction. Special attention shall be given to recording the horizontal and vertical location of buried utilities that differ from the locations indicated, or that were not indicated on the Contract Drawings. Said record drawings shall be supplemented by any detailed sketches as necessary or as CONTRACTOR is directed, to fully indicate the WORK as actually constructed. These record drawings are the CONTRACTOR's representation of as-built conditions, shall include revisions made by addenda and change orders, and shall be maintained up-to-date during the progress of the WORK. Red ink shall be used for alterations and notes. Notes shall identify relevant Change Orders by number and date. Disorganized or incomplete record drawings will not be accepted. The CONTRACTOR shall revise them and resubmit within 10 Days. Record drawings shall be accessible to the ENGINEER during the construction period. Final payment will not be acted upon until the record drawings have been completed and delivered to the ENGINEER.

1.4 SCHEDULE OF VALUES

A. The CONTRACTOR shall prepare and submit a detailed Schedule of Values to the ENGINEER prior to the CONTRACTOR’s first application for payment. Because the ultimate requirement is to develop a detailed Schedule of Values sufficient to determine appropriate progress payment amounts, sufficient detailed breakdown shall be provided to meet this requirement. The ENGINEER shall be the sole judge of acceptable numbers, details and description of values established. If, in the opinion of the ENGINEER, a greater number of Schedule of Values items than proposed by the CONTRACTOR is necessary, the CONTRACTOR shall add the additional items so identified by the ENGINEER.

1.5 SANITARY, HEALTH, AND SAFETY PROVISIONS

A. The CONTRACTOR shall not require any worker to work under conditions which are unsanitary, hazardous or dangerous to health or safety. The CONTRACTOR shall maintain the work in a sanitary, safe and nonhazardous condition.

B. The CONTRACTOR shall provide and maintain in a neat, sanitary condition, restrooms and other such accommodations for use of employees and ENGINEER or OWNER personnel. Such facilities shall comply with requirements of the State and local governments.

C. **Sanitary and Other Organic Wastes**: The CONTRACTOR shall establish a regular daily collection of all sanitary and organic wastes. All wastes and refuse from sanitary

facilities provided by the CONTRACTOR or organic material wastes from any other source related to the CONTRACTOR's operations shall be disposed of away from the Site in a manner satisfactory to the ENGINEER and in accordance with all laws and regulations pertaining thereto.

D. **Toilet Facilities:** Fixed or portable chemical toilets shall be provided wherever needed for the use of CONTRACTOR's employees. Toilets at construction job sites shall conform to the requirements of Subpart D, Section 1926.51 of the OSHA Standards for Construction. Provide separate field office facilities in conformance with Section 01590.

1.6 NAVIGABLE WATERS AND WETLANDS

A. All work in, over, or adjacent to navigable waters or wetlands shall be conducted in accordance with rules and regulations of the U. S. Army Corps of Engineers and U. S. Coast Guard.

B. Navigable clearances on waterways shall not be infringed upon, and existing navigable depths shall not be impaired except as allowed by permits issued by the responsible agency.

C. The CONTRACTOR shall display lights on equipment operating, berthed or moored in navigable streams, and provide temporary navigational lighting on temporary and permanent construction in the navigable limits as required by the U. S. Coast Guard.

D. Should the CONTRACTOR sink, lose or throw overboard any material, machinery or equipment which may be dangerous to navigation, it shall be immediately removed or recovered. The CONTRACTOR shall give immediate notice of such obstruction to proper authorities and, if required, shall mark or buoy such obstruction until it is removed.

E. The CONTRACTOR shall not deposit excavated material into the water-way or wetland without a permit from the appropriate agency.

F. All operations in connection with the work shall be in accordance with permits, rules and regulations of the U. S. Army Corps of Engineers and the U. S. Coast Guard. Deviations therefrom shall be only by special permission or special permit which shall be the responsibility of the CONTRACTOR. Failure of the CONTRACTOR to become familiar with the terms, conditions and provisions of the permits, rules and regulations applicable to the work shall not relieve the CONTRACTOR of responsibility under the contract.

1.7 BARRICADES AND WARNING SIGNS

A. The CONTRACTOR shall provide, erect and maintain necessary barricades, suitable lights, danger signals, signs and other traffic control devices, including flaggers, and shall take all necessary precautions for protection of the work and safety of the public. Highways closed to traffic shall be protected by effective barricades. Suitable warning signs shall be provided to direct traffic

1.8 USE OF EXPLOSIVES

A. Explosives shall not be used without written approval. When explosives are used, the CONTRACTOR shall not endanger life or property. The use of explosives shall be in compliance with all laws and ordinances. The CONTRACTOR shall be responsible for all damage resulting from the use of explosives.

B. Explosives shall be securely stored, in compliance with all laws and ordinances. Such storage places shall be clearly marked. When no local laws or ordinances apply, satisfactory storage shall be provided not closer than 1,000 feet from any road, building or place of human occupancy.

C. The CONTRACTOR shall notify, in writing, each utility company and affected property owner having facilities in proximity to the site of work of the intention to use explosives. Such notices shall be given sufficiently in advance to enable them to protect their property from damage.

1.9 ARCHEOLOGICAL AND HISTORICAL FINDINGS

A. If the CONTRACTOR encounters cultural artifacts or archaeological or historical sites, operations shall be discontinued. The engineer will contact the proper authorities in order that an appropriate assessment may be made to determine the disposition thereof and necessary actions relative to the site. When directed, the CONTRACTOR shall excavate the site to preserve the artifacts encountered. Such excavation will be paid for as extra work, including an appropriate adjustment in contract time. Borrow and muck disposal areas furnished by the CONTRACTOR will be subject to such assessment prior to use.

1.10 TEMPORARY UTILITIES

A. The CONTRACTOR shall be responsible for the provision of all temporary utilities he deems necessary for the proper execution of the WORK in the most efficient manner practical. The cost of provision of these temporary utilities shall be borne by the CONTRACTOR and shall be included in the price of the WORK.

B. tHE CONTRACTOR shall provide either new or used materials and equipment, which are in substantially undamaged condition and without significant deterioration and which are recognized in the construction industry, by compliance with appropriate standards, as being suitable for intended use in each case. Where a portion of temporary utility is provided by utility company, the CONTRACTOR shall provide the remaining portion with matching and compatible materials and equipment and shall comply with recommendations of utility company.

C. **Power:** The CONTRACTOR shall provide power required for its operations under the Contract, and shall provide and maintain all temporary power lines required to perform the WORK in a safe and satisfactory manner.

D. **Temporary Power Distribution**: The CONTRACTOR shall provide a weatherproof, grounded, temporary power distribution system sufficient for performance of entire WORK of project, including temporary electrical heating where indicated, operation of test equipment and test operation of building equipment and systems which cannot be delayed until permanent power connections are operable, temporary operation of other temporary facilities, including permanent equipment and systems which must be placed in operation prior to use of permanent power connections (pumps, HVAC equipment, elevators, and similar equipment), and power for temporary operation of existing facilities (if any) at the Site during change-over to new permanent power system. Provide circuits of adequate size and proper power characteristics for each use; run circuit wiring generally overhead, and rise vertically in locations where it will be least exposed to possible damage from construction operations and will result in minimal interference with performance of the WORK; provide rigid steel conduit or equivalent raceways for wiring which must be exposed on grade, floors, decks, or other exposures to damage or abuse.

Wiring for temporary electric light and power shall be properly installed and maintained and shall be securely fastened in place. Electrical facilities shall conform to the requirements of Subpart K of the OSHA Safety and Health Standards for Construction.

E. **Construction Lighting:** WORK conducted at night or under conditions of deficient daylight shall be suitably lighted to insure proper WORK and to afford adequate facilities for inspection and safe working conditions.

F. **Temporary Lighting**: The CONTRACTOR shall provide a general, weatherproof, grounded temporary lighting system in every area of construction work, as soon as overhead floor/roof deck structure has been installed to provide sufficient illumination for safe work and traffic conditions. Run circuit wiring generally overhead, and rise vertically in locations where it will be least exposed to possible damage from construction operations on grade, floors, decks, or other areas of possible damage or abuse.

G. **Construction Water:** The CONTRACTOR shall provide an adequate supply of water of a quality suitable for all domestic and construction purposes. The CONTRACTOR shall not make connection to or draw water from any fire hydrant or pipeline without first obtaining permission of the authority having jurisdiction over the use of said fire hydrant or pipeline and from the agency owning the affected water system. For each such connection made, the CONTRACTOR shall first attach to the fire hydrant or pipeline a valve and a meter, if required by the said authority, of a size and type acceptable to said authority and agency. The CONTRACTOR shall pay all permit and water charges.

1.11 SITE ACCESS AND STORAGE

A. The CONTRACTOR shall make its own investigation of the condition of available public and private roads and of clearances, restrictions, bridge load limits, and other limitations affecting transportation and ingress and egress to the site of the WORK. It shall be the CONTRACTOR's responsibility to construct and maintain any haul roads required for its construction operations.

B. Continuous, unobstructed, safe, and adequate pedestrian and vehicular access shall be provided to fire hydrants, commercial and industrial establishments, churches, schools, parking lots, service stations, motels, fire and police stations, and hospitals. Safe and adequate public transportation stops and pedestrian crossings at intervals not exceeding 300 feet shall be provided. The CONTRACTOR shall cooperate with parties involved in the delivery of mail and removal of trash and garbage so as to maintain existing schedules for such services. Vehicular access to residential driveways shall be maintained to the property line except when necessary construction precludes such access for reasonable periods of time.

C. Wherever necessary, to maintain vehicular crossings, the CONTRACTOR shall provide suitable temporary bridges or steel plates over unfilled excavations, except in such cases as the CONTRACTOR shall secure the written consent of the responsible individuals or authorities to omit such temporary bridges or steel plates, which written consent shall be delivered to the ENGINEER prior to excavation. All such bridges or steel plates shall be maintained in service until access is provided across the backfilled excavation. Temporary bridges or steel plates for street and highway crossing shall conform to the requirements of the authority having jurisdiction in each case, and the CONTRACTOR shall adopt designs furnished by said authority for such bridges or steel plates, or shall submit designs to said authority for approval, as may be required.

D. Nothing herein shall be construed to entitle the CONTRACTOR to the exclusive use of any public street, alleyway, or parking area during the performance of the WORK hereunder, and it shall conduct its operations to not interfere unnecessarily with the authorized work of utility companies or other agencies in such streets, alleyways, or parking areas. No street shall be closed to the public without first obtaining permission of the ENGINEER and proper governmental authority. Where excavation is being performed in primary streets or highways, one lane in each direction shall be kept open to traffic at all times unless otherwise indicated. Toe boards shall be provided to retain excavated material if required by the ENGINEER or the agency having jurisdiction over the street or highway. Fire hydrants on or adjacent to the WORK shall be kept accessible to fire-fighting equipment at all times. Temporary provisions shall be made by the CONTRACTOR to assure the use of sidewalks and the proper functioning of all gutters, storm drain inlets, and other drainage facilities.

E. The OWNER may designate and arrange for the CONTRACTOR's use, a portion of the property for its exclusive use during the term of the Contract as a storage and shop area for its construction operations on the WORK. At completion of WORK, the CONTRACTOR shall return this area to its original condition, including grading and landscaping.

F. The CONTRACTOR shall make its own arrangements for any necessary off-Site storage or shop areas necessary for the proper execution of the WORK.

G. The CONTRACTOR shall construct and use a separate storage area for hazardous materials used in constructing the WORK.

1.12 PROTECTION OF EXISTING UTILTIES

A. The CONTRACTOR shall protect all existing utilities and improvements not designated for removal and shall restore damaged or temporarily relocated utilities and improvements to a condition equal to or better than prior to such damage or temporary relocation, all in accordance with the Contract Documents.

B. When the CONTRACTOR's work involves excavating or underground demolition activity, the CONTRACTOR is required to reach Louisiana One Call, prior to starting any work, by calling (225) 275-3700 or toll-free 1-800-272- 3020, or by fax (225) 272-1967 in order to comply with the Louisiana Underground Utilities and Facilities Damage Prevention Law.

C. The CONTRACTOR's operations adjacent to properties of railway and utility companies or adjacent to other property, damage to which might result in considerable expense, loss or inconvenience, shall not commence until after all arrangements necessary for the protection thereof have been made.

D. The CONTRACTOR shall cooperate with owners of utility lines in their removal and rearrangement, in order that these operations may progress in a reasonable manner, that duplication of rearrangement work may be minimized and that services rendered by those parties will not be unnecessarily interrupted.

E. In the event of interruption of utility services due to accidental breakage or being exposed or unsupported, the CONTRACTOR shall promptly notify the proper authority and shall cooperate with such authority in restoration of service. If utility service is interrupted, continuous cooperation will be required until service is restored. No work

shall be undertaken around fire hydrants until provisions for continued service have been approved by the local fire authority.

1.13 QUALITY CONTROL

A. The CONTRACTOR shall establish and maintain an effective quality control process. The quality control process shall consist of plans, procedures, and organization necessary to provide materials, equipment, workmanship, fabrication, construction and operations which comply with the contract requirements. The process shall cover construction operations both onsite and offsite, and shall be keyed to the proposed construction sequence.

1.14 PROTECTION OF THE WORK

A. The CONTRACTOR shall be responsible for the protection of the site, and all WORK, materials, equipment and existing facilities thereon, against theft, vandals, and other unauthorized persons.

B. No claim shall be made against Owner by reason of any act of an employee or trespasser, and CONTRACTOR shall make good all damage to Owner's property resulting from his failure to provide security measures as specified.

C. Security measures shall be at least equal to those usually provided to protect the existing facilities during normal operation, but shall also include such additional security fencing, barricades, lighting, watchman services and other measures as required to protect the site.

D. The CONTRACTOR shall maintain the security of the limited access areas as required by the Owner.

E. The WORK shall be under the charge and care of the CONTRACTOR until final acceptance. The CONTRACTOR shall take precautions against damages to the WORK by action of the elements or from other cause, and shall satisfactorily repair any damaged work at his expense. In case of suspension of work, the CONTRACTOR shall be responsible for all materials and shall properly store them if necessary, and shall erect temporary structures where necessary.

F. If the CONTRACTOR fails to comply with the provisions of this section, the ENGINEER will notify the CONTRACTOR, in writing, of such noncompliance. If the CONTRACTOR fails to remedy unsatisfactory maintenance within 48 hours after receipt of such notices, the ENGINEER may immediately proceed to provide security for the project, and the cost of this security will be deducted from payments for the work.

G. If unsatisfactory maintenance results in a condition that is hazardous to life, health or property, the ENGINEER will immediately effect necessary repairs and deduct the cost of such repairs from payments for the work.

1.15 PROJECT MEETINGS

A. **Preconstruction Conference:**

1. Prior to the commencement of WORK at the Site, a preconstruction conference will be held at a mutually agreed time and place. The conference shall be attended by

the CONTRACTOR'S Project Manager, its superintendent, and its subcontractors as the CONTRACTOR deems appropriate. Other attendees will be:

a. ENGINEER and the Resident Project Representative.

b. Representatives of OWNER.

c. Governmental representatives as appropriate.

d. Representatives of the Louisiana Department of Transportation and Development

e. Representatives of the City of Gonzales

f. Representatives of the Kansas City Southern Railway

g. Others as requested by CONTRACTOR, OWNER, or ENGINEER.

2. 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 complete agenda will be furnished to the CONTRACTOR prior to the meeting date. However, the CONTRACTOR should be prepared to discuss all of the items listed below.

a. Status of CONTRACTOR's insurance and bonds.

b. CONTRACTOR's tentative schedules.

c. Transmittal, review, and distribution of CONTRACTOR's submittals.

d. Processing applications for payment.

e. Maintaining record documents.

f. Critical work sequencing.

g. Field decisions and Change Orders.

h. Use of Site, office and storage areas, security, housekeeping, and OWNER's needs.

i. Major equipment deliveries and priorities.

3. The ENGINEER will preside at the preconstruction conference and will arrange for keeping and distributing the minutes to all persons in attendance.

4. The CONTRACTOR and its subcontractors should plan on the conference taking no less than one half of one full working day.

B. **Progress Meetings:**

1. The ENGINEER will schedule and hold regular on-Site progress meetings as requested by CONTRACTOR or OWNER or as required by progress of the WORK. The CONTRACTOR, ENGINEER, and all subcontractors active on the Site shall

attend each meeting. CONTRACTOR may at its discretion request attendance by representatives of its suppliers, manufacturers, and other subcontractors.

2. The ENGINEER will preside at the progress meetings and will arrange for keeping and distributing the minutes. The purpose of the meetings is to review the progress of the WORK, maintain coordination of efforts, discuss changes in scheduling, and resolve other problems which may develop. During each meeting, the CONTRACTOR shall present any issues that may impact its progress with a view to resolve these issues expeditiously.

1.16 **PROJECT CLOSEOUT**

A. The CONTRACTOR shall promptly remove from the vicinity of the completed WORK, all rubbish, unused materials, concrete forms, construction equipment, and temporary structures and facilities used during construction. Final acceptance of the WORK by the OWNER will be withheld until the CONTRACTOR has satisfactorily performed the final cleanup of the Site.

B. The CONTRACTOR shall establish dates for equipment testing, acceptance periods, and on-site instructional periods (as required under the Contract). Such dates shall be established not less than one week prior to beginning any of the foregoing items, to allow the OWNER, the ENGINEER, and their authorized representatives sufficient time to schedule attendance at such activities.

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION (NOT USED)

- END OF SECTION -

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SECTION 01025 - MEASUREMENT AND PAYMENT (REVISED 03/12/2019)

PART 1 -- GENERAL

1.1 **THE REQUIREMENT**

A. Payment for the various items on the Bid Form, as further specified herein, shall include all compensation to be received by the CONTRACTOR for furnishing all tools, equipment, supplies, and manufactured articles, and for all labor, operations, and incidentals appurtenant to the items of work being described, as necessary to complete the various items of the WORK all in accordance with the requirements of the Contract Documents, including all appurtenances thereto, and including all costs of permits and cost of compliance with the regulations of public agencies having jurisdiction, including Safety and Health Requirements of the Occupational Safety and Health Administration of the U.S. Department of Labor (OSHA). No separate payment will be made for any item that is not specifically set forth in the Bid Schedule, and all costs therefor shall be included in the prices named in the Bid Schedule for the various appurtenant items of work.

1.2 **ACCURACY**

A. The ENGINEER will be the judge of the accuracy of measurements, or approximations made in lieu of accurate determinations and these decisions shall be binding upon both the CONTRACTOR and the OWNER.

B. The ENGINEER will utilize the accepted Schedule of Values for the purpose of estimating the value of WORK completed for the evaluation of requests for payment.

C. In computing volumes of excavation, the average end area method or other acceptable methods will be used.

D. When United States standard units are used, the pound or the ton will be the standard units of weight. The term "ton," in the United States standard, will mean the short ton of 2,000 pounds avoirdupois. Materials measured or proportioned by weight shall be weighed on approved scales by qualified personnel at designated locations. If material is shipped by rail, the car weight may be accepted provided the weight of material only will be paid for; however, car weights will not be acceptable for material to be passed through mixing plants. Trucks used to haul material being paid by measured weight shall be weighed empty at such times as directed; and each truck shall bear a plainly legible identification mark.

E. Materials specified to be measured by volume in hauling vehicles shall be hauled in approved vehicles and will be measured therein at the point of delivery on the project. Vehicles may be of any acceptable size or type, provided the body is of such shape that the volume can be readily and accurately determined. Vehicles shall be loaded to at least a predetermined permanently fixed mark, which defines a known volume, upon arrival at the point of delivery. Vehicles will be measured in increments of 0.5 cubic yard, except that when tailgate spreader-boxes are used to place aggregate materials for asphaltic surface treatment, the volume of the spreader-ox will be added to the volume of the vehicle. When materials are measured by weight and converted to volume for payment, conversion will be made to the nearest 0.1 cubic yard

F. The terms "lump sum, each, or unit" when used as a unit of measure for payment will mean complete payment for the work described in the contract.

1.3 **REMOVE EXISTING WEIR (Ref. No. 1)**

A. **Measurement:** No Measurement will be made for this item.

B. **Payment:** Payment for this item will be made at, or in portions thereof based upon the estimated amount of the WORK completed, of the lump sum bid price named on the bid form which price shall constitute full payment for removal of all sheet pile walls, rip-rap, and any other debris or channel obstructions, including furnishing all equipment, labor and materials necessary for the completion of this WORK in accordance with the Contract Documents.

1.4 **RIP RAP - 30 LB CLASS (Ref. No. 2)**

A. **Measurement:** Measurement for payment for this item will be based upon the number of square yards of such rip rap actually placed. Excavation required for installation of rip rap will not be measured for payment.

B. **Payment:** Payment for this item will be made at the contract unit price per square yard, which includes delivery and installation of rip rap, and all other items of material, labor, including furnishing all equipment, labor and materials necessary for the completion of this WORK in accordance with the Contract Documents.

1.5 **WEIR GATE STRUCTURE (INCLUDING FOUNDATION & SHEET PILES) (Ref. No. 3)**

A. **Measurement:** No Measurement will be made for this item.

B. **Payment:** Payment for this item will be made at, or in portions thereof based upon the estimated amount of the WORK completed, of the lump sum bid price named on the bid form which price shall constitute full payment for all required structures, inclusive of foundation pilings and sheet pilings, in accordance with the plans and specifications, including furnishing all equipment, labor and materials necessary for the completion of this WORK in accordance with the Contract Documents.

1.6 **CARBON STREET WEIR GATE ASSEMBLIES (Ref. No. 4)**

A. **Measurement:** Measurement for payment for this item will be based upon the number of such gate assemblies actually placed.

B. **Payment:** Payment for this item will be made at the contract unit price per each, which includes delivery and installation of gate assemblies, and all other items of material, labor, including furnishing all equipment, labor and materials necessary for installation of a complete and operational gate assemblies and the completion of this WORK in accordance with the Contract Documents.

1.7 **GENERAL ELECTRICAL WORK (Ref. No. 5)**

A. **Measurement:** No Measurement will be made for this item.

B. **Payment:** Payment for this item will be made at, or in portions thereof based upon the estimated amount of the WORK completed, of the lump sum bid price named on the

bid form which price shall constitute full payment for all required electrical and instrumentation equipment and services, including furnishing all equipment, labor and materials necessary for the completion of this WORK in accordance with the Contract Documents.

1.8 **CONSTRUCTION LAYOUT (Ref. No. 6)**

A. **Measurement:** No Measurement will be made for this item.

B. **Payment:** Payment for this item will be made at the lump sum price named in the Bid Form, or portions thereof, in accordance with the following table, which shall constitute full payment for construction layout, including furnishing all equipment, labor and materials necessary for the completion of this WORK in accordance with the Contract Documents.

Percent of Total Contract Amount Earned:	Allowable Percent of Lump Sum Price for Construction Layout:
First Estimate	40
25	60
50	80
75	95
100	100

1.9 **MOBILIZATION (Ref. No. 7)**

A. **Measurement:** No measurement will be made for this item.

B. **Payment:** Payment for this item will be made at the lump sum price on the Bid Form, or in portions thereof in accordance with the following table, which price shall constitute full payment for mobilization, including furnishing all equipment, labor and materials necessary for the completion of this WORK in accordance with the Contract Documents.

Percent of Total Contract Amount Earned	Allowable Percent of Lump Sum Price for Mobilization
1st Application for Payment	25
10	50
25	75
50	100

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SECTION 01030 – SUBMITTALS AND SAMPLING PLAN

PART 1 -- GENERAL

1.1 **THE REQUIREMENT**

A. The CONTRACTOR shall provide submittals and shall cooperate with quality control and acceptance testing in accordance with the requirements of the Contract Documents.

1.2 **SUBMITTALS LIST**

A. The list contained within Part 3 - Execution comprises the minimum submittals which shall be submitted by the CONTRACTOR to the ENGINEER in accordance with Section 01010. Additional submittals and testing may be required by the ENGINEER at his discretion. If additional submittals and samples.

B. The list contained within Part 3 – Execution does not reflect items required to be submitted with respect to bidding, or award of the contract.

PART 2 -- PRODUCTS

2.1 NOT USED

PART 3 -- EXECUTION

3.1 **REQUIRED SUBMITTALS AND SAMPLING (SPECIAL PROVISIONS)**

A. The CONTRACTOR shall provide at a minimum the following submittals and shall provide materials for the following sampling:

SPECIAL PROVISIONS				
Submittal No.	**Specification Section**	**Type (Submittal/Sample/Test)**	**Description of Submittal or Sample**	**Remarks**
00-01	Special Provisions	Submittal	Bar Chart Construction Schedule – 60 Day Bar Chart Plan	Submit at Pre – Construction Conference
00- 02	Special Provisions	Submittal	Project Overview Bar Chart Schedule	Submit at Pre – Construction Conference
00 – 03	Special Provisions	Submittal	Pre – Construction Photographs	Submit prior to mobilization
00 – 04	Special Provisions	Submittal	Pre – Construction Video	Submit prior to mobilization

3.2 **REQUIRED SUBMITTALS AND SAMPLING (DIV 1)**

A. The CONTRACTOR shall provide at a minimum the following submittals and shall provide materials for the following sampling:

SECTION 01010 – GENERAL REQUIREMENTS				
No	**Specification Section**	**Type (Submittal/Sample/Test)**	**Description of Submittal or Sample**	**Remarks**
01 – 01	01010	Submittal	Record Drawings – Maintain and submit record drawings as prescribed by Section 01010.	Submit to ENGINEER as requested and prior to final payment. Final payment will not be acted on until record drawings are received.

3.3 REQUIRED SUBMITTALS AND SAMPLING (DIV 2)

A. The CONTRACTOR shall provide at a minimum the following submittals and shall provide materials for the following sampling:

SECTION 02003 – AGGREGATES				
No	**Specification Section**	**Type (Submittal/Sample/Test)**	**Description of Submittal or Sample**	**Remarks**
N/A	02200	Testing	Specific sampling and testing requirements for aggregates are contained within the specific specifications sections for the type of WORK into which the aggregates are being incorporated.	

SECTION 02200 - EARTHWORK				
No	**Specification Section**	**Type (Submittal/Sample/Test)**	**Description of Submittal or Sample**	**Remarks**
02-01	02200	Submittal	The CONTRACTOR shall submit an excavation plan, detailing methods of bracing, sheeting, and/or shoring of all excavations.	.
02-02	02200	Submittal	The CONTRACTOR shall submit a dewatering plan, detailing methods of dewatering all excavations.	
02-03	02200	Sample	Useable Soils - Prior to the WORK, the CONTRACTOR shall submit a sample of select soil material from each source proposed to be utilized in the WORK to the ENGINEER or Testing Laboratory for source approval and classification. The sample will be tested for compliance with specification requirements. Moisture – density	Sample size shall be two (2) full Louisiana Department of Transportation and Development standard sample sacks, or as directed by the Testing Lab. Source approval testing shall be completed for each source of material utilized in the WORK. Useable soils may be existing

			relationships of acceptable material will be tested and reported in accordance with DOTD TR 418.	spoil from the canal provided suitable testing is completed ensuring its compliance with specification requirement.
SECTION 02200 – EARTHWORK (Continued)				
No	**Specification Section**	**Type (Submittal/Sample/Test)**	**Description of Submittal or Sample**	**Remarks**
02-04	02200	Sample	Useable Soils - During the WORK, the CONTRACTOR shall submit one sample per 1,000 cubic yards of select soil supplied. The sample will be classified and tested for compliance with specifications. Failed tests may be deemed as cause for rejection of the WORK by the ENGINEER. For embankments or backfill, Determination of In – Place Density and Determination of In – Place Moisture Content will be determined by DOTD TR 401 and DOTD TR 403, respectively.	Frequency of In – Place Moisture Density and In – Place Density will be at the discretion of the ENGINEER.
N/A	02200	Testing	Useable Soils - The CONTRACTOR shall provide sufficient testing to ensure that specification requirements are met.	NO SUBMITTAL REQUIRED.
02-05	02200	Sample	Plastic Soil Blanket - Prior to the WORK, the CONTRACTOR shall submit a sample of plastic soil blanket material from each source proposed to be utilized in the WORK to the ENGINEER or Testing Laboratory for source approval and classification. The sample will be tested for compliance with specification requirements. Moisture – density relationships of acceptable material will be tested and reported in accordance with DOTD TR 418.	Sample size shall be two (2) full Louisiana Department of Transportation and Development standard sample sack, or as directed by the Testing Lab. Source approval testing shall be completed for each source of material utilized in the WORK.

SECTION 02200 – EARTHWORK (Continued)				
No	**Specification Section**	**Type (Submittal/Sample/Test)**	**Description of Submittal or Sample**	**Remarks**
02-06	02200	Sample	Plastic Soil Blanket - During the WORK, the CONTRACTOR shall submit one sample per 1,000 cubic yards of plastic soil blanket supplied. The sample will be classified and tested for compliance with specifications. Failed tests may be deemed as cause for rejection of the WORK by the ENGINEER. For embankments or backfill, Determination of In – Place Density and Determination of In – Place Moisture Content will be determined by DOTD TR 401 and DOTD TR 403, respectively.	Frequency of In – Place Moisture Density and In – Place Density will be at the discretion of the ENGINEER.
N/A	02200	Test	Plastic Soil Blanket - The CONTRACTOR shall provide sufficient testing to ensure that specification requirements are met.	NO SUBMITTAL REQUIRED.
02-07	02200	Sample	Granular Material for Structures or Backfill - Prior to the WORK, the CONTRACTOR shall submit a sample of material from each source of granular material proposed to be utilized in the WORK to the ENGINEER or Testing Laboratory for source approval and classification. The sample will be tested for compliance with specification requirements. Classification and Group Index will be determined in accordance with DOTD TR 423. Moisture – density relationships of acceptable material will be tested and reported in accordance with DOTD TR 418.	Sample size shall be two (2) full Louisiana Department of Transportation and Development standard sample sacks, or as directed by the Testing Lab. Source approval testing shall be completed for each source of material utilized in the WORK. This sample is only required if granular material is used for Type “B” Backfill.

SECTION 02200 – EARTHWORK (Continued)				
No	**Specification Section**	**Type (Submittal/Sample/Test)**	**Description of Submittal or Sample**	**Remarks**
02-08	02200	Sample	Granular Material for Structures or Backfill - During the WORK, the CONTRACTOR shall submit one sample per 1,000 cubic yards of select soil supplied. The sample will be classified and tested for compliance with specifications. Failed tests may be deemed as cause for rejection of the WORK by the ENGINEER. For backfill, Determination of In – Place Density and Determination of In – Place Moisture Content will be determined by DOTD TR 401 and DOTD TR 403, respectively.	Frequency of In – Place Moisture Density and In – Place Density will be at the discretion of the ENGINEER. This sample is only required if granular material is used for Type “B” Backfill.
02-09	02200	Testing	Granular Material for Structures or Backfill - The CONTRACTOR shall provide sufficient testing to ensure that specification requirements are met.	Frequency of In – Place Moisture Density and In – Place Density will be at the discretion of the ENGINEER. This testing is only required if granular material is used for Type “B” Backfill
02-10	02200	Sample	Aggregate for Type “A” Backfill - Prior to the WORK, the CONTRACTOR shall submit a sample of bedding material proposed to be utilized in the WORK to the ENGINEER or Testing Laboratory for source approval. Material will be tested for deleterious materials and gradation. Relative Density Index of acceptable material will be developed in reported in accordance with ASTM D4253 and ASTM D4254.	Sample size shall be two (2) full Louisiana Department of Transportation and Development standard sample sacks, or as directed by the Testing Lab. Source approval testing shall be completed for each source of material utilized in the WORK.

SECTION 02200 – EARTHWORK (Continued)				
No	**Specification Section**	**Type (Submittal/Sample/Test)**	**Description of Submittal or Sample**	**Remarks**
02-11	02200	Sample	Aggregate for Type "A" Backfill - During the WORK, the CONTRACTOR shall submit one sample per 1,000 cubic yards of select soil supplied. The sample will be tested for compliance with specifications. Failed tests may be deemed as cause for rejection of the WORK by the ENGINEER. For backfill, Determination of In – Place Density and Determination of In – Place Moisture Content will be determined by DOTD TR 401 and DOTD TR 403, respectively.	Sample size shall be two (2) full Louisiana Department of Transportation and Development standard sample sack, or as directed by the Testing Lab. Source approval testing shall be completed for each source of material utilized in the WORK.
02-12	02200	Sample	Bedding Material - Prior to the WORK, the CONTRACTOR shall submit a sample of bedding material proposed to be utilized in the WORK to the ENGINEER or Testing Laboratory for source approval. Material will be tested for deleterious materials and gradation. Relative Density Index of acceptable material will be developed in reported in accordance with ASTM D4253 and ASTM D4254.	Sample size shall be two (2) full Louisiana Department of Transportation and Development standard sample sack, or as directed by the Testing Lab. Source approval testing shall be completed for each source of material utilized in the WORK.
02-13	02200	Sample	Bedding Material - During the WORK, the CONTRACTOR shall submit one sample per 1,000 cubic yards of select soil supplied. The sample will be tested for compliance with specifications. Failed tests may be deemed as cause for rejection of the WORK by the ENGINEER. For backfill, Determination of In – Place Density and Determination of In – Place	Frequency of In – Place Moisture Density and In – Place Density will be at the discretion of the ENGINEER.

			Moisture Content will be determined by DOTD TR 401 and DOTD TR 403, respectively.	
N/A	02200	Testing	Bedding Material - The CONTRACTOR shall provide sufficient testing to ensure that specification requirements are met.	NO SUBMITTAL REQUIRED.
SECTION 02200 – EARTHWORK (Continued)				
No	**Specification Section**	**Type (Submittal/Sample/Test)**	**Description of Submittal or Sample**	**Remarks**
02-14	02200	Submittal	Geotextile Fabric - Prior to the WORK, the CONTRACTOR shall submit evidence to the ENGINEER that the material is listed on the Louisiana Department of Transportation and Development Approved Materials List.	
N/A	02200	Sample	Geotextile Fabric - Unless questionable, geotextile fabric will not be sampled. If questionable, the material shall be tested for compliance with the specifications by an independent testing lab.	Costs for such testing will be made by a lab of the OWNER's choosing and at the OWNER's cost. Seams will be inspected visually by the ENGINEER. Fabric will be visually inspected for UV damage.
N/A	02200	Testing	Geotextile Fabric - The CONTRACTOR shall provide sufficient testing to ensure that specification requirements are met.	
02-15	02200	Sample	Topsoil - Prior to the WORK, the CONTRACTOR shall provide a report from an established testing laboratory for source approval.	
N/A	02200	Sample	Topsoil - Unless questionable, topsoil will not be sampled. If questionable, topsoil will be sampled and tested for compliance by the ENGINEER or Testing Laboratory.	Sample size shall be two (2) full Louisiana Department of Transportation and Development standard sample sack, or as directed by the Testing Lab.
N/A	02200	Testing	Topsoil - The CONTRACTOR shall provide sufficient testing to ensure that specification requirements are met.	

SECTION 02201 – SITE PREPARATION				
No	**Specification Section**	**Type (Submittal/Sample/Test)**	**Description of Submittal or Sample**	**Remarks**
N/A	02201	Submittal	Material used for backfill shall be sampled and tested in accordance with Section 02200 – Earthwork.	

SECTION 02202 – DEMOLITION AND REMOVAL				
No	**Specification Section**	**Type (Submittal/Sample/Test)**	**Description of Submittal or Sample**	**Remarks**
02-17	02202	Submittal	Demolition and reconstruction activities and procedures, including operational sequence, shall be submitted to the ENGINEER for approval. The procedures shall provide for safe conduct of the WORK, careful removal and disposition of materials and equipment, protection of existing facilities which are to remain undisturbed, coordination with existing facilities to remain in service, and timely disconnection and reconnection of utility services.	The procedures shall include a detailed description and time schedule of the methods and equipment to be used for each operation and the sequence of operation. A storage plan for salvaged items shall be included.

SECTION 02204 – TEMPORARY ENVIRONMENTAL CONTROLS				
No	**Specification Section**	**Type (Submittal/Sample/Test)**	**Description of Submittal or Sample**	**Remarks**
02-18	02204	Submittal	Where a stormwater pollution prevention plan is required, submit to the ENGINEER as specified herein. The CONTRACTOR shall submit all activity reports as required by permits as applicable.	
02-19	02204	Submittal	Where certificates, inspection reports, or other items are required, submit to the ENGINEER as specified herein.	

SECTION 02711 – RIP RAP				
No	**Specification Section**	**Type (Submittal/Sample/Test)**	**Description of Submittal or Sample**	**Remarks**
02-23	02711	Submittal/ Source Approval	The CONTRACTOR shall submit the location and name of the proposed rip – rap supplier as well as evidence of listing of the source on the LDOTD AML (formerly QPL 2).	
02-24	02711	Sampling/ Acceptance	At the option of the ENGINEER, the CONTRACTOR shall submit a sample of rip rap for gradation testing to confirm compliance with these specifications.	The ENGINEER will have the option of inspecting rip – rap at the source prior to delivery.

SECTION 02713 – TEMPORARY TRAFFIC CONTROL				
No	**Specification Section**	**Type (Submittal/Sample/Test)**	**Description of Submittal or Sample**	**Remarks**
02-25	02713	Submittal	The CONTRACTOR shall submit product information on all temporary traffic control devices and products to be utilized or incorporated into the WORK. The submittal for source approval shall include evidence of each product's listing on the LDOTD AML, compliance with applicable standards, and any other information required sufficient for the ENGINEER to review the acceptability of the proposed products.	
02-26	02713	Submittal	Traffic Control Device Plan: Prior to the start of the WORK, the CONTRACTOR shall submit a traffic control device plan, which shall clearly depict the arrangement of all temporary traffic control devices for all phases or portions of the WORK. The plan shall also clearly depict all temporary traffic control device products to be utilized, along with appropriate certifications to be included therewith. The traffic control device plan shall be prepared under the supervision of a licensed professional engineer registered in the State of Louisiana and signed and sealed by such. The traffic control device plan shall include product data detailing all traffic control devices to be utilized. WORK on public roads will not be authorized by the ENGINEER until such time as this plan has been submitted and reviewed by the ENGINEER. Prior to the start of the WORK, the CONTRACTOR shall submit to the ENGINEER proof of the TCS and TCT authorizations. TCS's and TCT shall meet all requirements of the Louisiana Department of Transportation and Development's requirements for such personnel.	

SECTION 02713 – TEMPORARY TRAFFIC CONTROL (CONTINUED)				
No	**Specification Section**	**Type (Submittal/Sample/Test)**	**Description of Submittal or Sample**	**Remarks**
02-27	02713	Acceptance	Prior to the issuance of the first progress payment, the CONTRACTOR shall submit a signed statement certifying that all traffic control devices conform to these specifications and reference standards.	
N/A	02713	Submittal/ Sampling	At his discretion, the ENGINEER may sample materials which in his opinion may be questionable in quality or suspected of not meeting requirements specified herein.	

SECTION 02803 – SHEET PILES				
No	**Specification Section**	**Type (Submittal/Sample/Test)**	**Description of Submittal or Sample**	**Remarks**
02-32	02803	Submittal	The CONTRACTOR shall submit product data for all permanent or temporary sheeting to be utilized in the WORK.	
02-33	02803	Submittal	Sheet Pile Driving Plan - The CONTRACTOR shall submit a sheet pile driving plan indicating the equipment, means and methods to be utilized in the WORK. CONTRACTOR shall provide information including make, model and rated driving energy for the pile driving hammer it proposes to use, and details of collars, shoes, splices, cushion blocks and related items.	

SECTION 02803 – SHEET PILES (CONTINUED)				
No	**Specification Section**	**Type (Submittal/Sample/Test)**	**Description of Submittal or Sample**	**Remarks**
02-34	02803	Submittal	The CONTRACTOR shall provide written notification to the ENGINEER of its scheduled date for commencing of pile driving at the site at least one week in advance of that date.	

3.4 **REQUIRED SUBMITTALS AND SAMPLING (DIV 3)**

A. The CONTRACTOR shall provide at a minimum the following submittals and shall provide materials for the following sampling:

SECTION 03315 - GROUT				
No	**Specification Section**	**Type (Submittal/Sample/Test)**	**Description of Submittal or Sample**	**Remarks**
03-01	03315	Submittal	Grout - The CONTRACTOR shall submit Manufacturer's literature for all grouts to be utilized, including product information, instructions and recommendations on the mixing, handling, placement, curing, and appropriate uses for each type of grout used in the WORK, and location of use. The submittal shall contain a certification that grouts used on the project contain no chlorides or other chemicals that cause corrosion. A certification that non-shrink grout does not contain aluminum, zinc, or magnesium powders as a method of expansion shall be included for non – shrink grouts.	

SECTION 03805 – STRUCTURAL CONCRETE				
No	**Specification Section**	**Type (Submittal/Sample)**	**Description of Submittal or Sample**	**Remarks**
N/A	03805	Submittal	Portland Cement Concrete: Requirements for submittals, sampling, and testing of Portland cement concrete shall be as specified in Section 03901 – Portland Cement Concrete.	
N/A	03805	Submittal	Reinforcing Steel: Requirements for submittals, sampling, and testing of reinforcing steel shall be as specified in Section 03906 – Reinforcing.	
03-02	03805	Submittal	Curing Material: Burlap cloth, white polyethylene sheeting, combination burlap cloth and white polyethylene sheeting, and waterproof paper will be sampled if quality of the material is questionable in the opinion of the ENGINEER.	Liquid membrane forming compounds will be sampled for compliance if the material is questionable in the opinion of the ENGINEER. This submittal may be waived if pre – cast concrete structures are supplied.
03-03	03805	Submittal	Curing Material - The CONTRACTOR shall submit to the ENGINEER evidence of listing of the proposed product on the LDOTD AML.	This submittal may be waived if pre – cast concrete structures are supplied.
03-04	03805	Submittal	Form Release Agent - The CONTRACTOR shall submit to the ENGINEER evidence of listing of the proposed product on the LDOTD AML.	This submittal may be waived if pre – cast concrete structures are supplied.

SECTION 03805 – STRUCTURAL CONCRETE (CONTINUED)				
No	**Specification Section**	**Type (Submittal/Sample)**	**Description of Submittal or Sample**	**Remarks**
03-05	03805	Submittal	Precast Concrete - Prior to fabrication of precast concrete, the CONTRACTOR shall submit product data, shop drawings, and other information as required suitable for the ENGINEER to evaluate the suitability of the proposed product. Shop drawings for standard precast concrete units shall be shop drawings furnished by the CONTRACTOR for approval by the ENGINEER. These drawings shall show complete design, installation, and construction information in such detail as to enable the ENGINEER to determine the adequacy of the proposed units for the intended purpose. Details of steel reinforcement size and placement as well as supporting design calculations or documentation that the proposed unit meets reference standards shall be included. Drawings for custom precast concrete units shall be shop drawings furnished by the precast concrete producer for approval by the ENGINEER. These drawings shall demonstrate that the applicable industry design standards and other design standards as specified or indicated on the drawings have been met. Installation and construction information shall be included on shop drawings. Details of steel reinforcement size and placement as well as supporting design calculations shall be included for all custom precast units. The precast concrete units shall be produced in accordance with the approved drawings.	The CONTRACTOR shall supply precast concrete unit design calculations and concrete mix design proportions and appropriate mix design test data. Structural design calculations shall be signed by a licensed professional engineer. The precast concrete producer shall supply copies of material certifications and/or laboratory test reports, including mill tests and all other test data, for portland cement, blended cement, pozzolans, ground granulated blast-furnace slag, silica fume, aggregate, admixtures, and curing compound proposed. Proposed methods of repairs of precast units shall be submitted. This submittal may be waived if cast – in – place concrete is provided.
03-06	03805	Submittal	Precast Concrete - The CONTRACTOR shall supply copies of in-plant QA/QC inspection reports and test results.	This submittal may be waived if cast – in – place concrete is provided.

SECTION 03806 – REINFORCEMENT				
No	**Specification Section**	**Type (Submittal/Sample/Test)**	**Description of Submittal or Sample**	**Remarks**
03-07	03806	Submittal	Reinforcing - Prior to fabrication of reinforcing, the CONTRACTOR shall submit to the ENGINEER the name and address of each mill providing reinforcing steel. For each type of reinforcement to be used, the CONTRACTOR shall submit a statement that the material meets the requirements of this section.	The CONTRACTOR shall submit the name, address, and current status of mills listed on the LDOTD AML to provide steel for the project.
03-08	03806	Submittal	Reinforcing - For each shipment of each type of reinforcement utilized, the CONTRACTOR shall submit a certified mill report or certificate analysis signed by an authorized representative of the mill providing the material.	
N/A	03806	Sample	Reinforcing - At his discretion, the ENGINEER may sample any type of reinforcement for verification of compliance with the requirements of this section.	

SECTION 03901 – PORTLAND CEMENT CONCRETE				
No	**Specification Section**	**Type (Submittal/Sample/Test)**	**Description of Submittal or Sample**	**Remarks**
03-09	03901	Submittal	The CONTRACTOR shall submit a proposed concrete mix designs on a form acceptable to the ENGINEER giving the intended sources of materials and the mix design for concrete to be furnished.	No work shall be started until the Portland cement concrete mix design has been reviewed and accepted. Review and acceptance of this mix design does not release the CONTRACTOR from the responsibility of producing concrete that meets the minimum requirements of the specifications.
03-10	03901	Submittal	Portland Cement - The CONTRACTOR shall submit product information on all Portland cement products to be utilized for all Portland cement concrete mixes to be incorporated into the WORK.	This information shall evidence of the listing of the proposed product on the LDOTD AML for the type of mix or mixes to be utilized on the project. The submittal for source approval shall include information on chemical properties, compliance with AASHTO M 85, alkali content, and any other information required sufficient for the ENGINEER to review the acceptability of the proposed product.
03-11	03901	Submittal	Aggregates for Concrete - The CONTRACTOR shall submit product information on all coarse and fine aggregates to be utilized for all mixes to be incorporated in the WORK.	This information shall evidence of the listing of the proposed aggregate products on the LDOTD AML for the type of mix or mixes to be utilized on the project. The submittal for source approval shall include information on deleterious materials, gradation, friction rating, unit weight, and any other information required sufficient for the ENGINEER to review the acceptability of the proposed product.

SECTION 03901 – PORTLAND CEMENT CONCRETE				
No	**Specification Section**	**Type (Submittal/Sample/Test)**	**Description of Submittal or Sample**	**Remarks**
03-12	03901	Submittal	Admixtures for Concrete - The CONTRACTOR shall submit product information on all concrete admixtures to be utilized for all mixes to be incorporated in the WORK.	This information shall evidence of the listing of the proposed admixture products on the LDOTD AML for the type of mix or mixes to be utilized on the project. The submittal for source approval shall include information on chemical properties, and any other information required sufficient for the ENGINEER to review the acceptability of the proposed product.
03-13	03901	Submittal	Water - Source of water shall be indicated in mix designs for all Portland cement concrete mixes to be incorporated into the WORK.	
03-14	03901	Submittal	Fly Ash - The CONTRACTOR shall submit product information on all fly ash products to be utilized for all Portland cement concrete mixes to be incorporated into the WORK.	This information shall evidence of the listing of the proposed products on the LDOTD AML for the type of mix or mixes to be utilized on the project. The submittal for source approval shall include information on chemical properties, compliance with AASHTO M 295, and any other information required sufficient for the ENGINEER to review the acceptability of the proposed product.

SECTION 03901 – PORTLAND CEMENT CONCRETE				
No	**Specification Section**	**Type (Submittal/Sample/Test)**	**Description of Submittal or Sample**	**Remarks**
03-15	03901	Testing	Structural Concrete (Classes AA(M), AA, A(M), A, D, F, P(X), P(M), S - The ENGINEER will conduct the following acceptance tests of a per – lot basis. Unless noted otherwise, a lot is defined as an identifiable placement of concrete not to exceed 200 cubic yards. 1. Entrained Air: Plastic concrete will be tested for air content at least once per lot or as otherwise determined by the ENGINEER. The air content will be determined in accordance with LDOTD TR 202. 2. Slump: Plastic concrete will be tested for slump at least once per lot or as otherwise determined by the ENGINEER. The slump of plastic concrete will be determined in accordance with LDOTD TR 207. 3. Compressive Strength: Compressive strength for acceptance of structural concrete will be determined by DOTD TR 226. Two (2) batches of three (3) 6 – inch by 12 – inch cylinders will be made and tested in accordance with DOTD TR 226 for each lot of structural concrete placed. 4. Batch Tickets: The CONTRACTOR shall provide batch tickets for each batch of concrete as indicated in Part 3 – Execution.	This testing shall be completed by the precast supplier with copies of all reports provided to the ENGINEER.

SECTION 03901 – PORTLAND CEMENT CONCRETE				
No	**Specification Section**	**Type (Submittal/Sample/Test)**	**Description of Submittal or Sample**	**Remarks**
03-16	03901	Testing	Minor Structural Concrete (Classes M, R, Y) - The ENGINEER will conduct the following acceptance tests of a per – lot basis. Unless noted otherwise, a lot for minor concrete shall be 50 cubic yards, regardless of day placed. 1. Entrained Air: Plastic concrete will be tested for air content at least once per lot or as otherwise determined by the ENGINEER. The air content will be determined in accordance with LDOTD TR 202. 2. Slump: Plastic concrete will be tested for slump at least once per lot or as otherwise determined by the ENGINEER. The slump of plastic concrete will be determined in accordance with LDOTD TR 207. 3. Compressive Strength: Compressive strength for acceptance of structural concrete will be determined by DOTD TR 226. One (1) batches of (3) 6 – inch by 12 – inch cylinders will be made and tested in accordance with DOTD TR 226 for each lot of structural concrete placed. 4. Batch Tickets: The CONTRACTOR shall provide batch tickets for each batch of concrete as indicated in Part 3 – Execution.	This may be waived if precast is provided.

3.5 **REQUIRED SUBMITTALS AND SAMPLING (DIV 5)**

A. The CONTRACTOR shall provide at a minimum the following submittals and shall provide materials for the following sampling:

SECTION 05500 – MISCELLANEOUS METALWORK				
No	**Specification Section**	**Type (Submittal/Sample/Test)**	**Description of Submittal or Sample**	**Remarks**
05-01	05500	Submittal	Bolts and Anchors - The CONTRACTOR shall submit product data for all bolts and anchors. Anchors shall be submitted with an ICBO report listing the ultimate load capacity in tension and shear for each size and type of concrete anchor.	CONTRACTOR shall submit manufacturer's recommended installation instructions and procedures for adhesive anchors. Upon review by ENGINEER, these instructions shall be followed specifically.
05-02	05500	Submittal	Powder Driven Pins - The CONTRACTOR shall submit product data for all powder driven pins. Powder driven pins shall be submitted with an ICBO report listing the ultimate load capacity in tension and shear for each size and type of powder driven pins.	CONTRACTOR shall submit manufacturer's recommended installation instructions and procedures for the pins. Upon review by ENGINEER, these instructions shall be followed specifically.
05-03	05500	Submittal	Impact Anchors - The CONTRACTOR shall submit product data for all impact anchors. Anchors shall be submitted with an ICBO report listing the ultimate load capacity in tension and shear for each size and type of impact anchor.	CONTRACTOR shall submit manufacturer's recommended installation instructions and procedures for the pins. Upon review by ENGINEER, these instructions shall be followed specifically.

3.6 **REQUIRED SUBMITTALS AND SAMPLING (DIV 9)**

A. The CONTRACTOR shall provide at a minimum the following submittals and shall provide materials for the following sampling:

SECTION 09800 – PROTECTIVE COATINGS				
No	**Specification Section**	**Type (Submittal/Sample/Test)**	**Description of Submittal or Sample**	**Remarks**
09-01	09800	Submittal	Coating Materials List: Submit a coating materials list showing the manufacturer and the coating number, keyed to the coating systems herein.	
09-02	09800	Submittal	Paint Manufacturer's Information: For each coating system to be used, the following data: 1. Paint manufacturer's data sheet for each product proposed, including statements on the suitability of the material for the intended use. 2. Technical and performance information that demonstrates compliance with the system performance and material requirements. 3. Paint manufacturer's instructions and recommendations on surface preparation and application. 4. Colors available for each product (where applicable). 5. Compatibility of shop and field applied coatings (where applicable). 6. Material Safety Data Sheet for each product used.	

3.7 **REQUIRED SUBMITTALS AND SAMPLING (DIV 15)**

A. The CONTRACTOR shall provide at a minimum the following submittals and shall provide materials for the following sampling:

SECTION 15250 – TILTING WEIR GATES				
No	**Specification Section**	**Type (Submittal/Sample/Test)**	**Description of Submittal or Sample**	**Remarks**
15-01	15250	Submittal	Technical Manuals: Complete technical manuals, including printed instructions for proper maintenance, lubrication, and complete parts list indicating the various parts by name, number, and exploded view where necessary. A list of recommended spare parts for the OWNER to store at the facility shall be included	
15-02	15250	Submittal	Certification: The CONTRACTOR shall obtain written certification from the designated single manufacturer, addressed to the OWNER, stating that the equipment will efficiently and thoroughly perform the required functions in accordance with these Contract Documents, and that the designated single manufacturer accepts the CONTRACTOR's assignment of responsibility for coordination of gate equipment, including operators, controls, and services required for proper installation and operation. The CONTRACTOR shall submit all such certificates to the ENGINEER.	
15-03	15250	Submittal	Field Procedures: Instructions for field procedures for installation, adjustments, inspection, and testing shall be provided prior to installation of the gates.	

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SECTION 02200 – EARTHWORK

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. The CONTRACTOR shall perform earthwork indicated and required for construction of the WORK, complete and in place, in accordance with the Contract Documents.

1.2 CONTRACTOR SUBMITTALS, SAMPLING, AND TESTING

A. Contractor Submittals shall be per Section 01010.

B. **Submittal**: The CONTRACTOR shall submit an excavation plan, detailing methods of bracing, sheeting, and/or shoring of all excavations. This plan shall be prepared under the supervision of a licensed professional engineer registered in the State of Louisiana, and shall be sealed by such.

C. **Submittal**: The CONTRACTOR shall submit a dewatering plan, detailing methods of dewatering all excavations.

D. Materials proposed for and utilized in the WORK will be sampled as indicated herein. The frequency of testing may be altered at the discretion of the ENGINEER. The CONTRACTOR shall provide all materials required for testing at no additional cost to the OWNER.

E. **Tests for Soil Properties:** Unless noted otherwise, soil will be classified in accordance with DOTD TR 423 from samples taken in the original location or from dedicated stockpiles. Unless noted otherwise, the following methods will be utilized in determination of soil properties:

Soil Property	Test Method
Plasticity Index (PI)	DOTD TR 428
Liquid Limit (LL)	DOTD TR 428
% Organic	DOTD TR 413
% Silt	DOTD TR 407
pH	DOTD TR 430

F. **Tests for Aggregate Properties:** When required, aggregates such as granular material will be classified in accordance with DOTD TR 423. Unless noted otherwise, the following methods will be utilized in testing aggregates:

Aggregate Property	Test Method
Deleterious Materials	DOTD TR 119

Unit Weight	AASHTO T 19
Specific Gravity and Absorption of Fine Aggregate	AASHTO T 84
Specific Gravity and Absorption of Coarse Aggregate	AASHTO T 85
Polish Value	AASHTO T 278 and T 279
Amount of Material Finer than the No. 200 Sieve	DOTD TR 112
Sieve Analysis (Gradation)	DOTD TR 113
Plasticity Index (PI)	DOTD TR 428
Liquid Limit (LL)	DOTD TR 428

G. **Levee Embankment:**

1. **Source Approval:** Prior to the work, the CONTRACTOR shall submit a sample of select soil material from each source proposed to be utilized in the WORK to the ENGINEER or Testing Laboratory for source approval and classification. The sample will be tested for compliance with specification requirements. Moisture – density relationships of acceptable material will be tested and reported in accordance with DOTD TR 418. Sample size shall be two (1) full Louisiana Department of Transportation and Development standard sample sack, or as directed by the Testing Lab. Source approval testing shall be completed for each source of material utilized in the WORK.

2. **Acceptance:** During the work, the CONTRACTOR shall submit one sample per 1,000 cubic yards of select soil supplied. The sample will be classified and tested for compliance with specifications. Failed tests may be deemed as cause for rejection of the work by the ENGINEER. For embankments or backfill, Determination of In – Place Density and Determination of In – Place Moisture Content will be determined by DOTD TR 401 and DOTD TR 403, respectively. Frequency of In – Place Moisture Density and In – Place Density will be at the discretion of the ENGINEER.

3. **Contractor Testing:** The CONTRACTOR shall provide sufficient testing to ensure that specification requirements are met.

H. **Granular Material for Structures or Backfill**

1. **Source Approval:** Prior to the work, the CONTRACTOR shall submit a sample of material from each source of granular material proposed to be utilized in the WORK to the ENGINEER or Testing Laboratory for source approval and classification. The sample will be tested for compliance with specification requirements. Classification and Group Index will be determined in accordance with DOTD TR 423. Moisture – density relationships of acceptable material will be tested and reported in accordance with DOTD TR 418. Sample size shall be two (1) full Louisiana

Department of Transportation and Development standard sample sacks, or as directed by the Testing Lab. Source approval testing shall be completed for each source of material utilized in the WORK.

2. **Acceptance:** During the work, the CONTRACTOR shall submit one sample per 1,000 cubic yards of select soil supplied. The sample will be classified and tested for compliance with specifications. Failed tests may be deemed as cause for rejection of the work by the ENGINEER. For backfill, Determination of In – Place Density and Determination of In – Place Moisture Content will be determined by DOTD TR 401 and DOTD TR 403, respectively. Frequency of In – Place Moisture Density and In – Place Density will be at the discretion of the ENGINEER.

3. **Contractor Testing:** The CONTRACTOR shall provide sufficient testing to ensure that specification requirements are met.

I. **Bedding Material:**

1. **Source Approval:** Prior to the work, the CONTRACTOR shall submit a sample of bedding material proposed to be utilized in the WORK to the ENGINEER or Testing Laboratory for source approval. Material will be tested for deleterious materials and gradation. Relative Density Index of acceptable material will be developed in reported in accordance with ASTM D4253 and ASTM D4254. Sample size shall be two (1) full Louisiana Department of Transportation and Development standard sample sack, or as directed by the Testing Lab. Source approval testing shall be completed for each source of material utilized in the WORK.

2. **Acceptance:** During the work, the CONTRACTOR shall submit one sample per 1,000 cubic yards of select soil supplied. The sample will be tested for compliance with specifications. Failed tests may be deemed as cause for rejection of the work by the ENGINEER. For backfill, Determination of In – Place Density and Determination of In – Place Moisture Content will be determined by DOTD TR 401 and DOTD TR 403, respectively. Frequency of In – Place Moisture Density and In – Place Density will be at the discretion of the ENGINEER.

3. **Contractor Testing:** The CONTRACTOR shall provide sufficient testing to ensure that specification requirements are met.

J. **Topsoil**

1. **Source Approval:** Prior to the Work, the CONTRACTOR shall provide a report from an established testing laboratory for source approval.

2. **Acceptance:** Unless questionable, topsoil will not be sampled. If questionable, topsoil will be sampled and tested for compliance by the ENGINEER or Testing Laboratory. Sample size shall be two (1) full Louisiana Department of Transportation and Development standard sample sack, or as directed by the Testing Lab.

3. **Contractor Testing:** The CONTRACTOR shall provide sufficient testing to ensure that specification requirements are met.

K. **Aggregate Surface Course:**

1. **Source Approval:** Prior to the work, the CONTRACTOR shall submit a sample of aggregate surface course material proposed to be utilized in the WORK to the ENGINEER or Testing Laboratory for source approval. Material will be tested for compliance with the specifications. Sample size shall be two (1) full Louisiana Department of Transportation and Development standard sample sack, or as directed by the Testing Lab. Source approval testing shall be completed for each source of material utilized in the WORK.

2. **Acceptance:** During the work, the CONTRACTOR shall submit one sample per 1,000 cubic yards of non – plastic embankment supplied. The sample will be tested for compliance with specifications. Failed tests may be deemed as cause for rejection of the work by the ENGINEER.

3. **Contractor Testing:** The CONTRACTOR shall provide sufficient testing to ensure that specification requirements are met.

1.3 REFERENCE STANDARDS

A. American Association of State Highway and Transportation Officials (AASHTO)

AASHTO T 19	Standard Method of Test for Bulk Density (Unit Weight) and Voids in Aggregate
AASHTO T 84	Standard Method of Test for Specific Gravity and Absorption of Fine Aggregate
AASHTO T 85	Standard Method of Test for Specific Gravity and Absorption of Coarse Aggregate
AASHTO T 278	Standard Method of Test for Frictional Properties Using the British Pendelum Tester
AASHTO T 279	Standard Method of Test for Accelerated Polishing of Aggregates Using the British Wheel

B. ASTM International

ASTM D 1388	Standard Test Methods for Stiffness of Fabrics
ASTM D 4253	Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table
ASTM D 4254	Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density
ASTM D 6637	Standard Test Method for Determining Tensile Properties of Geogrids by the Single or Multi-Rib Tensile Method
ASTM D 698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort
ASTM D 2487	Standard Practice for Classification of Soils for Engineering Purposes

ASTM D 2974	Standard Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils
ASTM D 1140	Standard Test Methods for Determining the Amount of Material Finer than 75-µm

C. The Geo - Synthetic Institute (GSI)

GG2	Test Method for Geogrid Junction Strength

D. Louisiana Department of Transportation and Development (DOTD)

DOTD AML	Louisiana DOTD Approved Materials List
DOTD TR 112	Method of Test for Amount of Material Finer than the No. 200 Sieve in Aggregate by Wash
DOTD TR 113	Method of Test for Sieve Analysis of Fine and Coarse Aggregate
DOTD TR 119	Method of Test for Determination of Deleterious Materials
DOTD TR 401	Method of Test for the Determination of In – Place Density
DOTD TR 403	Method of Test for Determination of Moisture Content
DOTD TR 407	Method of Test for Mechanical Analysis of Soils
DOTD TR 413	Method of Test for Organic Material in Soil
DOTD TR 418	Method of Test for Moisture – Density Relationships
DOTD TR 423	Method of Test for Classification of Soils and Soil – Aggregate Mixtures
DOTD TR 428	Method of Test for Determining the Atterberg Limits of Soils
DOTD TR 430	Method of Test for Determination of pH Value of Water and Soil
DOTD QPL 2	Louisiana Department of Transportation and Development Approved Materials List – Aggregates

1.4 **QUALITY CONTROL**

A. The CONTRACTOR shall locate, select, and place material conforming to specification requirements and requirements shown on the drawings. The CONTRACTOR shall control his processes, including performing tests and making adjustments as necessary to result in a uniform product meeting all the requirements of the drawings and specifications.

B. All sheeting, shoring, and bracing of excavations shall conform to requirements necessary to comply with local codes and authorities having jurisdiction. Impact pile driving and sheet pile installations will cause vibrations that may affect existing

residences or underground utilities in the vicinity of the proposed force main. Peak particle velocities due to pile driving should be monitored at critical locations with a seismograph during the installation of test piles, job piles and sheet piles. The record of peak particle velocities will provide information in assessing the need for changes in driving operations and the types of changes best suited for the project requirements. Monitoring will be performed by an independent testing lab retained by the OWNER.

PART 2 -- PRODUCTS

2.1 FILL AND BACKFILL MATERIAL REQUIREMENTS

A. **Soil Usage:** Soils which do not meet Liquid Limit or Plasticity Index requirements shall not be blended to reduce Liquid Limit or Plasticity Index. Soils may be treated with Lime to reduce plasticity index only with the approval of the ENGINEER.

2.2 LEVEE EMBANKMENT

A. The embankment for levee, berms, ramps and road crossings shall be constructed of earth materials naturally occurring or CONTRACTOR blended. Materials that are classified in accordance with ASTM D 2487 or CL or CH with less than 35% sand content are suitable for use as embankment fill. Materials classified as ML are suitable if blended to produce a material that classifies as CH or CL according to ASTM D 2487. All fill materials shall be free from masses of organic matter, sticks, branches, roots, and other debris including hazardous and regulated solid wastes. As earth from the designated excavation areas may contain excessive amounts of wood, isolated pieces of wood will not be considered objectionable in the embankment provided their length does not exceed 1 foot, their cross-sectional area is less than 4 square inches, and they are distributed throughout the fill. Not more than 1 percent (by volume) of objectionable material shall be contained in the earth material placed in each cubic yard of the levee section. Pockets and/or zones of wood shall not be placed in the embankment. The CONTRACTOR shall notify the ENGINEER whenever the in-place Plasticity Index of the material is 15 or less. Materials placed in the section must be at above the Plasticity Index of 10. Materials placed in the section must be at or below organic content of 9 percent by weight, as determined by ASTM D 2974, Method C. Materials placed in the section must contain less than 35 percent sand content by weight, as determined by ASTM D 1140.

2.3 GRANULAR MATERIAL FOR STRUCTURES OR BACKFILL

A. Granular material shall be material shall be Mississippi River “pumped sand”, DOTD Classification of A-4 or better having a maximum liquid limit of 25 and a maximum plasticity index of 6. All sands shall be free of trash, weeds, lumps, humus, pieces of wood or any other deleterious material. Granular material shall have a group index number not to exceed 6.

2.4 BEDDING MATERIAL FOR PIPE OR STRUCTURES

A. Bedding Material shall be crushed limestone for pipe bedding shall be #57 stone as indicated below. Bedding material shall be free of soil, roots, debris, deleterious materials, or other rubbish. The limestone shall be wrapped with geotextile fabric as indicated on the drawings or as specified. Crushed concrete or other alternate bedding materials will not be accepted. Stone shall be supplied from a source listed on the Louisiana Department of Transportation and Development Approved Materials List (QPL 2).

#57 Stone Gradation		
US Sieve	**Metric Sieve**	**Percent Passing**
1-½ Inch	37.5 mm	100
1 Inch	25.0 mm	95 - 100
No. 4	4.75 mm	0 – 10
No. 8	2.36 mm	0 – 5

2.5 TOPSOIL

A. When available, topsoil shall be existing surface soil stripped and stockpiled. When additional topsoil is required beyond the available topsoil from the stripping operation, topsoil shall be delivered and amended as recommended by soil tests. Soil tests shall be provided prior to delivery of topsoil to the site. The tests shall determine the quantities and type of soil amendments required to meet local growing conditions for the seed species provided. Delivered topsoil, existing soil in smooth graded areas, and stockpiled topsoil shall be tested for particle size, pH, organic content, textural class, chemical composition and soluble salts. Topsoil shall be free from slag, cinders, stones, lumps of soil, sticks, roots, trash or other material over 1 ½ inches diameter. Topsoil shall be free from viable plants and plant parts Topsoil shall also be free from debris, noxious weeds, toxic substances, or other materials harmful to plant growth. Topsoil shall have a minimum PI of 4, a maximum PI of 12, a pH of 5.5-8.0, a minimum organic content of 2 percent, and shall be capable of supporting adequate vegetation.

B. Soil amendments to be blended with the topsoil shall be delivered to the site either in the original, unopened containers bearing the manufacturer's chemical analysis, or in bulk. A chemical analysis shall be provided for bulk deliveries.

C. Existing topsoil meeting the above requirements within construction limits may be used. If agricultural lime or organic matter is added to a soil to bring topsoil into conformance with these specifications, it shall be at the expense of the CONTRACTOR.

2.6 AGGREGATE SURFACE COURSE

A. **Stone:** Stone shall be supplied from a source listed on the Louisiana Department of Transportation and Development Approved Materials List (QPL 2). Stone shall consist of 100 percent stone and shall comply with the following gradation:

U.S. Sieve	**Metric Sieve**	**Percent Passing**
1 1/2 inch	37.5 mm	100
3/4 inch	19.0 mm	50-100
No. 4	4.75 mm	35-65
No. 40	425 µm	10-32

No. 200	75 µm	3-15

B. **Reclaimed Asphaltic Pavement (RAP):** RAP shall comply with the following gradation:

U.S. Sieve	**Metric Sieve**	**Percent Passing**
2 – ½ Inch	63 mm	100
No. 4	4.75 mm	35-75

2.7 **SHEETING, SHORING, AND BRACING**

A. Wood for shoring and sheeting shall be green, rough cut hardwood (i.e. oak or hickory). Planking for sheeting and foundation lumber shall have a minimum thickness of 2 inches. CONTRACTOR shall be responsible for the design and installation of all wood sheeting unless wood shoring is indicated on the plans.

B. Steel sheet piling shall be a continuous interlock design. The sheet piling must be in good condition and shall provide a tight interlocking connection, which will retard the infiltration of ground water. Cofferdams shall be provided when constructing wet wells at pump station sites. The CONTRACTOR shall be responsible for the design and installation of all cofferdams.

C. Trench boxes and shields shall be in good, sound condition and shall comply with all applicable OSHA requirements. Installation, use, and removal of trench shields or boxes shall be in accordance with the manufacturer's recommendations. CONTRACTOR shall be responsible for the design and installation of all trench boxes or shields and the use thereof shall be depicted within the CONTRACTOR's sheeting, shoring and bracing plan.

PART 3 -- EXECUTION

3.1 **GENERAL**

A. Except when specifically provided to the contrary, excavation shall include the removal of materials, including obstructions that would interfere with the proper execution and completion of the WORK. The removal of such materials shall conform to the lines and grades indicated or ordered. Unless otherwise indicated, the entire Site shall be stripped of vegetation and debris and shall be grubbed, and such material shall be removed from the Site prior to performing any excavation or placing any fill.

3.2 **SHEETING, SHORING, AND BRACING**

A. The CONTRACTOR shall furnish, place, and maintain supports and shoring that may be required for the sides of excavations. The CONTRACTOR shall be solely responsible for the stability and safety of all excavations.

B. Excavations shall be sloped or otherwise supported in a safe manner in accordance with applicable State safety requirements and the requirements of OSHA Safety and Health Standards for Construction (29CFR1926).

C. The use of horizontal strutting below the barrel of a pipe or structure or the use of a pipe as support for trench bracing will not be permitted.

3.3 EXCLUSION OF WATER

A. The CONTRACTOR shall remove and exclude water, including storm water, groundwater, irrigation water, and wastewater, from excavations. Dewatering wells, well-points, sump pumps, or other means shall be used to remove water and continuously maintain groundwater at a level at least 2 feet below the bottom of excavations before the excavation WORK begins at each location. Water shall be removed and excluded until backfilling is complete and field soils testing has been completed.

3.4 OVER-EXCAVATION

A. **Indicated:** Where areas are indicated to be over-excavated, excavation shall be to the depth indicated, and backfill shall be installed to the grade indicated.

B. **Not Indicated:** When ordered to over-excavate areas deeper and/or wider than required by the Contract Documents, the CONTRACTOR shall over-excavate to the dimensions ordered and backfill to the indicated grade.

C. **Neither Indicated nor Ordered**: Any over-excavation carried below the grade ordered or indicated shall be backfilled and compacted to the required grade with granular material or non – plastic embankment as part of the WORK.

3.5 DISPOSAL OF EXCESS EXCAVATED MATERIAL

A. Unless otherwise indicated, excess excavated material shall be the property of the CONTRACTOR. The CONTRACTOR shall be responsible for the removal and disposal of excess excavated material. Material shall be disposed of at an approved on-Site disposal area or off-Site at a location arranged by the CONTRACTOR in accordance with laws and regulations regarding disposal of such material.

3.6 LEVEE EMBANKMENT

A. The location and extent of the compacted fill is shown on the drawings. All embankment, berms, ramps and road crossings material shall be compacted fill. Compacted fill shall not be placed in water. The materials for compacted fill shall be placed or spread in layer, the first or bottom layer and the last two layers not more than 6 inches in thickness and all layers between the first and the last two layers not more than 12 inches in thickness prior to compaction. Layers shall be started in full out to the slope stakes and shall be carried substantially horizontal and parallel to the levee centerline with sufficient crown or slope to provide satisfactory drainage during construction. Areas on which geotextile is to be placed shall be dressed out and leveled to the grade indicated on the drawings. When placing fill on the geotextile, mechanical equipment shall not be allowed to come in contact with geotextile in any way. Requirements for benching into the slope of the existing embankment are required in order to place and compact the material in horizontal layers as described on the drawings. Benching shall not consist of excavating the existing levee embankment as shown on the drawings and described herein. The vertical face of the existing embankment resulting from the benching operation shall be a minimum of 1 foot in height but shall not exceed 2 feet in height as shown on the drawings. Material excavated from the benching operations shall be used as compacted fill. When the surface of any compacted layer is too smooth to bond properly with the

succeeding layer, it shall be adequately scarified before the next layer is placed thereon. The elevation of the levee embankment shall not exceed the elevation of the berm embankment(s) by more than 2 feet.

B. The first and each successive layer of compacted fill material for embankments, berms, ramps, and road crossings shall be compacted to at least 90 percent of maximum dry density as determined by ASTM D 698 (Standard Proctor Compaction Test) at a moisture content within the limits of plus 5 to minus 3 percentage points of optimum moisture content determined from ASTM D 698. The first and each successive layer of the sand drainage blanket shall be compacted to at least 95 percent of maximum dry density as determined by ASTM D 698 at moisture content within the limits of plus to minus 3 percentage points of optimum moisture content determined from ASTM D 698. For the first layer above the geotextile, a tractor having a ground pressure no greater than 4.7 plus or minus 0.2 psi shall be used to spread and then compact the layer.

C. The entire embankment, berms, ramps and road crossings shall be brought to not less than the prescribed design cross section, within allowable tolerance, at all points. Unreasonable roughness of the surface shall be dressed out to permit fertilizing, seeding and mulching operations.

3.7 BEDDING MATERIAL

A. **Placement of Bedding:** Geotextile fabric shall be placed in accordance with plan details prior to placing bedding material. Care shall be taken to prevent damage to geotextile fabric during placement of bedding material. Materials shall be placed in lifts, shaped, and uniformly compacted to 75 percent of relative density.

B. Adjacent rolls of fabric will be overlapped or sewn. When rolls are overlapped, the overlap shall be a minimum of 18 inches, including the ends of the rolls. The top layer of the fabric shall be parallel with adjacent rolls and in the direction of bedding materials placement. When rolls are sewn, the CONTRACTOR shall join adjacent rolls by sewing with polyester, or Kevlar thread. Field sewing shall employ the “J” seam or “Butterfly” seam with the two pieces of geotextile fabric mated together, turned in order to sew through 4 layers of fabric and sewn with 2 rows of Type 401, two-threaded locking chain stitch. Factory seams other than specified may be submitted to the ENGINEER for approval. When the ground is covered with water or supersaturated soil, sewing of the fabric will be required.

C. Damaged fabric shall be either removed and replaced with new fabric or covered with a second layer of fabric extending 2 feet in each direction from the damaged area.

D. Excavation below the established grade of the structure for placement of bedding material shall be used or disposed.

3.8 GRANULAR MATERIAL FOR BACKFILL OR STRUCTURES

A. Materials shall be placed, properly shaped and uniformly compacted lifts not exceeding 6 inches by approved methods to a minimum of 95 percent of maximum dry density. Maximum dry density will be determined in accordance with DOTD TR 415 or TR 418 and in-place density will be determined in accordance with DOTD TR 401. Granular materials shall not be displaced during subsequent operations. Each lift shall be compacted and tested as specified herein, unless determined otherwise by the ENGINEER.

3.9 AGGREGATE SURFACE COURSE

A. Equipment necessary to produce a finished project meeting specification requirements shall be furnished and maintained by the CONTRACTOR. Equipment will be approved prior to use.

B. The material shall be placed directly on the prepared and approved subgrade from hauling vehicles or spreading equipment. No surface course shall be placed on damaged subgrade until repairs to the subgrade have been completed and approved.

C. **Aggregate Surfacing:** Aggregate surfacing materials shall not be placed or spread on adjacent portland cement concrete or asphaltic concrete pavements. Aggregate surfacing operations shall be conducted so that pavement surfaces, edges, and joints are not damaged.

D. The material shall be shaped by suitable means and compacted. Shaping and compacting shall continue until the surface conforms to the required sections and is free from ruts and waves.

E. Stone aggregate surfacing shall be compacted to the satisfaction of the ENGINEER by approved methods. After initial compaction, the surface shall be wetted as necessary and rolled with a pneumatic-tire or steel-wheel roller to a tight, uniform surface.

F. Reclaimed asphaltic material shall be placed to required thickness, shaped to the required section, and compacted with at least three passes by an approved pneumatic-tire roller to a tight, uniform surface.

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SECTION 02201 - SITE PREPARATION

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. The WORK of this Section includes measures required during the CONTRACTOR's initial move onto the Site.

1.2 REFERENCE STANDARDS

A. Commercial Standards:

AAN	American Association of Nurserymen

1.3 CONTRACTOR SUBMITTALS, SAMPLING, AND TESTING

A. Material used for backfill shall be sampled and tested in accordance with Section 02200 – Earthwork.

1.4 QUALITY CONTROL

A. NOT USED

1.5 SITE INSPECTION

A. Prior to moving onto the Site, the CONTRACTOR shall inspect the Site conditions and review maps of the existing plant site, existing utilities, and facilities or other items delineating the OWNER's property and right-of-way lines.

PART 2 -- PRODUCTS

PART 3 -- EXECUTION

3.1 PRIMARY CONSTRUCTION SITE ACCESS

A. The CONTRACTOR shall develop any necessary access to the Site, including access barriers to prohibit entry of unauthorized persons.

B. **Utility Interference:** Where existing utilities interfere with the WORK, notify the utility owner and the ENGINEER before proceeding in accordance with the General Conditions.

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SECTION 02202 – DEMOLITION AND REMOVAL OF STRUCTURES AND OBSTRUCTIONS

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. The CONTRACTOR shall demolish facilities as indicated, and shall remove and/or relocate structures and obstructions as indicated, all in accordance with the Contract Documents.

B. The CONTRACTOR shall carefully coordinate the WORK in areas where existing facilities are interconnected with new facilities and where existing facilities remain operational. The WORK as indicated is not all inclusive, and the CONTRACTOR shall be responsible to perform the reconstruction indicated plus that which can be reasonably inferred from the Contract Documents as necessary to complete the Project. The Specifications and Drawings identify the major facilities that shall be demolished and reconstructed, but auxiliary utilities are not necessarily shown.

C. While demolition and reconstruction are being performed, the CONTRACTOR shall provide adequate access for the continued operation and maintenance of equipment and other facilities to remain. The CONTRACTOR shall erect and maintain fences, warning signs, barricades, and other devices around the reconstruction as required for the protection of the CONTRACTOR's employees and the OWNER's personnel. The CONTRACTOR shall remove such protection when reconstruction activities are complete, or as work progresses, or when directed by the ENGINEER.

1.2 REFERENCE STANDARDS

A. Code of Federal Regulations

49 CFR, Parts 172-180 Regulations for Hazardous Materials

B. Louisiana Administrative Code (LAC)

LAC Title 33, Part V, Chapter 38, Section 3813

LAC Title 33, Part V, Chapter 38

C. Louisiana Department of Transportation and Development (LDOTD)

Water Well Rules, Regulations, and Standards, State of Louisiana

D. Louisiana Department of Environmental Quality (LDEQ)

UST Regulations Regulations for Underground Storage Tanks

1.3 CONTRACTOR SUBMITTALS, SAMPLING, AND TESTING

A. Contractor Submittals shall be per Section 01010.

1. Submittal: Demolition and reconstruction activities and procedures, including operational sequence, shall be submitted to the ENGINEER for approval. The procedures shall provide for safe conduct of the WORK, careful removal and disposition of materials and equipment, protection of existing facilities which are to

remain undisturbed, coordination with existing facilities to remain in service, and timely disconnection and reconnection of utility services. The procedures shall include a detailed description and time schedule of the methods and equipment to be used for each operation and the sequence of operation. A storage plan for salvaged items shall be included.

2. Submittal: Certificates as required herein for shall be submitted to the ENGINEER.

PART 2 -- PRODUCTS - NOT USED

PART 3 -- EXECUTION

3.1 GENERAL

A. The CONTRACTOR shall coordinate demolition and reconstruction WORK with the OWNER and ENGINEER. Unless otherwise indicated, the CONTRACTOR shall be responsible for the sequence of activities. WORK shall be performed in accordance with applicable safety rules and regulations.

B. The CONTRACTOR shall verify that any utilities connected to structures, equipment, and facilities to be removed, relocated, salvaged, replaced, or abandoned are rendered inoperable, replaced with new utilities, or adequately bypassed with temporary utilities before proceeding with demolition and reconstruction.

C. The CONTRACTOR shall take precautions to avoid damage to adjacent facilities and to limit the WORK activities to the extent indicated. If reconstruction beyond the scope indicated is required, the CONTRACTOR shall obtain approval from the ENGINEER prior to commencing.

D. The CONTRACTOR shall perform a functional test of existing equipment that is relocated and reinstalled to ensure the equipment functions in the manner documented during the initial inspection. The CONTRACTOR shall inform the ENGINEER in writing a minimum of 5 Days prior to the functional testing in order for the OWNER and ENGINEER to witness the test. If, in the opinion of the ENGINEER, the relocated equipment does not function in a satisfactory manner, the CONTRACTOR shall make repairs and modifications necessary to restore the equipment to its original operating condition at no additional cost to the OWNER.

3.2 PROTECTION OF EXISTING FACILITIES

A. Before beginning any reconstruction, the CONTRACTOR shall carefully survey the existing facilities and examine the Specifications and Drawings to determine the extent of reconstruction and coordination with the WORK. Existing facilities not subject to reconstruction shall be protected and maintained. Damaged existing facilities shall be repaired to the previous condition or replaced.

B. Persons shall be afforded safe passages around areas of demolition.

C. Structural elements shall not be overloaded. The CONTRACTOR shall be responsible for shoring, bracing, or adding new supports as may be required for adequate structural support as a result of WORK performed under this Section. The CONTRACTOR shall remove temporary protection when the WORK is complete or when so authorized by the ENGINEER.

D. The CONTRACTOR shall carefully consider bearing loads and capacities before placement of equipment and material on Site. In the event of any questions as to whether an area to be loaded has adequate bearing capacity, the CONTRACTOR shall consult with the ENGINEER prior to the placement of such equipment or material.

3.3 DEMOLITION AND REMOVAL OF STRUCTURES AND OBSTRUCTIONS

A. **Equipment Supports:** Equipment supports, including concrete pads, baseplates, mounting bolts, and support hangers, shall be removed where indicated. Damage to the existing structure shall be repaired as indicated.

B. **Exposed Piping:** Exposed piping including vents, drains, and valves shall be removed. Where exposed piping penetrates existing floors and walls, the piping, including wall thimbles, shall be removed to a minimum depth of 2-inches. Resultant openings in the structure shall be repaired as indicated.

C. **Electrical Control Panels:** Electrical control panels, junction boxes, motor control centers, and local switches and pushbuttons shall be removed, as indicated on the Drawings.

D. **Connections:** Connections to embedded electrical conduits shall be removed a minimum of 2-inches inside the finished surface of the existing structure. Wiring shall be removed and the resulting openings shall be repaired as indicated.

E. **Structures**: Unsalvageable materials in a structure designated for removal shall become the property of the CONTRACTOR and shall be removed and disposed of by the CONTRACTOR. Appurtenances forming a part of a structure to be demolished, whether integral or not integral to the structure, shall be demolished and removed by the CONTRACTOR.

F. **Pipe**: Pipe to be relaid shall be removed and stored so that there will be no loss or undue damage before relaying. The CONTRACTOR shall replace sections lost from storage or unduly damaged at no direct pay. When specified, pipe not to be relaid and considered usable shall be salvaged, cleaned of soils or other materials, stored and stacked.

3.4 REMOVING ENVIRONMENTALLY SENSITIVE MATERIALS

A. When removal or remediation of any environmentally sensitive or contaminated sites is required during construction, the CONTRACTOR's operations shall be coordinated through the appropriate agency having jurisdiction. If the CONTRACTOR fails to follow the guidelines of the agency having jurisdiction, and subsequently causes or increases harm or damage to the environment, then all resulting fines and clean-up costs shall be the responsibility of the CONTRACTOR.

B. **Non-Friable Asbestos**: When a structure contains non-friable asbestos, the CONTRACTOR shall carefully remove the asbestos without excessive breakage or crushing before removal, relocation or demolition of the structure. The non-friable asbestos material shall be disposed of at an approved industrial landfill.

C. **Friable Asbestos**: When a structure contains friable asbestos, the CONTRACTOR shall immediately notify the Department of Environmental Quality (DEQ), Air Quality Division and request that DEQ provide a confirmation letter with an Asbestos Disposal Verification Form (ADVF). The CONTRACTOR shall complete the ADVF within 90

calendar days from the date of issue. When this information is available, the Department will indicate on the plans which structures contain friable asbestos. Only entities certified by DEQ as Asbestos Abatement Entities shall remove friable asbestos from structures. The asbestos removal shall be performed before removal, relocation or demolition of the structure. Friable asbestos removal, handling and disposal shall be performed in accordance with the latest requirements for asbestos abatement of the DEQ, Air Quality Division. The CONTRACTOR shall maintain, and furnish to the ENGINEER, within 21 calendar days, Chain of Custody verification records for the friable asbestos from the work site to the disposal site. These records will become part of the permanent project records.

D. **Contaminated Soils:** Soil contaminated with Benzene, Toluene, Ethyl Benzene, Xylene (BTEX), Total Petroleum Hydrocarbons- Gasoline (TPH-G), Total Petroleum Hydrocarbons-Diesel (TPH- D), Total Petroleum Hydrocarbons-Oil (TPH-O), or other identified toxic materials, in areas of underground fuel tanks or other areas, at levels above the regulatory limits and is non-protective of groundwater shall be excavated by the CONTRACTOR as shown on the plans or as directed. Determination of groundwater protection shall be through the use of the Synthetic Precipitation Leachate Procedure (SPLP) or as directed. The CONTRACTOR shall remove the overburden above the contaminated soil to the dimensions shown on the plans or as directed. The CONTRACTOR shall also excavate the contaminated soil at the locations shown on the plans or as directed. The contaminated soil shall be loaded into approved hauling vehicles by the CONTRACTOR and be disposed of in a disposal site approved by the Department of Environmental Quality. The CONTRACTOR shall furnish the ENGINEER, within 21 calendar days, Chain of Custody verification records for the contaminated soil. The Materials and Testing Section will verify that all contaminated soil has been removed. While the excavation is open, the CONTRACTOR shall construct and maintain a soil berm around the excavation to prevent surface water runoff from entering the excavation. The removed overburden may be used to construct the berm and backfill the excavation. Removal and disposal of contaminated soils will be in accordance with all local, state and federal laws and regulations.

E. **Paint Containing Lead or Other Hazardous Materials on Metal Surfaces:** Steel members of structures protected by paint containing lead or other hazardous materials as shown on the plans or as discovered in the field shall be removed and prepared for transport by methods approved by the ENGINEER. Such steel members shall be delivered to a licensed recycling center capable of processing steel members coated with paint identified by the Resource Conservation and Recovery Act (RCRA) as hazardous. Prior to removal, transport, treatment or disposal of any steel members, the CONTRACTOR shall submit the following to the ENGINEER.

    1) Plan of removal of steel members.

    2) Plan for transport of steel members.

    3) Name and address of the licensed recycling center.

    All steel members shall be transported in accordance with all federal, state and local laws. Certificates of Disposal, Chain of Custody forms, or other applicable documents shall be provided within 21 calendar days following each shipment.

F. **Treated Timber:** Creosoted and other treated timber or lumber shown on the plans or discovered in the field shall be removed and prepared for transport by methods approved by the ENGINEER. All materials that are not designated to be salvaged by the

OWNER or salvaged by the CONTRACTOR are to be disposed of in an appropriate landfill. Certificates of Disposal, Chain of Custody forms, or other applicable documents shall be provided within 21 calendar days following each shipment.

G. **Universal Wastes:** Universal wastes are hazardous wastes defined in LAC Title 33, Part V, Chapter 38, Section 3813 to include batteries, pesticides, thermostats, lamps and antifreeze. Universal wastes shall be removed by the CONTRACTOR in accordance with the plans and shall be stored and prepared for transport as specified in LAC Title 33, Part V, Chapter 38 and herein. A lamp is the bulb or tube portion of an electric lighting device. Universal waste lamps include, but are not limited to, fluorescent, high intensity discharge, neon, mercury vapor, high pressure sodium, and metallic halide. Such lamps shall be removed and stored in containers or packages that are structurally sound, adequate to prevent breakage, and compatible with the contents of the lamps. Such containers shall remain closed and lack evidence of leakage, spillage or damage that could cause releases of mercury or other hazardous constituents to the environment under reasonably foreseeable conditions. The containers shall be clearly labeled or marked with the words “Universal Waste – Lamps” and with the earliest date that any lamp in the container was discarded as waste. If a container develops a leak, it shall be placed into an over-pack container. The CONTRACTOR shall immediately clean up any leakage and place in a container any lamp that shows evidence of breakage, leakage, or damage. Universal waste lamps will not be allowed to accumulate for a period longer than one year from the date the lamps were discarded. The waste lamps shall be delivered to a universal waste disposal site or destination facility by a Universal Waste Transporter in accordance with the applicable U.S. Department of Transportation Regulations, 49 CFR, Parts 172-180. The CONTRACTOR shall be responsible for informing all employees who handle universal wastes of the proper handling and emergency procedures appropriate to the type of waste.

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SECTION 02204 - TEMPORARY ENVIRONMENTAL CONTROLS

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. The CONTRACTOR shall comply with federal, state, and local laws and regulations controlling pollution of the environment, including air, water, and noise. The CONTRACTOR shall take precautions to prevent pollution of waters and wetlands with fuels, oils, asphalts, chemicals, or other harmful materials.

1.2 REFERENCE STANDARDS

A. Louisiana Department of Environmental Quality (LDEQ)

LAR 100000	Master General Permit for Discharges of Storm Water from Construction Activities – Five Acres or More
LAR 200000	Storm Water General Permit for Small Construction Activities

B. Occupational Safety Hazard Administration (OSHA)

Part 1926	Safety and Health Regulations for Construction

C. United States Environmental Protection Agency (US EPA)

Storm Water Management for Construction Activities

1.3 CONTRACTOR SUBMITTALS

A. Contractor Submittals shall be per Section 01010.

1. **Submittal:** Where a stormwater pollution prevention plan (SWPPP) is required, submit to the ENGINEER as specified herein. The CONTRACTOR shall submit all activity reports as required by permits as applicable. Where SWPPP is not required, the CONTRACTOR shall inform the ENGINEER in writing, documenting the reasons why a SWPPP is not required.

2. **Submittal:** Where certificates, inspection reports, or other items are required, submit to the ENGINEER as specified herein.

1.4 DUST ABATEMENT

A. The CONTRACTOR shall prevent its operation from producing dust in amounts damaging to property, cultivated vegetation, or domestic animals, or causing a nuisance to persons living in or occupying buildings in the vicinity of the Site. The CONTRACTOR shall be responsible for any damage resulting from dust originating from its operations. Dust abatement measures shall be continued until the CONTRACTOR is relieved of further responsibility by the ENGINEER.

B. **Storage Piles**: The CONTRACTOR shall enclose, cover, water (as needed), or apply non-toxic soil binders according to manufacturer's specifications on material piles (i.e. gravel, sand, dirt) with a silt content of 5 percent or greater.

C. **Active Areas of Site**: The CONTRACTOR shall water active construction areas and unpaved roads as needed and as directed by ENGINEER.

D. **Inactive Areas of Site**: The CONTRACTOR shall apply non-toxic soil stabilizers according to manufacturer's specifications to inactive construction areas, or water as needed to maintain adequate dust control.

E. **Vehicle Loads**: The CONTRACTOR shall cover or maintain at least 2-feet of freeboard vertical distance between the top of the load and the top of the trailer sides on trucks hauling dirt, sand, soil, or other loose materials off of the Site.

F. **Roads**: When there is visible track-out onto a paved public road, the CONTRACTOR shall install wheel washers where the vehicles exit and enter onto the paved roads and wash the undercarriage of trucks and any equipment leaving the Site on each trip. The CONTRACTOR shall sweep the paved street at the end of each shift with a water spray pick-up broom-type street sweeper as necessary or as directed.

G. **Vehicle Speeds**: If watering of unpaved roads is not sufficient to control dust. The CONTRACTOR shall reduce vehicle speeds as required for control of dust.

1.5 SEDIMENTATION ABATEMENT

A. For work disturbing one acre or less, no Storm Water Pollution Prevention Plan is required. CONTRACTOR shall be responsible for collecting, storing, hauling, and disposing of spoil, silt, and waste materials in compliance with applicable federal, state, and local rules and regulations and the Contract Documents.

B. The CONTRACTOR shall install and maintain erosion and sediment control measures, such as swales, grade stabilization structures, berms, dikes, waterways, filter fabric fences, and sediment basins.

C. The CONTRACTOR shall filter fabric barrier systems, if used, shall be installed in such a manner that surface runoff will percolate through the system in sheet flow fashion and allow sediment to be retained and accumulated.

D. The CONTRACTOR shall remove and dispose of sediment deposits at the designated spoil area. If a spoil area is not indicated, dispose of sediment off-Site at a legally permitted disposal facility. Sediment to be placed at the spoil area should be spread evenly, compacted, and stabilized. Sediment shall not be allowed to flush into a stream, drainage structure, or drainage way.

E. The CONTRACTOR shall maintain erosion and sediment control measures until final acceptance or until directed by the ENGINEER to remove it.

1.6 STORMWATER POLLUTION PREVENTION PLAN

A. The CONTRACTOR shall prepare and maintain a Storm Water Pollution Prevention Plan (SWPPP), for work disturbing one acre or greater. The plan shall describe in specific details the CONTRACTOR’s program to prevent contamination of the storm water collection system for this project. A suggested Template and Sample SWPPP Inspection Report, as well as other valuable information can be found at EPA’s website: http://cfpub.epa.gov/npdes/stormwaterlswppp.cfm

B. The CONTRACTOR'S Storm Water Pollution Prevention Plan shall be compromised of all relevant components specified in the U.S. Environmental Protection Agency document entitled, "Storm Water Management for Construction Activities".

C. The CONTRACTOR shall implement, maintain, and inspect all erosion and sediment controls identified in the SWPPP. The program shall address both common construction activities and extraordinary events. The CONTRACTOR shall remove all temporary SCMs, such as silt fences, catch basin filters, wash areas, etc. at the end of construction.

D. The CONTRACTOR shall include Water Pollution Control Drawings (WPCD) in the SWPPP to illustrate the locations, applications, and deployment of the Storm Water Control Measures (SCMs) identified in the SWPPP. The WPCDs shall be included as an attachment to the SWPPP.

E. **Storm Water Control Measures (SCMs):** The Storm Water Control Measures (SCMs) are techniques, processes, activities, or structures used to reduce the pollutant content of a storm water or non-storm water discharge. SCMS may include simple, non-structural methods such as good housekeeping, staff training, and preventative maintenance. Additionally, SCMs may include structural modifications such as the installation of berms, canopies, or treatment control.

F. The CONTRACTOR shall comply with laws, rules, and regulations of the State of Louisiana and agencies of the United States Government prohibiting the pollution of lakes, wetlands, streams, or river waters from the dumping of contaminates, refuse, rubbish, or debris.

G. The CONTRACTOR shall submit copies of the SWPPP a minimum of 10 working days prior to beginning construction, to the ENGINEER. The CONTRACTOR shall update the SWPPP as necessary during the work to prevent contamination of the storm water collection system.

H. Before the start of work, the CONTRACTOR shall train all employees and Subcontractors on the approved SWPPP and related WPCD and provide the ENGINEER with written documentation of said training.

I. For work disturbing one acre or less, Storm Water Control Measures (SCMs) must be in place. There shall be no Notice of Intent (NOI) required. The CONTRACTOR shall complete inspection reports and submit copies to OWNER. The CONTRACTOR and the INSPECTOR shall keep a copy of the report on file.

J. For work disturbing one to five acres, Storm Water Control Measures (SCMs) must be in place. The CONTRACTOR must prepare SWPPP and post prominently on the job site. The CONTRACTOR must have the LAR 200000 General Permit posted on the job site. There shall be no Notice of Intent (NOI) required. The CONTRACTOR shall complete all required reports and submit them to OWNER.

K. For work disturbing five acres or more, Storm Water Control Measures (SCMs) must be in place. The CONTRACTOR must have Notice of Intent (NOI) completed, sent to DEQ, and posted. The CONTRACTOR must prepare a SWPPP and post prominently on the site. The CONTRACTOR shall have the LAR 100000 General Permit posted on site with DEQ permit number for specific site. The CONTRACTOR must complete a Notice of Termination (NOT) and submit it to DEQ.

1.7 **RUBBISH CONTROL**

A. During the progress of the WORK, the CONTRACTOR shall keep the Site and other areas for which it is responsible in a neat and clean condition and free from any accumulation of rubbish. The CONTRACTOR shall dispose of rubbish and waste materials of any nature and shall establish regular intervals of collection and disposal of such materials and waste. The CONTRACTOR shall also keep its haul roads free from dirt, rubbish, and unnecessary obstructions resulting from its operations. Disposal of rubbish and surplus materials shall be off the Site in accordance with local codes and ordinances governing locations and methods of disposal and in conformance with applicable safety laws and the particular requirements of Part 1926 of the OSHA Safety and Health Standards for Construction.

1.8 **CHEMICALS**

A. Chemicals used on the WORK or furnished for facility operation, whether defoliant, soil sterilant, herbicide, pesticide, disinfectant, polymer, reactant, or of other classification, shall show approval of either the U.S. Environmental Protection Agency or the U.S. Department of Agriculture. Use of such chemicals and disposal of residues shall be in strict accordance with the printed instructions of the manufacturer.

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION (NOT USED)

- END OF SECTION -

SECTION 02711 – RIPRAP

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. The CONTRACTOR shall furnish and place riprap in accordance with these specifications and in conformity to lines, grades and thickness shown on the plans or as directed.

1.2 REFERENCE STANDARDS

A. American Association of State Highway and Transportation Officials (AASHTO)

AASHTO T85 Specific Gravity and Absorption of Coarse Aggregate

B. Louisiana Department of Transportation and Development (LDOTD)

AML Approved Materials List

1.3 CONTRACTOR SUBMITTALS, SAMPLING, AND TESTING

A. The CONTRACTOR shall furnish submittals in accordance with Section 01010.

B. Materials proposed for and utilized in the WORK will be sampled as indicated in herein. The frequency of testing may be altered at the discretion of the ENGINEER. The CONTRACTOR shall provide all materials required for testing at no additional cost to the OWNER.

C. **Submittal/Source Approval:** The CONTRACTOR shall submit the location and name of the proposed rip – rap supplier as well as evidence of listing of the source on the LDOTD AML (formerly QPL 2).

D. **Submittal/Source Approval:** If geotextile fabric is specified, the CONTRACTOR shall provide submittals as detailed in Section 02200 – Earthwork.

E. **Sampling/Acceptance:** At the option of the ENGINEER, the CONTRACTOR shall submit a sample of rip rap for gradation testing to confirm compliance with these specifications. The ENGINEER shall have the option of inspecting rip – rap at the source prior to delivery.

PART 2 -- PRODUCTS

2.1 MATERIALS

A. Stone riprap shall be from an approved source listed in the LDOTD AML (formerly QPL 2). Stone riprap shall not disintegrate upon exposure to the elements or be easily broken from handling, shall be reasonably free from earth and other foreign materials. When tested in accordance with AASHTO T 85, the solid weight of stone shall be at least 155 pounds per cubic foot (based on bulk specific gravity). The least dimension of any individual stone shall be 1/3 its maximum dimension. Each shipment of stone shall be reasonably well graded within specified limits.

B. Recycled concrete may be used as riprap unless otherwise indicated herein provided its solid weight is at least 155 pounds per cubic foot (based on bulk specific gravity) and it is free of protruding reinforcement.

C. Stockpiles of recycled concrete shall be source approved prior to use and kept separate from other materials. Stockpiles shall be uniform and free of soil, debris, excessive amounts of asphaltic materials, and foreign matter. Once a stockpile has been approved as an acceptable source of material, no material shall be added without prior approval.

D. Control of gradation will be by visual inspection at the source, project site or both.

E. Any difference of opinion between the ENGINEER and CONTRACTOR will be resolved by checking the gradation of two random truckloads (or equivalent size samples). Equipment, labor and sorting site shall be furnished by the CONTRACTOR at no additional cost to the OWNER.

F. **Riprap**: Riprap shall be reasonably well graded and shall comply with Table 02711-1.

G. **Geotextile Fabric:** Geotextile Fabric shall comply with Section 02200 – Earthwork.

Table 02711-1

Riprap Class [1]	Stone Size lb	Spherical Diameter, ft [2]	Percent of Store Smaller Than
55 lb (25 kg) [3]	275	1.50	100
	110	1.11	42-100
	55	0.88	15-50
	20	0.63	0-15

[1]The stone size used to define the Riprap Class is the minimum median stone size for the stone class. The minimum thickness of a riprap layer shall be no less than the spherical diameter of the maximum stone size in Riprap Class.
[2]Spherical diameters of riprap classes up to 30 lb are based on a solid weight of 140 lb/cu ft . Spherical diameters of riprap classes above 30 lb are based on a solid weight of 155 lb/cu ft.
[3]Recycled Portland cement concrete may not be used in these riprap classes.

PART 3 -- EXECUTION

3.1 CONSTRUCTION REQUIREMENTS

A. **Riprap:** Areas on which riprap is to be placed shall be graded to the required section. Riprap shall be placed on the prepared slope or area in a manner which will produce a reasonably well-graded mass of stone with a minimum practicable percentage of voids. The entire mass of stone will be placed to be in conformance with the lines, grades, and thickness at one operation and to avoid displacing underlying material. Placing of riprap in layers, or dumping into chutes, or by similar methods likely to cause segregation, will not be permitted.

B. When placement in water currents is required, the CONTRACTOR shall make drift checks and place riprap in such manner as to compensate for drift. The CONTRACTOR shall furnish necessary facilities and personnel for checking riprap depth and distribution.

C. **Filter Stone:** When specified, filter stone shall be placed on the prepared slope or area before placement of riprap. When filter stone is placed under water, free dumping will not be permitted. Underwater placement shall be controlled by methods using bottom dump

buckets or wire rope baskets lowered through the water to the point of placement. If placement in strong water currents is required, placement of riprap will follow soon after placement of filter stone. Unless shown otherwise on the plans or directed, filter stone shall be Riprap (Class 10 lb) or less.

D. **Geotextile Fabric:** When specified, geotextile fabric shall be placed on the prepared slope or area in accordance with Section 02200 - Earthwork before placement or riprap. Care shall be taken not to damage the geotextile fabric when placing riprap. Placing riprap by rolling riprap down slope, or dropping riprap from extreme heights, or by similar methods likely to damage geotextile fabric, will not be permitted. Damaged geotextile fabric shall be replaced in accordance with Section 02200 – Earthwork or as directed by the ENGINEER.

- END OF SECTION –

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SECTION 02717 – SEEDING

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. The CONTRACTOR shall seed all areas affected by construction.

B. Unless otherwise specified, seed shall be applied mechanically in a dry condition.

C. The CONTRACTOR shall obtain the services of an established soil testing entity to coordinate soil sampling, perform testing and analyses, and prepare recommendations for materials and procedures to be used during the preplanting phase of new turf establishment. When practicable, soil testing shall be performed early enough to permit agricultural lime or other additives (if required) to be applied sufficiently in advance of planting so that the soil pH adjustment will occur before planting. Samples shall be tested and analyzed to determine pH and fertility conditions. The test results and recommendations shall be used to determine the quantities of agricultural lime and fertilizer required for preplanting applications. A copy of the test report with recommendations shall be furnished to the ENGINEER. Testing will be at no direct pay. Agricultural lime recommendations shall consider probable time of application.

1.2 REFERENCE STANDARDS

A. NOT USED

1.3 CONTRACTOR SUBMITTALS, SAMPLING, AND TESTING

A. The CONTRACTOR shall furnish submittals in accordance with Section 01010.

B. Materials proposed for and utilized in the WORK will be sampled as indicated in herein. The frequency of testing may be altered at the discretion of the ENGINEER. The CONTRACTOR shall provide all materials required for testing at no additional cost to the OWNER.

C. **Source Approval/Submittal:** The CONTRACTOR shall submit product information on all seeding products to be utilized or incorporated into the WORK. The submittal for source approval shall include information on chemical properties, compliance with applicable standards, and any other information required sufficient for the ENGINEER to review the acceptability of the proposed products.

1.4 QUALITY ASSURANCE

A. NOT USED

1.5 DELIVERY, STORAGE, AND HANDLING:

A. NOT USED

PART 2 -- PRODUCTS

2.1 TOPSOIL

A. Areas to be seeded shall be covered with 2” of top soil per Section 02200.

2.2 **FERTILIZER**

A. Fertilizer shall be as specified in Section 02718 – Fertilizer and Agricultural Lime.

2.3 **AGRICULTURAL LIME**

A. Agricultural Lime shall be as specified in Section 02718 – Fertilizer and Agricultural Lime.

2.4 **SEED**

A. Seed shall comply with requirements of Louisiana law. minimum percentage of pure live seed and the maximum percentage of weed seed permitted shall be in accordance with the table below:

Variety	**Minimum Percent of Pure Live Seed (Purity Times Germination Including Hard Seed by Count)**	**Maximum Percent of Weed Seed by Count**
Hulled Bermuda	83	1
Pensacola Bahia	81	2
Crimson Clover	78	1
Kentucky 31 Fescue	80	1
Unhulled Bermuda	80	1
Ball Clover	80	1
Vetch	80	1
Lespedeza	80	1
Annual Rye	80	1
Browntop Mullet	80	1

B. Each variety of seed shall be furnished and delivered in separate bags or other containers. Each bag or container shall bear an analysis tag which is a minimum No. 6 standard shipping tag having all information required by the Louisiana Seed Law.

C. Seed furnished shall be the previous season's crop (the last crop year for the crop kind in question) and the date of analysis shown on each tag shall be within 5 months (excluding the month in which the test is completed) of the time of delivery to the project. Noxious weeds shall be interpreted to mean that list of weeds, except Bermuda, which has been adopted by the Louisiana Seed Commission as being noxious in Louisiana. Noxious weed seeds shall not exceed the limitations prescribed in the regulations and in no case shall they exceed 500 per pound. Analysis tags shall be removed from each bag or container only by the ENGINEER or an authorized representative.

PART 3 -- EXECUTION

3.1 SOIL AREAS AND SEED SELECTION

A. The CONTRACTOR's seed supplier shall recommend and select seed mixture on the basis of the five general areas described below and the time of planting. Seed mixtures, soil areas, and planting and establishment dates are detailed in the table below.

1) Area 1 – Alluvial Soils of Mississippi and Red River Bottoms

2) Area 2 – Mississippi Terraces and Loessial Soils

3) Area 3 – Coastal Plan Soils

4) Area 4 - Coastal Prairie Soils

5) Area 5 - Ouachita River Bottom

Type	Seed Mixture	Minimum Pounds per Acre (Respectively)	Soil Area	Planting Dates	Establishment Period
A	Hulled Bermuda	30	1,2,3,4,5	Mar – Sep	Mar – Dec
B	Hulled Bermuda, Crimson Clover	20, 25	1,2,3,5	Feb – Mar	Feb – Jun
C	Kentucky 31 Fescue, Unhulled Bermuda	25,20	1,2,3,4,5	Sep – Feb	Sep – May
D	Unhulled Bermuda, Crimson Clover	20, 40	1,2,3,4,5	Sep – Feb	Sep – May
E	Pensacola Bahia	25	1,2,3,5	Mar – Sep	Mar – Dec
F	Ball Clover, Unhulled Bermuda	25, 20	1,2,3,4,5	Feb – Mar	Feb – Jun
G	Vetch, Unhulled Bermuda	40, 20	1,2,3,4,5	Sep – Oct	Sep – Jan
H	Annual Rye	30	1,2,3,4,5	Sep - Jan	Sep – Apr

3.2 PREPARATION OF SEED BED

A. Seed beds shall be prepared by disking, harrowing or other approved methods. Soil on slopes of 3- horizontal-to-1-vertical and flatter shall be tilled to a minimum of 4 inches depth. On slopes between 3-horizontal-to-1-vertical and 1- horizontal-to-1 vertical, the soil shall be tilled to a minimum of 2 inches depth by scarifying with heavy rakes, or other methods. Rototillers may be used where soil conditions and length of slope permit. On slopes 1- horizontal-to-1-vertical and steeper, no tillage is required. Drainage patterns shall be maintained as indicated on the plans. Areas compacted by construction operations shall be completely pulverized by tillage. Soil used for repair of surface erosion or grade deficiencies shall conform to topsoil requirements. The pH adjuster, fertilizer, and soil conditioner may be applied during this procedure. The prepared surface shall be a maximum 1 inch below the adjoining grade of any surfaced area. New surfaces shall be blended to existing areas. The prepared surface shall be completed with a light raking to remove debris.

B. **Lawn Area Debris:** Debris and stones over a maximum of 5/8- inch in any dimension shall be removed from surfaces designated on the plans as lawn areas or as directed by the ENGINEER.

C. **Field Area Debris:** Debris and stones over a maximum of 3-inches in any dimension shall be removed from the surface

D. **Protection:** Prepared surface areas shall be protected from compaction or damage by vehicular or pedestrian traffic and surface erosion.

3.3 PERMANENT SEEDING

A. Seed shall be planted within the dates specified above, unless otherwise directed or permitted by the ENGINEER.

3.4 WATERING

A. When deemed necessary due to dry conditions, seeded areas shall be periodically watered until final acceptance at no direct pay.

3.5 SEED ESTABLISHMENT PERIOD

A. Turf will be considered to be established and completed when the areas to be turfed have produced Bermuda grass stems or runners which overlap adjacent Bermuda grass growth over a minimum of 85 percent of the entire area as determined by the ENGINEER by random sampling on a square yard basis and when the areas to be turfed have no spots greater than 4 square feet that are void of Bermuda grass.

B. Acceptance of the entire turfed area will be based on the ENGINEER's visual inspection and determination of the required coverage. Acceptance will be based on coverage by Bermuda grass only. Dying or dead turf and eroded areas will not be accepted. Partial areas will not be accepted unless determined by the ENGINEER to be in the best interest of the OWNER.

- END OF SECTION -

SECTION 02727 - MOBILIZATION

PART 1 -- GENERAL

1.1 GENERAL

A. CONTRACTOR shall mobilize as required for the proper performance and completion of the WORK and in accordance with the Contract Documents.

B. Mobilization shall include at least the following items:

1. Moving onto the Site of CONTRACTOR's plant and equipment necessary for the first month of operations.

2. Installing temporary construction power, wiring, and lighting facilities.

3. Establishing fire protection system.

4. Developing construction water supply.

5. Providing on-Site sanitary facilities and potable water facilities.

6. Arranging for and erection of CONTRACTOR's WORK and storage yards.

7. Constructing and implementing security features and requirements as specified.

8. Obtaining required permits.

9. Having OSHA required notices and establishing safety programs.

10. Having the CONTRACTOR's superintendent at the Site full time.

11. Submitting initial submittals.

1.2 PAYMENT FOR MOBILIZATION

A. The CONTRACTOR's attention is directed to the condition that no payment for mobilization, or any part thereof, will be recommended for payment under the Contract until mobilization items listed above have been completed.

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION (NOT USED)

- END OF SECTION –

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SECTION 02740 – CONSTRUCTION LAYOUT

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. The CONTRACTOR shall establish all lines and grades, take all cross sections, and stake out the construction work in accordance with these specifications, plan details, and as directed.

1.2 REFERENCE STANDARDS

A. NOT USED

1.3 CONTRACTOR SUBMITTALS, SAMPLING, AND TESTING

A. NOT USED

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION

3.1 GENERAL

A. The CONTRACTOR shall establish all lines and grades and stake out all work, including sufficient vertical and horizontal points for all necessary operations.

B. The ENGINEER will also provide one bench mark on or near the project for vertical control. The CONTRACTOR shall verify the values of any intermediate bench marks shown on the plans, by checking against the bench mark established by the ENGINEER for vertical control.

C. The CONTRACTOR shall employ qualified engineering and surveying personnel experienced in layout of the type of work of this project to correctly establish and keep complete and comprehensive records of all lines and grades necessary from initial layout to final acceptance. The CONTRACTOR shall provide sufficient qualified staff, of at least one employee, on site during utility relocation periods. The CONTRACTOR shall provide any necessary survey work to ensure there are no utility conflicts with required construction. The CONTRACTOR shall provide daily documentation of utility relocation activities for incorporation into the project diaries.

D. The CONTRACTOR shall be liable for the accuracy of the initial layout and all subsequent alignment and elevations and shall, at no additional cost to OWNER, 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.

- END OF SECTION -

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SECTION 02804 – DRIVEN PILES

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. The CONTRACTOR shall provide driven piles, complete and in place, in accordance with the requirements of the Contract Documents.

1.2 REFERENCE STANDARDS

A. American Association of State Highway and Transportation Officials (AASHTO)

AASHTO M270	Standard Specification for Structural Steel for Bridges

B. ASTM International (ASTM)

ASTM D 25	Standard Specification for Round Timber Piles
ASTM D 173	Standard Specification for Bitumen Saturated Cotton Fabrics Used in Roofing and Waterproofing

C. American Wood Protection Association (AWPA)

AWPA C1	Preservative Treatment by Pressure Process
AWPA C3	Piles – Preservative Treatment by Pressure Process
AWPA M4	Standard for the Care of Preservative – Treated Wood Products
AWPA P1	Standard for Creosote Preservative
AWPA P2	Standard for Creosote Solutions
AWPA P3	Standard for Creosote – Petroleum Oil Solution
AWPA P5	Standard for Waterborne Preservatives
AWPA P8	Standard for Oil – Borne Preservatives
AWPA P9	Standard for Solvents and Formulations for Organic Preservative Systems

1.3 SUBSURFACE CONDITIONS

A. A geotechnical engineering study has been performed for the site. Copies of pertinent reports are included as an Appendix to the Contract Documents and Technical Specifications. The CONTRACTOR shall understand and conform to all recommendations and criteria associated with pile foundations given in this report.

B. The CONTRACTOR shall visit the site and shall satisfy itself as to all existing surface and subsurface conditions affecting its WORK. The information provided in the geotechnical engineering report is available to the CONTRACTOR to assist it, at its own risk, in its assessment of subsurface conditions at the site. Prior to bidding, interested

parties may make their own subsurface investigations to satisfy themselves as to site and subsurface conditions, but such subsurface investigations shall be performed only under time schedules and arrangements approved in advance by the OWNER.

1.4 SUBMITTALS, SAMPLING, AND TESTING

A. The CONTRACTOR shall furnish submittals in accordance with Section 01010.

B. The CONTRACTOR shall submit the following:

1. Pile Driving Plan: The CONTRACTOR shall submit a description of the proposed pile driving system, which includes the pile driving equipment to be furnished by the CONTRACTOR and the method of pile installation in the form of a Pile Installation Plan for review by the ENGINEER. The pile driving equipment and the pile installation method shall be such that piles will obtain the required penetration without damage. In no case shall the pile driving equipment be transported to the project site until approval is received in writing. Any parts of the CONTRACTOR's submittal that are unacceptable will be rejected and the CONTRACTOR will resubmit changes agreed upon for reevaluation. The ENGINEER will notify the CONTRACTOR, within seven calendar days after receipt of proposed changes, of their acceptance or rejection. The time required for submission, review, and approval of a revised pile driving system shall not constitute the basis for a contract time extension by the CONTRACTOR. All approvals given by the ENGINEER shall be subject to trial and satisfactory performance in the field. The CONTRACTOR shall use the approved pile driving system during pile driving operations. The CONTRACTOR shall make any required changes, including supplying additional hammers, that may result from unsatisfactory field performance. Final acceptance will be given after necessary modifications are made. No changes in the driving system or installation method may be made after final approval without the written approval of the ENGINEER. The pile installation plan shall provide detailed information pertaining to the pile driving equipment and method of piling installation. The submittal shall include at a minimum the following information:

a. A detailed list detailing the type and size of the proposed pile driving equipment, including hammer, leads, jetting equipment, compressors and drilling equipment for pre-boring. Include hammer manufacturer's operating manual and compressor data sheets. If a mandrel is used to install piles, a complete description shall be provided including size and weight of components.

b. Proposed pile driving methods that may be required to facilitate pile driving installation such as pre-boring or jetting.

c. Methods to determine hammer energy in the field for determination of the pile bearing capacity. When pressure measuring equipment will be used to determine hammer energy, the submittal shall include hose length, hose diameter, equivalent energy charts, and calibrations.

d. Pile driving sequence for each unique pile layout configuration.

2. **Timber Pile Information:** The CONTRACTOR shall submit information regarding pile dimensions, source, treatment, and other information as required by the ENGINEER. The information shall contain a physical address for where piles to be utilized are located to facilitate inspection prior to shipment.

C. Materials proposed for and utilized in the WORK will be sampled or inspected as indicated in herein.

1. Prior of shipment of the piles to the site, the CONTRACTOR shall arrange for the inspection of the piles proposed for the WORK by the Testing Laboratory. The Testing Laboratory will inspect the piles at their location for dimensional compliance with specifications, for preservative retention, and will mark piles which are found to be acceptable for use.

2. Upon arrival at the site, the Testing Laboratory will inspect the piles delivered to the site to verify that they are the piles which were proposed and marked as acceptable for use.

3. The Testing Laboratory will take blow counts during the installation of the piles. This information will be provided to the CONTRACTOR and ENGINEER, but the Testing Laboratory will make no evaluation of the pile driving operation.

PART 2 -- PRODUCTS

2.1 PILE LENGTHS

A. The CONTRACTOR shall furnish piles in accordance with the plans, which show the number, size, length, and location of all permanent piles. The lengths shown on the plans will be based upon the lengths that are assumed to remain in the completed structure. At the CONTRACTOR's expense, the pile lengths shall be increased as required to provide for fresh heading and for such additional length as required to suit the CONTRACTOR's method of operation. When test piles or indicator piles are required, the pile lengths shown on the plans ware for estimating purposes. The ENGINEER may revise pile lengths when driving conditions differ from those in design.

2.2 TIMBER PILES

A. Timber piles shall be Southern Yellow Pine or Douglas Fir and shall comply with ASTM D 25, except that the table below shall be used in lieu of Tables I and II in ASTM D 25.

Circumference and Diameters of Timber Piles (Measurements shall be taken with bark removed)						
Length, Feet	3 Feet from Butt, Inches				At Tip, Inches	
	Minimum		Maximum		Minimum	
	Circumference	Diameter (Approx)	Circumference	Diameter (Approx)	Circumference	Diameter (Approx)
Under 40	38	12	63	20	25	8
40 to 54 Inclusive	38	12	63	20	22	7
55 to 74 Inclusive	41	13	63	20	22	7

B. All timber piles shall be treated with timber preservative. The type preservatives to be used are as follows:

1. Creosote: Creosote for land, fresh, and coastal water use shall comply with AWPA P1/P3.

2. Creosote Solutions: Creosote solutions for fresh and coastal water shall comply with AWPA P2.

3. Pentachlorophenol – Petroleum Solution: Pentachlorophenol – Petroleum solution shall comply with AWPA P8 and P9.

4. Chromated Copper Arsenate: Chromated Copper Arsenate shall comply with AWPA P5, Type B or C.

5. Creosote for Field Repairs: Creosote for field repair shall comply with AWPA M4.

C. Treatment of Timber Piles: Piles shall be treated according to current AWPA Standard Specifications for Preservative Treatment by Pressure Process C1 and C3, modified as indicated herein. Kiln – dried timber shall be steamed prior to treatment for a minimum of two hours. The amount of preservative shall be as indicated in the Minimum Preservative Retention Table below. The amount of preservative shall be determined by assay. The assay zone shall be as specified in the AWPA standards. All penetration requirements of the AWPA standards shall be met. Treating reports shall be forwarded to the ENGINEER upon request and may be utilized for acceptance at the discretion of the ENGINEER. Material treated with CCA shall be conditioned by kiln – drying prior to treatment.

Minimum Preservative Retention Table for Timber Piles (Pounds per Cubic Foot of Wood)				
Material and Usage	Creosote	Creosote Solutions	Pentachlorophenol	Chromated Copper Arsenate
Foundation Piles (Piles which are Embedded in the Ground and Capped with Concrete)				
Land and Fresh Water, Southern Pine	12.0	12.0	0.60	0.80
Land and Fresh Water, Douglas Fir	17.0	17.0	0.85	N/A

PART 3 -- EXECUTION

3.1 GENERAL

A. Hammers: Piles may be driven with either diesel hammers or external combustion hammers (ECH) such as hammers driven by steam, air, or hydraulic power. Non-impact hammers such as vibratory hammers shall not be used unless specified in the plans or permitted in writing by the ENGINEER. Hammers shall be rated based on the theoretical potential energy of the ram at impact. A variable energy hammer shall be used to drive precast concrete piles.

1. **Steam and Air Hammers**: Steam and air hammers that are used to drive precast concrete piles shall be capable of providing at least two ram stroke lengths. The short ram stroke length shall be approximately half of the full stroke. Reductions in steam or air pressures to produce reduced hammer strokes will not be permitted. In lieu of a variable energy hammer, the CONTRACTOR may propose in the Pile Installation Plan the use of multiple hammers of different rated energies to drive precast concrete piles. The plant and equipment furnished for steam and air hammers shall have sufficient capacity to maintain the hammer at the volume and pressure specified by the manufacturer. The plant and equipment shall be equipped with accurate pressure gauges that are easily accessible for viewing by the ENGINEER. The weight of the striking parts of air and steam hammers shall not be less than 1/3 the weight of drive head and pile being driven, and in no case shall the striking parts weight less than 2,750 pounds.

2. **Open-End Diesel Hammers**: Open-end diesel hammers used to drive precast concrete piles shall be capable of providing a selection of at least three fuel settings that will produce varying stroke lengths. The CONTRACTOR shall provide the ENGINEER a chart from the hammer manufacturer equating stroke in feet and blows per minute. The CONTRACTOR shall have available on-site an approved device to determine and display ram stroke in feet of an open-end diesel hammer. The device used to determine the hammer stroke shall be periodically verified as determined by the ENGINEER by comparing the computed hammer stroke with the observed stroke on rams that have rings on the ram or by placing a temporary scale extending above the ram cylinder.

3. **Closed-End Diesel Hammers**: Closed-end diesel hammers used to drive precast concrete piles shall be capable of providing a selection of at least three fuel settings that will produce varying stroke lengths. Closed – end (double acting) diesel hammers shall be equipped with a bounce chamber pressure gauge mounted to be easily accessible by the ENGINEER. The CONTRACTOR shall provide the ENGINEER a chart, calibrated to actual hammer performance, equating bounce chamber pressure to either equivalent energy or stroke for the closed-end diesel hammer to be used. The calibration between bounce chamber pressure and actual hammer performance should be performed within 30 calendar days prior to starting driving and at 90 calendar day intervals thereafter.

4. **Hydraulic Impact Hammers**: The power plant and equipment furnished for hydraulic hammers shall have sufficient capacity to maintain the hammer at the volume and pressure specified by the manufacturer. The power plant and equipment shall be equipped with accurate pressure gauges that are easily accessible to the ENGINEER. These hammers shall be equipped with sensors or other approved devices capable of monitoring and displaying hammer performance.

5. **Gravity Hammers**: Gravity hammers, if permitted in the contract, shall only be used to drive timber piles. When gravity hammers are permitted, the ram shall weight between 2,000 and 3,300 pounds and the height of drop shall not exceed 10 feet. In no case shall the weight of gravity hammers be less than the combined weight of helmet and pile. All gravity hammers shall be equipped with hammer guides to ensure concentric impact on the helmet.

B. Drive System Components and Accessories:

1. **Hammer Cushion:** All impact pile driving equipment designed to be used with a hammer cushion shall be equipped with a suitable thickness of hammer cushion material to prevent damage to the hammer or pile and to ensure uniform driving

behavior. Hammer cushions shall be made of durable, manufactured materials, provided in accordance with the hammer manufacturer's guidelines. Wood, wire rope, and asbestos hammer cushions shall not be used unless permitted by the ENGINEER. A striker plate as recommended by the hammer manufacturer shall be placed on the hammer cushion to ensure uniform compression of the cushion material. The hammer cushion shall be inspected in the presence of the ENGINEER when beginning pile driving at each structure and after every 100 hours of use during pile driving operations. The CONTRACTOR shall replace the cushion when the hammer cushion begins to deteriorate or when the reduction in thickness exceeds 25 percent of the original thickness.

2. **Helmet:** Piles driven with impact hammers require an adequate helmet or drive head to distribute the hammer blow to the pile head. The helmet shall be axially aligned with the hammer and the pile. The helmet shall be guided by the leads and not be free-swinging. The helmet shall fit around the pile head in such a manner as to prevent transfer of torsional forces during driving, while maintaining proper alignment of hammer and pile.

3. **Pile Cushion**: A pile cushion shall protect the heads of precast concrete piles. The pile cushion shall be made of plywood, hardwood, or a composite plywood and hardwood material. The minimum pile cushion thickness placed on the pile head prior to driving shall not be less than 4 inches. The pile cushion dimensions shall match the cross sectional area of the pile top. A new pile shall be provided for each pile driven unless otherwise permitted by the ENGINEER. The pile cushion shall be replaced during pile driving when the cushion begins to deteriorate or burn. Pile bearing capacity shall not be determined using a new pile cushion until after the pile has been driven a minimum of 5 feet or 100 blows. When easy driving conditions exist throughout the entire depth of driving, the ENGINEER may allow the pile cushion to be reused on several piles after guidelines for pile cushion replacement are developed from successful field performance. The objective shall be to maintain consistent energy delivery at the end-of-driving for proper determination of the pile bearing capacity without pile damage.

4. **Leads:** Piles shall be supported in line and position with leads while being driven. Pile driver leads shall be constructed in a manner that affords freedom of movement of the hammer while maintaining alignment of the hammer and the pile to ensure concentric impact for each blow. Leads may be either fixed, semi-fixed or swinging types. Swinging leads shall be used in combination with a rigid template providing pile support meeting the approval of the ENGINEER. The pile section being driven shall not extend above the leads. The leads shall be of sufficient length to make the use of followers unnecessary and shall be so designed as to permit proper alignment of batter piles.

5. **Templates:** A rigid template shall be used swinging leads are used. When driving battered piles with swinging leads, the template shall be two tiered or equipped with cradles to hold the pile at the required batter, and the bottom of the leads shall be attached to the template. Template construction shall allow the pile to pass freely through the template without binding.

C. Piles shall be accurately located and driven either vertically or to the prescribed batter as shown. No variation greater than 1/4-inch per foot will be permitted. Piles with greater variation and those seriously damaged in driving shall be removed or cut off, and replaced with new piles. Any pile heaved by the subsequent driving of adjacent piles shall be re-driven. Piles, after driving, shall not be out of position by more than 6 inches. All correction costs shall be paid by the CONTRACTOR.

3.2 PREPERATION FOR INSTALLATION OF DRIVEN PILES

A. Excavation: Piles shall not be driven until after any required excavation is complete. Any material forced up between the piles shall be removed to the correct elevation before concrete for the foundation is placed.

B. Embankment Fill: The full height of embankments shall be constructed prior to dricing piles. Piles to be driven through compacted embankment greater than 6 feet shall be driven through pre-bored holes limited to the depth of the embankment.

C. Cofferdams: Prior to driving any piles the CONTRACTOR shall ensure the cofferdam is stable by monitoring the external stability of the ground outside of the cofferdam, wall inclination, and depth of excavation within the cofferdam. All excavation within the cofferdam shall be complete prior to driving piles. The depth of the excavation within the cofferdam shall be inspected for proper depth with a weighted line or other approved method.

3.3 PILING PREPARATION

A. Transportation of Precast Concrete Piling: Precast concrete piling shall be supported adequately to prevent damage during transport.

B. Collars: Collars, bands, or other approved devices to protect timber piles against splitting or brooming shall be provided when necessary, or as required by the ENGINEER.

C. Painting of Piling: When required by the plans, the foundation piling will be painted. The area of steel piles or the exterior surface of the steel shell of cast-in-place concrete piles, as specified in the plans shall be cleaned and painted from the top of the pile to a point 10 feet below the ground or mudline. The paint system shall be a 2-coat coal tar epoxy in accordance with Section 09800 – Protective Coatings.

D. Supporting Holes for Piles: When approved, piles may be set in supporting holes, but in no case shall the depth of the holes be more than 10 feet for piles up to 50 feet long, or more than 20 percent of the designated penetration of the piles for piles over 50 feet long. If additional support is required, templates or falsework above ground shall be furnished. After piles are driven, supporting holes shall be backfilled to finished ground or base of footing with granular-type material acceptable to the ENGINEER and saturated with water.

E. Splicing Piles:

1. Precast Concrete Piles: Precast concrete piles shall be furnished and driven in full lengths, unless otherwise specified in the plans or approved in writing by the ENGINEER. There will be no direct payment for splicing.

2. Steel Piles: Steel piles shall be furnished and driven in full lengths unless splices are authorized. Splices shall be limited to two field splices per pile. Splicing of steel piles shall be made by welding with full penetration welds as specified below:

1. **Structural Steel Shapes:** Welding of structural steel shapes shall comply with the latest edition of ANSI/AASHTO/AWS D1.5 Bridge Welding Code. All minimum preheat and interpass temperatures in this code that are less than 125 F shall be amended to be a minimum of 125 F.

2. **Tubular Members:** Welding of steel pipe and tubular members shall comply with the latest edition of ANSI/AWS D1.1 Structural Welding Code – Steel. All minimum preheat and interpass temperatures in this code that are less than 125 F shall be amended to be a minimum of 125 F.

3. Timber Piles: Timber piles shall be furnished and driven full length.

4. Cast – in – Place Concrete Pile Shells: Cast – in – place concrete shells may be field spliced, but sections that in the opinion of the ENGINEER are too short shall not be used. Field splices of shell sections shall be made in accordance with the manufacturer's recommendations and to the satisfaction of the ENGINEER.

5. Pickup Straps: Pickup straps shall be cutoff and epoxy grouted prior to driving in coastal areas.

3.4 CONSTRUCTION REQUIREMENTS

A. Pre-boring: Pre-boring by augering, wet-rotary drilling, or other methods used to facilitate pile driving will not be permitted unless specified in the plans or specifications or required by the ENGINEER. When the soil investigation or field trials indicate impenetrable material above the minimum pile tip elevation, pre-boring may be required to facilitate pile driving. The use of spuds to punch through impenetrable soil layers shall not be permitted without approval. The depth of the prebored hole shall be developed so as to minimize the pile skin friction disturbance and still be sufficient to permit pile installation to the required pile tip elevation. Preboring procedures shall be carried out in a manner that will not impair the capacity of the piles already in place or the safety of existing structures. The CONTRACTOR shall develop the preboring depth limits based on the soil information obtained from soil boring logs and submit the limits to the ENGINEER for approval. The maximum prebored depth shall be 3 feet above pile tip elevation, unless otherwise directed. Prebored holes shall have a maximum diameter of 80 to percent of the pile diameter unless written approval to do otherwise is received from the ENGINEER. The prebored hole diameter for tapered piles shall be determined by the ENGINEER. Upon completion of the preboring, any voids around the pile shall be filled with granular-type material acceptable to the ENGINEER and saturated with water. The CONTRACTOR is responsible for any and all effects due to preboring.

B. Jetting: Jetting will not be permitted unless allowed in the plans or required by the ENGINEER. Jetting will not be allowed in footings, header banks, or where stability of embankments or other structures would be endangered unless approved in writing by the ENGINEER. When the soil investigation or field trials indicate impenetrable material above the minimum pile tip elevation, jetting may be required to facilitate pile driving. The jet pipe penetration limit shall be developed to minimize the pile skin friction disturbance and still be sufficient to permit pile installation to the required pile tip elevation. The CONTRACTOR shall develop the jet pipe penetration limits based on soil information obtained from soil boring logs and shall submit the limits to the ENGINEER for approval. The maximum jet penetration limit shall be 5 feet above the required pile tip elevation. Extending the maximum jet penetration limit will require written approval by the ENGINEER.

C. When water jets are permitted, the jetting procedures shall be carried out in a manner which will not impair the capacity of the piles already in place or the safety of existing structures or create a crater around the pile causing it to drift. The CONTRACTOR shall be responsible for all damage to the site caused by unapproved or improper jetting operations. The number and size of jets and the volume and pressure of water at jet nozzles shall be sufficient to erode material adjacent to the pile but not disturb the soil

bearing material within 5 feet of the required pile tip penetration. The jetting plant shall have sufficient capacity to deliver at all times a pressure equivalent to at least 100 psi at two 0.75 inch jet nozzles. One jet pipe will be allowed only when the CONTRACTOR is pre-jetting a hole prior to placing and driving the pile or when driving is interrupted and the jet is placed inside a steel pipe pile or a voided concrete pile. A minimum of two jets will be required when piles are jetted and driven concurrently using external jets. When jetting and driving is required, the jets shall be above the advancing pile tip approximately 3 feet, or as approved by the ENGINEER. Jetting operations shall cease when the jet penetration limit is reached, and the pile shall then be driven with the approved impact hammer to the final pile tip penetration. The pile bearing capacity shall be determined only from the results of driving after the jets have been withdrawn. The CONTRACTOR shall control, treat if necessary, and dispose of all jet water in a manner satisfactory to the ENGINEER. Upon completion of jetting a pile, any voids around the pile shall be filled with granular-type material acceptable to the ENGINEER and saturated with water.

D. Followers and Underwater Hammers: Followers or underwater hammers shall only be used when approved in writing by the ENGINEER. When a follower or underwater hammer is permitted, the first pile in each pile group and every tenth pile driven thereafter shall be sufficiently long to permit being driven without a follower or underwater hammer, to verify that adequate pile capacity is being attained to develop the desired end-of-driving pile capacity for the pile group. The determination of the pile bearing capacity shall be made as specified herein using the driving results of the extended piles. No direct payment will be made for cut-off of these extended piles. The follower or underwater hammer and pile shall be held and maintained in equal and proper alignment during driving. The follower shall be of such material and dimensions to permit the piles to be driven to the length determined necessary from the driving of the extended piles. The follower shall be provided with a socket or hood carefully fitted to the pile head to minimize energy losses and prevent pile damage.

E. Location and Alignment Tolerances: Piles shall be driven at locations shown on the plans or as ordered in writing. In pile bents, the centroid of a pile at cut-off elevation shall not vary from plan location by more than 3 inches measured perpendicular to the bent, nor more than 6 inches measured along the centerline of the bent. For footing piles, the centroid of load of any pile at cut-off elevation shall be within a 6 inch radius of a circle having the plan location as its center. No pile shall be nearer than 3 inches from any edge of the cap. Any increases in size of cap to meet these edge distance requirements shall be at the CONTRACTOR'S expense. The final pile head at cut-off elevation shall be plus or minus 2 inches of the final grade shown in the plans. Piles shall be installed so that the axial alignment is within 2 percent of the specified alignment shown in the plans. For piles that cannot be inspected internally after installation, an alignment check shall be made before installing the last 5 feet of pile, or after installation is completed provided the exposed portion of the pile is not less than 5 feet in length. The ENGINEER may require that driving be stopped in order to check the pile alignment. Pulling laterally on piles to correct misalignment, or splicing a properly aligned section on a misaligned section shall not be permitted. If the location and/or alignment tolerances specified herein are exceeded, the CONTRACTOR shall provide the ENGINEER with a sketch showing the actual versus theoretical positions of the piles. If corrective measures are necessary, the CONTRACTOR shall bear all costs, including delays, associated with the corrective action.

F. Installation Sequence: The CONTRACTOR'S approved pile driving sequence to drive individual piles in a footing shall be used unless otherwise directed by the ENGINEER.

The pile driving sequence for individual piles in a footing shall be in accordance with one of the following options:

1. From the center of the pile group outward.
2. By rows from the center of the pile group to the side.
3. By rows from one side of the pile group to the other side.

G. Pile Driving Stresses: The piles shall be driven in a manner as not to exceed the maximum allowable driving stresses. For steel piles, the maximum compressive driving stresses shall not exceed 90 percent of the yield point of the pile material. For timber piles, the compressive driving stress shall not exceed 3600 psi. For precast prestressed concrete piles, the tensile and compressive driving stress in units of psi from the Maximum Allowable Driving Stresses Table below shall not be exceeded.

Maximum Allowable Driving Stresses Table

Tensile Driving Stress (Normal Environments):	
U.S. Units $3\sqrt{f'_c} + f_{pe}$	Metric Units: $0.25\sqrt{f'_c} + f_{pe}$
Tensile Driving Stress (Corrosive Environments):	
U.S. Units f_{pe}	Metric Units f_{pe}
Compressive Driving Stress (All Environments):	
U.S. Units $0.85\ f'_c - f_{pe}$	Metric Units: $0.85\ f'_c - f_{pe}$
f'_c = Concrete Compressive Strength, psi (MPa) f_{pe} = Effective Prestress, psi (MPa)	

H. Extent of Driving: Driving shall be continued until the ENGINEER determines satisfactory penetration and pile bearing capacity have been obtained. Approval from the ENGINEER shall be required to terminate pile driving above the plan tip elevation. Piles shall be driven to the plan tip elevation in accordance with these specifications, unless a minimum pile tip is specified in the plans. If the pile penetration requirements and pile bearing capacity are achieved within 5 feet of the plan pile tip elevation, the ENGINEER may consider the penetration and capacity requirements to be satisfied. The following requirements shall be used to evaluate satisfactory pile penetration and pile bearing capacity.

1. **Pile Driving Penetration Requirements:** Practical refusal blow count depends on the site soil profile, the pile type, and hammer manufacturer limitations to prevent hammer damage. Practical refusal is broadly defined as a rate of 20 blows per inch at maximum stroke, for 3 consecutive inches. However, depending on site conditions, this criterion may not always be applicable. If practical refusal is encountered above the required plan pile tip elevation, the CONTRACTOR may be required to obtain a larger hammer capable of achieving the required penetration, or

to use pile installation techniques to facilitate pile driving such as preboring or jetting. Refusal conditions shall require that the approved hammer is operating at the maximum stroke or fuel setting required to achieve the hammer manufacturer's maximum rated energy. The hammer shall be in proper working order. If the hammer performance needs to be evaluated, the ENGINEER may require dynamic monitoring of the pile driving operations. If the hammer performance indicates that the pile driving system's effective efficiency is not satisfactory, the CONTRACTOR shall be required to adjust the pile driving system until satisfactory performance is observed. The cost of dynamic monitoring and/or delays due to unsatisfactory hammer performance shall be at the CONTRACTOR'S expense. Dynamic monitoring of hammers performing satisfactorily shall be paid for by the OWNER.

2. **Pile Bearing Capacity Requirements:** The pile bearing capacity shall be determined as specified herein. If pile bearing capacity is less than the required end-of-driving pile capacity at cut-off elevation, the ENGINEER has the option of either loading a permanent pile to determine its ultimate pile capacity, continuing to drive the pile until satisfactory resistance is obtained, or perform a pile restrike to check for increase in pile bearing capacity due to soil set-up. The loading procedure of permanent piles shall be in accordance with the requirements of this section. The additional length of pile due to the additional driving shall be furnished in accordance with the construction methods specified herein for pile extensions. Pile restrikes shall be performed as specified herein. If the potential exists for obtaining false pile bearing capacity results due to excess pore water pressure or if this condition was observed during field testing of test piles, indicator piles, or monitor piles, the pile bearing capacity shall be determined from pile restrikes as directed by the ENGINEER.

3. **Pile Restrikes:** Pile restrikes are to be conducted as required for test piles, indicator piles, and production piles or as directed by the ENGINEER. Pile restrikes shall be conducted at no direct pay. The piles to be restruck shall be driven initially to 1 foot above the required pile tip elevation, or as directed by the ENGINEER. All pile restrikes shall be performed with a warm hammer that has applied a minimum of 20 blows to another pile or dummy block immediately before being used to restrike the selected pile. For precast concrete piles, the original pile cushion used during initial driving shall be used. If the original pile cushion used to drive precast concrete piles is no longer in an acceptable condition, another similar used cushion shall be used. The maximum amount of pile penetration required for each pile restrike shall be 6 inches or a maximum of 50 hammer blows. If the required end-of-driving pile capacity is obtained during the restrike of permanent piles, the pile shall be driven to grade. Restrike blow counts shall be measured as the number of hammer blows per increment of 1 inch

4. **Heaved Piles:** Elevations to check on pile heave after driving shall be made at the start of pile driving operations and shall continue until the ENGINEER determines that such checking is no longer required. Elevations shall be taken immediately after the pile has been driven and again after piles within a radius of 15 feet have been driven. If pile heave is observed, level readings referenced to a fixed datum shall be taken on all piles immediately after installation and periodically thereafter as adjacent piles are driven to determine the pile heave range. All end bearing piles that have been heaved more than 1/4 inch shall be redriven to the required resistance or penetration at no direct pay. Concrete shall not be placed in pile casings until all piles in a footing have been driven, or as directed by the ENGINEER.

I. Pile Cut-Offs:

1. Timber Piles: The tops of timber piling which support concrete footings or caps shall be sawed off perpendicular to their axes at the required elevation. When piles support timber caps they shall be sawed to a horizontal plane or to the slope specified, in such manner as to fit the cap. Shimming on tops of piles will not be permitted. Treatment of pile heads shall be as follows:

1. After cutting, pile heads shall be treated to prevent decay. Pile heads to be encased in concrete will not require treatment.

2. Immediately after making final cut-off on treated timber foundation piles, the cut area shall be given two liberal applications of preservative followed by a heavy application of hot roofing pitch or other approved sealer. Heads of treated timber piles in bents or where the cut-off is exposed shall be protected by one of the following methods, as specified. If not specified, galvanized metal coverings shall be used.

3. **Galvanized Metal Coverings:** The sawed surface shall be thoroughly brush coated with two applications of creosote oil, after which there shall be placed two layers of heavy canvas size 20 by 20 inches saturated with hot roofing pitch, followed by a 24 by 24 inches, 28 gage galvanized metal cover. The cover shall be bent down over the pile approximately 45 degrees.

4. **Fabric Covering:** Heads of treated piles shall be covered with alternate layers of hot pitch and loosely woven fabric complying with ASTM D 173, using four applications of pitch and three layers of fabric. The cover shall measure at least 6 inches more in dimension than the diameter of the pile and shall be neatly folded down over the pile and secured by large headed galvanized nails or by binding with at least seven complete turns of galvanized wire securely held in place by large-headed galvanized nails and staples. Edges of fabric projecting below the wire wrapping shall be trimmed to present a workmanlike appearance.

3.5 UNSATISFACTORY PILES

A. The procedure used in driving piles shall not subject them to excessive abuse which produces cracking, crushing or spalling of concrete, splitting, splintering and brooming of timber, or deformation of steel. Manipulation of precast concrete piles to force them into proper position will not be permitted. Any pile found to be unacceptable due to internal defects, by improper driving, driven out of proper location, or driven below required elevation shall be corrected at no direct pay by one of the following methods approved by the ENGINEER:

1. The pile shall be withdrawn and replaced by a new and, if necessary, a longer pile. Additional pile length and/or load testing may be required with no additional compensation due to disturbance of the soil from jetting or other methods used during removal of the pile.

2. A second pile shall be driven adjacent to the defective pile. This may require driving the replacement pile with a batter in order to place the pile head at the plan location.

3. The pile shall be spliced or built up as otherwise provided herein or a sufficient portion of the footing extended to embed the pile.

4. The cap or footing shall be redesigned at no direct pay and shall be approved by the ENGINEER. The CONTRACTOR will not be allowed additional compensation for increased quantities in a bent or footing due to driving additional piles to correct unsatisfactory piles.

3.6 DETERMINATION OF PILE BEARING CAPACITY

A. The pile bearing capacity is the pile capacity obtained during the end-of-driving or pile restrike. The pile bearing capacity determination shall be made by use of the Dynamic Formula, the Wave Equation, or the Test Pile Loading Results as specified in the plans. If the method of pile capacity is not shown on the plans the Dynamic Formula shall be used.

1. **Dynamic Formula:** The pile bearing capacity shall be determined by the ENGINEER, based on the dynamic formula. Piles shall be driven with the approved pile driving equipment to the ordered length or other lengths necessary to obtain the required end-of-driving pile capacity. If the end of driving capacity is not shown on the plans the required pile bearing capacity shall be 3.5 times the pile design load.

   English Dynamic Formula:

$$R = \frac{\left(1.75\sqrt{E_r}\log(10N_b)\right) - 100}{2}$$

R = *Pile Bearing Capacity (Tons)*

E_r = *Manufacturer's Rated Energy at the field observed ram stroke (foot – pounds)*

N_b = *Number of Hammer Blows/Inch*

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SECTION 03315 – GROUT

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. The CONTRACTOR shall provide grout, complete and in place, in accordance with the Contract Documents

B. The following types of grout are specified in this Section:

1. Cement Grout
2. Non-Shrink Grout - Class I (cement based)
3. Non-Shrink Grout - Class II (cement based)
4. Non-Shrink Epoxy Grout
5. Topping Grout and Concrete/Grout Fill

1.2 MODIFICATION BY SPECIAL PROVISIONS

1. The WORK of this section may be affected by requirements contained within the Special Provisions. The CONTRACTOR shall review, understand, and incorporate the requirements contained within the Special Provisions into the WORK of this Section.

1.3 REFERENCE STANDARDS

A. American Association of State Highway and Transportation Officials (AASHTO)

AASHTO M171	Standard Specification for Sheet Materials for Curing Concrete
AASHTO M182	Standard Specification for Burlap Cloth Made from Jute or Kenaf and Cotton Mats

B. ASTM International (ASTM)

ASTM C307	Standard Test Method for Tensile Strength of Chemical – Resistant Mortar, Grouts, and Monolithic Surfaces
ASTM C496	Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens
ASTM C579	Standard Test Method for Compressive Strength of Chemical Resistant Mortars, Grouts, Monolithic Surfaces, and Polymer Concretes
ASTM C580	Standard Test Method for Flexural Strength and Modulus of Elasticity of Chemical – Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes

ASTM C827	Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures
ASTM C882	Standard Test Method for Bond Strength of Epoxy Resin Systems Used with Concrete by Slant Shear
ASTM C939	Standard Test Method for Flow of Grout for Pre-placed Aggregate Concrete (Flow Cone Method)
ASTM C1090	Standard Test Method for Measuring Changes in Height of Cylindrical Specimens of Hydraulic – Cement Grout
ASTM C1107	Standard Specification for Packaged Dry Hydraulic Cement Grout (Nonshrink)

C. International Concrete Repair Institute

Technical Guide for Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays

D. Louisiana Department of Transportation and Development Testing Procedures (LDOTD)

TR 226 Specimens	Making, Field Curing, and Transporting Concrete
TR 230	Curing, Capping, and Determining the Compressive Strength of Molded Concrete Cylinders

1.4 CONTRACTOR SUBMITTALS, SAMPLING, AND TESTING

A. The CONTRACTOR shall furnish submittals in accordance with Section 01010.

B. **Grout (All Types):**

1. **Submittal/Source Approval:** The CONTRACTOR shall submit Manufacturer's literature containing instructions and recommendations on the mixing, handling, placement, curing, and appropriate uses for each type of grout used in the WORK, and location of use. The submittal shall contain a certification that grouts used on the project contain no chlorides or other chemicals that cause corrosion. A certification that non-shrink grout does not contain aluminum, zinc, or magnesium powders as a method of expansion shall be included for non – shrink grouts.

2. **Acceptance:** The CONTRACTOR shall submit a certificate of compliance for all shipments of grout to the WORK.

3. **Verification:** If required by the ENGINEER, compression test specimens will be taken. If required, specimens will be taken at intervals thereafter selected by the ENGINEER. The specimens will be made by the ENGINEER or its representative. Compression tests and fabrication of specimens for cement grout and cement based non-shrink grout will be performed in accordance with ASTM C 1107 - Packaged Dry, Hydraulic-Cement Grout (Nonshrink), at intervals during construction

selected by the ENGINEER. A set of 3 specimens will be made for testing at 7 Days, 28 Days, and each additional time period as appropriate. Compression tests and fabrication of specimens for epoxy grouts will be performed in accordance with ASTM C 579 - Test Methods for Compressive Strength of Chemical-Resistant Mortars and Monolithic Surfacings and Polymer Concretes, Method B, at intervals during construction selected by the ENGINEER. A set of 3 specimens will be made for testing at 7 Days and each earlier time period as appropriate. Compression tests for fabrication of specimens for topping grout and concrete/grout fill will be performed in accordance with LDOTD TR 226. The cost of laboratory tests on grout will be paid by the OWNER except where test results show the grout to be defective. In such case, the CONTRACTOR shall pay for the tests, removal and replacement of Defective Work, and re-testing, all as part of the WORK. The CONTRACTOR shall assist the ENGINEER in obtaining specimens for testing and shall furnish materials necessary for fabricating the test specimens.

PART 2 -- PRODUCTS

2.1 APPLICATION

A. Unless indicated otherwise, grouts shall be provided as listed below whether indicated on the Drawings or not.

Application	Type of Grout
Anchor bolts and reinforcing steel required to be set in grout that is not in high temperature or high fire risk areas.	Epoxy Adhesive per Section 05500
Beam and column (1 or 2 story) base plates less than 16-inches in the least dimension.	Non-Shrink - Class I
Column base plates (greater than 2 story or larger than 16-inches in the least dimension)	Non-Shrink - Class II
Storage tanks and other non-motorized equipment and machinery under 30 horsepower	Non-Shrink - Class I
Filling blockout spaces for embedded items such as railing posts, gate guide frames, etc.	Non-Shrink - Class I (Class II where placement time exceeds 20 min.)
Under precast concrete elements	Non-Shrink - Class II
Toppings and concrete/grout fill less than 3-inches thick	Topping Grout
Toppings and concrete/grout fill greater than 3-inches thick	Minor Concrete, Class R or Class M per Section 03901 – Portland Cement Concrete
Surface repairs	Cement Grout

Repair of holes and defects in concrete members which are not water bearing and not in contact with soil or other fill material	Non-Shrink - Class I
Repair of holes and defects in concrete members which are water bearing or in contact with soil or other fill materials	Non-Shrink - Class II
Any application not listed above, where grout is called for on the Drawings	Non-Shrink Class I, unless noted otherwise

2.2 **CEMENT GROUT**

A. Cement grout shall be composed of one part cement, 3 parts sand, and the minimum amount of water necessary to obtain the desired consistency. Where needed to match the color of adjacent concrete, white portland cement shall be blended with regular cement as needed. The minimum compressive strength at 28 Days shall be 4000 psi.

B. Cement grout materials shall be as indicated in Section 03901 – Portland Cement Concrete.

2.3 **NON-SHRINK GROUTS (cement based)**

A. **General:**

1. Cement-based non-shrink grout shall be a prepackaged, inorganic, fluid, non-gas-liberating, non-metallic, cement type grout requiring only the addition of water. Cement from kilns burning metal-rich hazardous waste fuel shall not be used.

2. Manufacturer's instructions shall be printed on each bag or other container in which the materials are packaged. The specific formulation for each class of non-shrink grout indicated herein shall be that recommended by the manufacturer for the particular application.

3. Grout shall not contain chlorides or additives that may contribute to corrosion.

4. Grout shall be formulated to be used at any consistency from fluid to plastic.

5. Cement-based non-shrink grout shall have the following minimum properties when tested at a fluid consistency, at 28 Days:

   a. Minimum tensile splitting strength of 500 psi per ASTM C 496 - Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens.

   b. Minimum flexural strength of 1000 psi per ASTM C 580 - Standard Test Method for Flexural Strength and Modulus of Elasticity of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes.

   c. Minimum bond strength (concrete to grout) of 1900 psi per modified ASTM C 882 - Standard Test Method for Bond Strength of Epoxy-Resin Systems Used with Concrete by Slant Shear.

d. Grout to be used in a marine environment shall be certified for use in a marine environment.

e. Grout shall be certified for use in freeze/thaw environments.

B. **Class I Non-Shrink Grout:**

1. Class I non-shrink grout shall have a minimum 28 Day compressive strength of 5000 psi when mixed at a fluid consistency.

2. Class I non-shrink grout shall meet the requirements of ASTM C 1107, Grade B or C, when mixed to fluid, flowable, and plastic consistencies.

3. Grout shall have a maximum early age height change of 4.0 percent expansion, and shall have no shrinkage (0.0 percent) in accordance with ASTM C 827 – Test Method for Early Volume Change of Cementitious Mixtures. The grout when tested shall not bleed or segregate at maximum allowed water.

4. Grout shall have no shrinkage (0.0 percent) and a maximum of 0.3 percent expansion in the hardened state when tested in accordance with ASTM C 1090 - Test Method for Measuring Changes in Height of Cylindrical Specimens from Hydraulic-Cement Grout.

5. Furnish certification that the non-shrink property of grout is not based on gas production or gypsum expansion.

6. Class I Non-Shrink Grout shall be **Masterflow 713 Plus** by **MBT-Chemrex; Five Star Grout** by **Five Star Products; Sikagrout 212** by **Sika Corporation; Premier** by **L&M Construction Chemicals; High-Flow Grout** by **Euclid Chemical Company; CG 200 PC** by **Hilti,** or equal.

C. **Class II Non-Shrink Grout:**

1. Class II non-shrink grout shall be a high precision, fluid, extended working time, grout. The minimum 28-Day compressive strength shall be 7500 psi, when mixed at a fluid consistency.

2. Grout shall have a maximum early age height change of 4.0 percent expansion, and shall have no shrinkage (0.0 percent) in accordance with ASTM C 827.

3. Grout shall have no shrinkage (0.0 percent) and a maximum of 0.3 percent expansion in the hardened state when tested in accordance with ASTM C 1090.

4. Class II non-shrink grout shall have an extended working time of 30 minutes minimum when mixed to a fluid consistency as defined in ASTM C 827 at temperature extremes of 45 to 90 degrees F in accordance with ASTM C 1107.

5. Class II non-shrink grout shall meet the requirements of ASTM C 1107, Grade B or C when tested using the amount of water needed to achieve fluid consistency per ASTM C 939.

6. The grout when tested shall not bleed or segregate at maximum allowed water content.

7. Provide certification that its non-shrink property is not based on gas production or gypsum expansion.

8. Class II non-shrink grout shall be **Masterflow 928** by **MBT-Chemrex; Five Star Fluid Grout 100** by **Five Star Products; Crystex** by **L&M Construction Chemicals;** or equal.

2.4 TOPPING GROUT AND CONCRETE/GROUT FILL

A. Where fill is thicker than 3-inches, Minor Concrete, Class M or R, as indicated in Section 03901 – Portland Cement Concrete shall be used.

B. Grout for topping of slabs and concrete/grout fill for built-up surfaces of tank, channel, and basin bottoms shall be composed of cement, fine aggregate, coarse aggregate, water, and admixtures proportioned and be mixed as indicated. Materials and procedures indicated for normal concrete in Section 03901 – Portland Cement Concrete, shall apply unless indicated otherwise.

C. Topping grout and concrete/grout fill shall contain a minimum of 564 pounds of cement per cubic yard with a maximum water cement ratio of 0.45.

D. Coarse aggregate shall be graded as follows:

U.S. STANDARD SIEVE SIZE	PERCENT BY WEIGHT PASSING
1/2 in	100
3/8 in	90-100
No. 4	20-55
No. 8	5-30
No. 16	0-10
No. 30	0

2.5 CURING MATERIALS

A. Curing materials shall be burlap cloth compying with AASHTO M182, Class 3, or combined burlap and white polyethylene sheeting shall complying with AASHTO M 171. For prepackaged grouts, curing materials shall be as recommended by the manufacturer of prepackaged grouts.

2.6 CONSISTENCY

A. The consistency of grouts shall be that necessary to completely fill the space to be grouted for the particular application. Dry pack consistency is such that the grout is plastic and moldable but will not flow. Where "dry pack" is called for in the Contract Documents, it shall mean a grout of that consistency; the type of grout to be used shall be as indicated herein for the particular application.

B. The slump for topping grout and concrete/grout fill shall be adjusted to match placement and finishing conditions but shall not exceed 4-inches.

2.7 MEASUREMENT OF INGREDIENTS

A. Measurements for cement grout shall be made accurately by volume using containers. Shovel measurements shall not be allowed.

B. Prepackaged grouts shall have ingredients measured by means recommended by the manufacturer.

PART 3 -- EXECUTION

3.1 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Grout shall be stored in accordance with manufacturer's recommendations.

3.2 GENERAL

A. Grout shall not be placed until base concrete or masonry has attained its design strength, unless authorized otherwise by the ENGINEER.

B. When cementitious grouts are used on concrete surfaces, the concrete surface shall be saturated with water for 24 hours prior to placement. Upon completion of the saturation period, excess water shall be removed with clean, oil free compressed air prior to grouting. Concrete substrate shall not be wet prior to placement of epoxy grouts.

C. Surfaces that will be in contact with grout shall be free of dirt, loose rust, oil, wax, grease, curing compounds, laitance, loose concrete, and other deleterious materials.

D. Shade the WORK from sunlight for at least 24 hours before and 48 hours after grouting.

E. Contact the grout manufacturer's representative for assistance on hot and cold weather grouting techniques and precautions if applicable.

3.3 GROUTING PROCEDURES

A. **General:** Mixing, surface preparation, handling, placing, consolidation, curing, and other means of execution for prepackaged grouts shall be done according to the instructions and recommendations of the manufacturer.

B. Structural, equipment, tank, and piping support bases shall be grouted, unless indicated otherwise.

1. The original concrete shall be blocked out or finished off a sufficient distance below the plate to provide for a minimum one-inch thickness of grout, or a thickness as indicated.

2. After the base plate has been set in position at the proper elevation by steel wedges or double nuts on the anchor bolts, the space between the bottom of the plate and the original pour of concrete shall be filled with non-shrink-type grout through a headbox of appropriate size. The mixture shall be of a fluid consistency and poured continuously into the space between the plate and the base concrete. Forms for grout shall be tight against retaining surfaces, and joints shall be sealed as

recommended by the grout manufacturer to be liquid-tight. Forms shall be coated as recommended by the grout manufacturer for easy form release. Where this method of placement is not practical or where required by the ENGINEER, alternate grouting methods shall be submitted for acceptance by the ENGINEER.

C. **Topping Grout and Concrete/Grout Fill**

1. Mechanical, electrical, and finish WORK shall be completed prior to placement of topping or concrete/grout fill. To ensure bonding to the base slab, the base slab shall be given an exposed aggregate finish. Alternatively where accepted by the ENGINEER, the base slab shall be given a roughened textured surface by a close-spaced rake while the surface is green. After curing, high pressure washing shall expose the aggregates and produce not less than a 3/16-inch amplitude roughness. Jackhammers or chipping hammers shall not be used.

2. The minimum thickness of grout topping and concrete/grout fill shall be one-inch. Where the finished surface of concrete/grout fill is to form an intersecting angle of less than 45 degrees with the concrete surface it is to be placed against, a key shall be formed in the concrete surface at the intersection point. The key shall be a minimum of 3-1/2 inches wide by 1-1/2 inches deep.

3. The base slab shall be thoroughly cleaned and wetted to saturated surface dry (SSD) condition per the International Concrete Repair Institute (ICRI) -- Technical Guide for Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays, prior to placing topping and fill. No topping concrete shall be placed until the slab is completely free from standing pools or ponds of water. A thin coat of neat cement grout shall be broomed into the surface of the slab just before topping or fill placement. The neat cement grout shall not be allowed to dry before topping placement. If it does dry, it must be immediately removed using wet stiff brooms and reapplied. The topping and fill shall be compacted by rolling or thorough tamping, brought to established grade, and floated. Grouted fill for tank and basin bottoms where scraping mechanisms are to be installed shall be screeded by blades attached to the revolving mechanism of the equipment in accordance with the procedures outlined by the equipment manufacturer after the grout is brought to the established grade. Coat surface with evaporation retardant as needed to prevent plastic shrinkage cracks.

4. Topping grout placed on sloping slabs shall proceed uniformly from the bottom of the slab to the top, for the full width of the placement.

5. The surface shall be tested with a straight edge to detect high and low spots which shall be immediately eliminated. When the topping or fill has hardened sufficiently, it shall be steel troweled to a smooth surface free from pinholes and other imperfections. An approved type of mechanical trowel may be used as an assist in this operation, but the last pass over the surface shall be by hand-troweling. During finishing, no water, dry cement, or mixture of dry cement and sand shall be applied to the surface.

6. As soon as topping or fill finishing is completed, coat surface with curing compound. After the topping is set and sufficiently hard in clarifiers and where required by the ENGINEER, the tank shall be filled with sufficient water to cover the entire floor for 14 days.

3.4 **CONSOLIDATION**

A. Grout shall be placed in such a manner, for the consistency necessary for each application, to assure that the space to be grouted is completely filled.

3.5 **CURING**

A. Cement based grouts shall be cured with wet burlap or combined wet burlap and white polyethylene sheeting and per the manufacturer's recommendations.

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SECTION 03805 – STRUCTURAL CONCRETE

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. The CONTRACTOR shall provide Structural Concrete, complete and in place, in accordance with the contract documents.

B. Structural excavation and backfill shall conform to Section 02200 - Earthwork.

C. Unless otherwise noted, structural concrete shall be cast in place. Substitutions may be allowed if in the opinion of the ENGINEER a pre – cast structure will be equivalent in performance to cast – in – place structure. The ENGINEER will require that pre – cast substitutions be designed by the CONTRACTOR. If allowed, substitutions of precast structures for cast – in – place structures shall be at no additional cost to the OWNER.

D. Standard pre – cast structures shall include items governed by ASTM C478 or other specific design standard referenced in the drawings or specified elsewhere. Custom designed structures shall be taken to be as all other precast structures or pre – cast substitutions for cast – in – place concrete.

1.2 REFERENCE STANDARDS

A. American Association of State Highway and Transportation Officials (AASHTO)

AASHTO M148	Standard Specification for Liquid – Forming Compounds for Curing Concrete
AASHTO M153	Standard Specification for Preformed Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction
AASHTO M171	Standard Specification for Sheet Materials for Curing Concrete
AASHTO M182	Standard Specification for Burlap Cloth Made from Jute or Kenaf and Cotton Mats
AASHTO M213	Standard Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
AASHTO M315	Standard Specifications for Joints for Circular Concrete Sewer and Culvert Pipe using Rubber Gaskets

B. American Concrete Institute (ACI)

ACI 318	Building Code Requirements for Structural Concrete
ACI 350	Code Requirements for Environmental Engineering Concrete Structures
ACI 517	Required Practice for Atmospheric Pressure Steam Curing
ACI 543	Guide to Design, Manufacture, and Installation of Concrete Piles

C. ASTM International (ASTM)

ASTM A416	Standard Specification for Low – Relaxation, Seven – Wire Steel Strand for Pre-stressed Concrete
ASTM A653	Standard Specification for Steel Sheet, Zinc – Coated (Galvanized) or Zinc – Iron Alloy Coated (Galvaannealed) by the Hot – Dip Process
ASTM B370	Standard Specification for Copper Sheet and Strip for Building Construction
ASTM C109	Standard Test Method for Compressive Strength of Hydraulic Cement Mortars
ASTM C1064	Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete
ASTM C1107	Standard Specification for Packaged Dry, Hydraulic Cement Grout (Non – Shrink)
ASTM D994	Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type)
ASTM D7174	Standard Specification for Preformed Closed – Cell Polyolefin Expansion Joint Fillers for Concrete Paving and Structural Construction

D. American Welding Society

AWS D1.1	Structural Welding Code

E. Louisiana Department of Transportation and Development (LDOTD)

AML	Approved Materials List
	Application of Quality Assurance Specifications for Portland Cement Concrete Pavement and Structures
	Application of Quality Assurance Specifications for Precast – Pre-stressed Concrete Plants
TR 201	Weight per Cubic Foot, Yield, and Air Content of Concrete
TR 202	Air Content of Freshly Mixed Concrete

TR 207 Slump of Portland Cement Concrete

TR 226 Making, Field Curing, and Transporting Concrete Test Specimens

TR 230 Curing, Capping, and Determining the Compressive Strength of Molded Concrete Cylinders

F. Pre-stressed Concrete Institute

MNL-116 Manual for Quality Control for Structural Precast Concrete Concrete Products

G. United States Army Corps of Engineers (USACE)

CRD-C-513 Corps of Engineers Specifications for Rubber Waterstop

CRD-C-572 Corps of Engineers Specification for Polyvinyl Chloride Waterstop

1.3 CONTRACTOR SUBMITTALS, SAMPLING, AND TESTING

A. Furnish submittals and certificates in accordance with Section 01300 – CONTRACTOR Submittals.

B. Materials proposed for and utilized in the WORK will be sampled as indicated in herein. The frequency of testing may be altered at the discretion of the ENGINEER. The CONTRACTOR shall provide all materials required for testing at no additional cost to the OWNER.

C. **Portland Cement Concrete:** Requirements for submittals, sampling, and testing of Portland cement concrete shall be as specified in Section 03901 – Portland Cement Concrete.

D. **Joint Fillers:**

1) **Submittal/Source Approval:** The CONTRACTOR shall submit to the ENGINEER evidence of listing of the proposed product on the LDOTD AML.

2) **Acceptance:** Prior to acceptance of the WORK, the CONTRACTOR shall submit a signed certificate certifying compliance with the requirements of this specification section with each shipment of joint filler to the WORK.

E. **Joint Sealant:**

1) **Submittal/Source Approval:** The CONTRACTOR shall submit to the ENGINEER evidence of listing of the proposed product on the LDOTD AML.

2) **Acceptance:** Prior to acceptance of the WORK the CONTRACTOR shall submit a signed certificate certifying compliance with the requirements of this specification section with each shipment of joint sealant to the WORK.

3)

F. **Reinforcing Steel:** Requirements for submittals, sampling, and testing of reinforcing steel shall be as specified in Section 03906 – Reinforcing.

G. **Curing Material:** Burlap cloth, white polyethylene sheeting, combination burlap cloth and white polyethylene sheeting, and waterproof paper will be sampled if quality of the material is questionable in the opinion of the ENGINEER. Liquid membrane forming compounds will be sampled for compliance if the material is questionable in the opinion of the ENGINEER.

1) **Submittal/Source Approval:** The CONTRACTOR shall submit to the ENGINEER evidence of listing of the proposed product on the LDOTD AML.

2) **Acceptance:** Prior to acceptance of the WORK, the CONTRACTOR shall submit a signed certificate certifying compliance with the requirements of this specification section with each shipment of liquid membrane forming compound to the WORK.

1.4 SAMPLING AND TESTING SCHEDULE

A. Materials proposed for and utilized in the WORK will be sampled as indicated in herein. The frequency of testing may be altered at the discretion of the ENGINEER. The CONTRACTOR shall provide all materials required for testing at no additional cost to the OWNER.

1.5 CLASSES AND USES OF CONCRETE

A. Unless noted otherwise on the drawings, classes of concrete furnished shall be as indicated in the table below:

Classes and Uses of Concrete

Concrete Class	Use
A or A(M)	Concrete exposed to sea water, and all other concrete except as listed herein.
AA or AA(M)	Cast-in-place bridge superstructure
D	Pier footings
F	Dams and flood control structures
P or P(M)	Precast Concrete
P(X)	Pre-stressed Concrete
R	Non-reinforced sections
S	Underwater sections

PART 2 -- PRODUCTS

2.1 MORTAR

A. Mortar shall consist of one part Portland cement, two parts mortar sand, and water as required for proper consistency. Mortar shall be used 30 minutes after mixing.

B. Portland cement for mortar shall conform to Section 03901 – Portland Cement Concrete.

C. Mortar sand for mortar shall conform to Section 03901 – Portland Cement Concrete.

2.2 PORTLAND CEMENT CONCRETE

A. Portland cement concrete shall conform to Section 03901 – Portland Cement Concrete.

2.3 JOINT FILLERS

A. Joint fillers shall be pre-formed joint fillers complying with any of the following:

1. **Preformed Resilient Bituminous Types:** Fillers shall consist of preformed strips which have been formed from cane or other suitable fibers of a cellular nature securely bound together and uniformly saturated with a suitable bituminous binder, or strips which have been formed from clean, granulated cork particles securely bound together by a suitable bituminous binder and encased between two layers of felt. The type shall be as specified and shall conform to AASHTO M 213.

2. **Wood Fillers:** Bottom boards shall be clear heart redwood. Top boards shall be any type of wood which is free from defects and meets dimensional requirements. Occasional medium surface checks will be permitted provided the board is free of defects that will impair its usefulness. The load required to compress the material in an oven-dry condition to 50 percent of its original thickness shall not exceed 1750 psi. Boards shall not vary from specified dimensions in excess of the following tolerances:

   a. Thickness: -0, +1/16 inch

   b. Depth: +/- 1/8 inch

   c. Length: +/- ¼ inch

3. **Preformed Bituminous Type:** Bituminous preformed expansion joint filler shall consist of bituminous (asphalt or tar) mastic composition, formed and encased between two layers of bituminous impregnated felt. The preformed filler shall conform to ASTM D 994.

4. **Preformed Asphalt Ribbon:** This material shall be resistant to cracking, tearing or permanent deformation under normal handling and installation procedures. It shall be sufficiently rigid to enable it to form a straight joint. This filler shall consist of preformed strips of bitumen and inert filler material conforming to the following requirements:

   a. Thickness, mm: 3-5

   b. Depth Tolerance, mm: +\- 3

   c. Weight, kg/100 sq meters, min: 245

   d. Tensile Strength, kg/100 mm width, min: 90

   e. Bitumen, % by weight:

5. **Preformed Closed Cell Polyethylene Joint Filler:** The joint filler shall comply with ASTM D 7174, Type I. This material shall be used with an adhesive-lubricant. Joint fillers and adhesive-lubricants shall be approved products listed on the LDOTD Approved Material List (formerly QPL 18).

6. **Preformed Rubber:** This filler shall consist of polyurethane bonded recycled rubber in accordance with AASHTO M 153.

2.4 REINFORCING STEEL

A. Reinforcing steel shall conform to Section 03806 – Reinforcement unless otherwise noted.

2.5 CURING MATERIAL

A. **Liquid Membrane – Forming Compounds:** Liquid membrane – forming compounds shall comply with AASHTO M 148 and shall be an approved product listed on the LDOTD AML (formerly QPL 65). The types shall be Type 2 white pigmented or Type 1-D, clear or translucent with fugitive dye.

B. **Burlap:** Burlap cloth make from Jute or Kenaf shall comply with AASHTO M 182, Class 3.

C. **Waterproof Paper:** Waterproof paper shall comply with AASHTO M 171.

D. **White Polyethylene Sheeting:** White polyethylene sheeting shall comply with AASHTO M 171.

E. **Combined Burlap and White Polyethylene Sheeting:** Combined burlap and white polyethylene sheeting shall comply with AASHTO M 171.

2.6 FORM MATERIALS

A. Forms shall be of wood, metal or other approved material, built mortar-tight and of sufficient rigidity to prevent distortion due to pressure of concrete and other loads incident to construction operations.

B. Forms shall be constructed and maintained to prevent warping and opening of joints due to shrinkage of lumber. Forms shall be substantial and unyielding and so designed that finished concrete will conform to proper dimensions and contours. Design of forms shall take into account the effect of vibration of concrete as it is placed.

C. **Re-Used Forms**: Shape, strength, rigidity, mortar-tightness and surface smoothness of re-used forms shall be maintained. Warped or bulged lumber shall be resized before being reused. Unsatisfactory forms shall not be re-used.

2.7 FORM RELEASE AGENTS

A. Form release agents for concrete shall be an approved product listed on the LDOTD AML (formerly QPL 29).

PART 3 -- EXECUTION

3.1 HANDLING AND PLACING CONCRETE

A. General: In preparation for placing concrete, all sawdust, chips and other debris shall be removed from the interior of forms. Struts, stays and braces serving to hold forms in correct shape and alignment shall be removed from the forms when concrete placing has reached an elevation rendering their use unnecessary.

B. Concrete shall be placed to avoid segregation of materials and displacement of reinforcement. The use of long troughs, chutes and pipes for conveying concrete from mixer to forms will be permitted only with written authorization. If these devices cause segregation, impede workability, or produce detrimental effects, their use shall be discontinued.

C. Open troughs and chutes shall be metal or metal-lined. Where steep slopes are required, chutes shall be equipped with baffles or be in short lengths that reverse the direction of movement of concrete. Chutes, troughs and pipes shall be kept free from coatings of hardened concrete by thoroughly flushing with water after each pour. Water for flushing shall not be discharged within the structure.

D. When placing operations involve dropping concrete more than 5 feet, it shall be deposited through a sheet metal or other approved tremie. After initial set of the concrete, forms and any reinforcing bar projection shall not be disturbed.

E. Concrete, during and immediately after depositing, shall be thoroughly consolidated. Consolidation shall be done by mechanical vibration subject to the following provisions.

1) Vibration shall be internal unless authorization for other methods is obtained or as provided herein.

2) Vibrators shall be of an approved type and design, capable for transmitting vibration to concrete at frequencies of at least 4,500 impulses per minute.

3) Intensity of vibration shall be such as to visibly affect concrete over a radius of at least 18 inches.

4) The CONTRACTOR shall provide a sufficient number of vibrators to properly consolidate each concrete batch immediately after it is placed.

5) Vibrators shall be manipulated so as to thoroughly WORK concrete around reinforcement and imbedded fixtures and into corners and angles of forms.

6) Vibration shall be applied at the point of deposit and in the area of freshly deposited concrete. Vibrators shall be inserted and slowly withdrawn vertically from the concrete. Vibration shall be of sufficient duration and intensity to thoroughly compact concrete, but shall not cause segregation. Vibration shall not be continued at any one point to the extent that localized areas of grout are formed.

7) Application of vibrators shall be at points uniformly spaced and not farther apart than twice the radius over which vibration is visibly effective.

8) Vibration shall not be applied directly to or through reinforcement to sections or layers of concrete which have hardened to the degree that concrete ceases to be plastic under vibration. It shall not be used to make concrete flow over distances so great as to cause segregation. Vibrators shall not be used to drag concrete in forms.

9) Vibration shall be supplemented by such spading as necessary to ensure smooth surfaces and dense concrete along form surfaces and in corners and locations inaccessible to vibrators.

10) These provisions for vibration shall apply to filler concrete for steel grid floor except that the vibrator shall be applied to the steel.

11) These provisions for vibration shall also apply to precast concrete except that, if approved, the manufacturer's methods of vibration may be used.

F. Concrete shall be placed in horizontal layers not more than 15 inches thick unless otherwise permitted. When less than a complete layer is placed in one operation, it shall be terminated at a vertical bulkhead. Each layer shall be placed and consolidated before the preceding batch has taken initial set to prevent damage to green concrete and avoid surfaces of separation between batches. The top surface of concrete adjacent to forms shall be finished to a suitable grade strip.

G. When concrete placement is temporarily discontinued, the concrete, shall be cleaned of laitance and other objectionable material to a sufficient depth to expose sound concrete after becoming firm enough to retain its form.

H. Where a featheredge might be produced at a construction joint, as in the sloped top surface of a wingwall, an inset form shall be used to produce a blocked out portion in the preceding layer which shall produce an edge thickness of not less than 6 inches in the succeeding layer. Placement of concrete shall not be discontinued within 18 inches of the top of any face, unless provision has been made for a coping less than 18 inches thick, in which case, the construction joint may be made at the underside of the coping.

I. Following concrete placement, accumulations of mortar splashed on reinforcement steel and forms shall be removed. Dried mortar chips and dust shall not be mixed in fresh concrete.

3.2 GIRDERS, SLABS, WALLS AND COLUMNS

A. Concrete in girders shall be deposited uniformly for the full length of girder and brought up evenly in horizontal layers.

B. Concrete in slabs and slab spans shall be placed in one continuous operation for each slab and/or slab span.

C. Concrete columns and walls shall be placed in a continuous operation. Concrete shall be allowed to set at least 24 hours before caps are placed. When friction collars are used to support cap forms, concrete columns shall have been poured at least 7 days or shall have at least 3,000 psi compressive strength before caps are placed. Compressive strength cylinder shall be made in accordance with DOTD TR 226 and tested in accordance with DOTD TR 230.

D. No concrete shall be placed in the superstructure until column forms have been stripped sufficiently to determine the quality of concrete in the columns. The superstructure loads shall not be allowed on the bents until the concrete has attained at least 3,000 psi compressive strength but not less than 7 curing days. Compressive strength cylinders shall be made in accordance with DOTD TR 226 and tested in accordance with DOTD TR 230.

3.3 PUMPING

A. Pumping equipment shall be so arranged that no vibrations result which might damage freshly placed concrete. Pipes carrying concrete to placing area shall be laid out with a minimum of bends and no unauthorized change in size. Where concrete is conveyed

and placed by mechanically applied pressure, suitable equipment of adequate capacity shall be used.

B. A grout mortar, or concrete without coarse aggregate, shall be pumped through the equipment ahead of the regular concrete to provide lubrication to start pumping operations. This material shall not be used in placement. The lubrication process need not be repeated as long as pumping operations are continuous.

C. Operation of the pump shall be such as to provide a continuous stream of concrete without air pockets. When pumping is completed, concrete remaining in the pipes, if it is to be used, shall be ejected in such manner that there will be no contamination of concrete or separation of ingredients.

3.4 DEPOSITING CONCRETE UNDERWATER

A. Concrete shall not be deposited in water except on approval. The method of placing shall be approved by the ENGINEER and conform to the following:

B. To prevent segregation, concrete shall be placed in its final position by means of a tremie and shall not be disturbed after being deposited. Concrete shall be placed in caissons, cofferdams or watertight forms.

C. For underwater parts of structures, concrete seals shall be placed in one continuous operation. The surface of the concrete shall be kept as nearly horizontal as possible; still water shall be maintained at the point of deposit.

D. A tremie shall consist of a tube at least 10 inches (250 mm) in diameter; if constructed in sections, the couplings shall be watertight. Tremies shall be supported so as to permit positioning anywhere over the top surface of the WORK and for rapid lowering when necessary to retard or stop the flow of concrete.

E. When concrete is dumped into the hopper, flow may have to be induced by slightly raising the discharge end of the tremie, but always keeping it in deposited concrete. Flow shall be continual until the WORK is completed. Aluminum tremies will not be permitted.

F. Dewatering may proceed when the concrete is sufficiently hard, but not for at least 72 hours after concrete placement is completed. Prior to constructing succeeding portions of the structure, laitance or other unsatisfactory material shall be removed from the surface by scraping, chipping or other means which will not damage the concrete.

3.5 CONSTRUCTION JOINTS

A. **General:** Construction joints shall be made only where located on the plans or shown on the pouring schedule, unless otherwise approved. When not detailed on the plans, construction joints shall be placed as directed. Raised shear keys or reinforcing steel shall be used where necessary to transmit shear or bond sections together.

B. **Bonding:** Forms shall be retightened before placing new concrete on or against hardened concrete.

1) **Neat Cement Slurry Joints**: The surface of hardened concrete shall be roughened as required in a manner that will not leave loosened particles of aggregate or damaged concrete at the surface. It shall then be thoroughly cleaned of foreign matter and laitance, and saturated with

water. All surfaces shall be thoroughly coated with a neat slurry to ensure that adequate mortar is placed at the juncture of the hardened and newly deposited concrete. New concrete shall be placed before the grout has attained its initial set. Placing of concrete shall be carried continuously from joint to joint. Edges of joints which are exposed to view shall be finished true to line and elevation.

2) **Epoxy Resin Joints**: Vertical surfaces of bridge deck construction joints and other construction joints shall be coated prior to each succeeding pour with an approved Type II, Grade B or Grade C epoxy resin applied according to the manufacturer's recommendations. Surfaces of hardened concrete to which new concrete is to be bonded shall be cleaned of foreign material, loose or unsound concrete by sandblasting, hammers or wire brushes. Grease or oil shall be removed with a detergent wash such as trisodium phosphate, and the entire area washed with fresh water and brushed with a stiff brush. If a detergent is not required, dust and small particles not removed by other cleaning methods shall be removed by washing.

3) Unless a joint type (1) or (2) above is specified in the plans or specifications, the surface of the hardened concrete shall be thoroughly cleaned of foreign matter and laitance, and saturated with water prior to pouring fresh concrete.

3.6 FORM EXECUTION

A. **Form Surface**: Forms for exposed surfaces shall not adhere to nor discolor concrete. Forms shall be made of either metal or dressed lumber of uniform thickness with or without approved form liner and shall be mortar-tight. Forms for reentrant angles shall be chamfered and forms shall be filleted at sharp corners. Forms for projections, such as girders or copings, shall be given a bevel or draft to ensure easy removal.

B. When possible, forms shall be day-lighted at intervals not greater than 10 feet vertically, the openings being sufficient to permit free access for inspecting, working and spading the concrete.

C. **Form ties:** Metal ties or anchorages within forms shall be constructed to permit their removal to a depth of at least 1/2 inch from the face without damage to concrete. If wire ties are permitted, upon removal of the forms, wire shall be cut back at least 1/4 inch inside from the face of the concrete with chisels or nippers. Fittings for metal ties shall be of such design that, upon their removal, cavities left will be of the smallest possible size. Cavities shall be filled with cement mortar and the surface left sound, smooth, even and uniform in color.

D. Fiberglass ties may be used and shall be ground flush with the concrete surface.

E. **Setting and Maintaining:** Forms shall be set and maintained reasonably true to required line and grade until concrete is sufficiently hardened. When forms are deemed to be unsatisfactory, either before or during placing of concrete, the WORK shall be stopped until defects have been corrected. Forms shall be so designed that portions where finishing is required may be removed without disturbing portions of forms to be removed later and, as far as practical, so that form marks will conform to general lines of the structure. For narrow walls and columns, where the bottom of the form is inaccessible, lower form boards shall be left loose so that they may be removed for cleaning out immediately before placing concrete.

3.7 **CURING**

A. Concrete for structures (except for minor structures) shall be cured with wet burlap or combined wet burlap and white polyethylene sheeting, except where provided for herein.

B. A Type 1-D curing compound may be used for curing concrete when surfaces do not require a Class 2A finish. When membrane curing is used, exposed reinforcing steel and construction joint surfaces shall be covered or shielded to prevent coating with curing compound. Construction joint surfaces shall be wet cured by approved methods as soon as possible after concrete placement. Concrete surfaces in contact with forms shall be sealed immediately after completion of form removal and surface finishing. Membrane curing shall be applied as soon as surface moisture has evaporated. Method and application rate of curing compound shall be in accordance with the manufacturer's recommendations, but in no case shall the application rate be less than one gallon per 100 square feet surface area. The compound shall be applied in one or two applications. If the compound is applied in two increments, the second application shall follow the first application within 30 minutes. Satisfactory equipment shall be provided, with means to properly control and direct application of curing compound on concrete surfaces to result in uniform coverage.

C. If rain falls on newly coated concrete before the film has dried sufficiently to resist damage, or if the film is damaged, a new coat of compound shall be applied to affected portions.

D. When curing with burlap, the exposed concrete immediately after finishing shall be covered with two thicknesses of wet burlap. Burlap shall be fixed so that it is in contact with the concrete at all times and shall be kept continuously wet for at least 5 curing days after concrete is placed, with curing days as defined as specified herein.

3.8 **REMOVAL OF FALSEWORK AND FORMS**

A. Except as otherwise specified herein, face form for barrier curbs or rails and side forms for caps requiring a Class 2A finish shall be removed not less than 1/2 nor more than 2 curing days after concrete is placed to permit finishing.

B. Forms for surfaces not requiring a Class 2A finish, and supporting forms and falsework for structure members such as bent caps, beams and slabs, shall be removed in accordance with one of the following methods. For concrete containing fly ash or ground granulated blast-furnace slag, only Method 1 shall be used.

1) **Method 1**: Forms and falsework may be removed as soon as concrete has attained a compressive strength, as determined by cylinder tests, indicated in the table below. Test specimens will be made in accordance with DOTD TR 226 from the same concrete and cured under the same conditions as the portion of the structure involved. Specimens will be tested in accordance with DOTD TR 230.

Removal of Forms and Falsework

Concrete Class	Compressive Strength, Psi (MPa)
A	3,000 (20.7)
A (M)	4,000 (27.6)
AA	3,500 (24.1)
AA (M)	4,000 (24.1)
D	2,500 (17.2)
F	3,200 (22.1)

P (nonpre-stressed)	3,000 (20.7)
P(M) (nonpresetressed)	3,600 (24.9)
R	1,600 (11.0)

2) **Method 2**: Forms and falsework may be removed when concrete has aged for the minimum number of curing days in the table below:

Forms and Falsework Removal Schedule

Forms	Curing Days
Under slabs, beams or pile caps with span lengths less than 10 feet (3.0 mm)	7 days
Under slabs, beams or pile caps with span lengths of 10 to 17 feet (3.0 to 5.0 m)	7 days plus 1 day for each foot (300 mm) of span over 10 feet (3 m)
Under slabs, beams or pile caps with span lengths over 17 feet (5.0 m)	7 days plus 1 day for each foot (300 mm) of span over 10 feet (3 m)
Under portion of slabs that cantilever more than 1 foot (300 mm)	7 days
Walls, columns, side forms for beams, pile caps and slabs that cantilever less than 1 foot (300 mm)	1 day
Caissons	1 day
Precast and/or Pre-stressed Concrete	Per Manufacturer and as provided for herein

3) The term "curing day" will be interpreted as a calendar day on which the temperature is above 50°F (10°C) or 55°F (13°C) if ground granulated blast furnace slag is used in concrete for at least 19 hours. Colder days may be counted if approved methods are used to maintain air temperature adjacent to concrete above 50°F (10°C) throughout the day.

4) During continued cold weather, when artificial heat is not provided, the ENGINEER may permit removal of forms and falsework at the end of a period of calendar days equal to two times the number of curing days stated above.

5) The foregoing provisions for form and falsework removal shall apply only to forms or parts of forms so constructed as to permit removal without disturbing forms or falsework which are required to be left in place for a longer period on other portions of the structure.

6) Methods of form removal likely to cause overstressing of concrete shall not be used. Forms and their supports shall not be removed without

approval. Supports shall be removed in such manner as to permit concrete to uniformly and gradually take stresses due to its own weight.

3.9 EXPANSION AND FIXED JOINTS, AND BEARINGS

A. **Open Joints:** Open joints shall be constructed by insertion and subsequent removal of a wood strip, metal plate or other approved material. Insertion and removal of the template shall be accomplished without chipping or breaking corners of concrete. Reinforcement shall not extend across an open joint.

B. **Filled Joints**: Joints to be sealed with poured seals shall be formed and constructed similar to open joints. For joints with preformed filler, the filler shall be in correct position when concrete is placed.

3.10 CONCRETE SURFACE FINISHES

A. Surface finishes shall be classified in accordance with the table below.

Concrete Surface Finishes

Class 1	Ordinary Surface Finish

B. All concrete shall be given Class 1, Ordinary Surface Finish, in addition to any other type of finish specified.

C. **Class 1, Ordinary Surface Finish:** Immediately following the removal of forms, fins and irregular projections shall be removed from all surfaces except from those which will not be exposed to view after construction or are not to be waterproofed. Cavities produced by form ties and other holes, honeycombed spots, broken corners or edges and other defects shall be cleaned and, after having been kept saturated with water, shall be pointed and trued with a mortar of cement and fine aggregate mixed in the proportions used in the concrete being finished.

1) Mortar used in pointing shall be not more than 1 hour old. Water shall be added to a workable consistency. Concrete shall then be cured as specified under Subsection 805.10. Construction and expansion joints shall be free of mortar and concrete. Joint filler shall be left exposed for its full length with clean and true edges.

2) Surfaces shall be true and uniform. Surfaces which cannot be satisfactorily repaired shall be coated as specified for Class 2A, Special Surface Finish

3) Exposed surfaces not protected by forms shall be struck off with a straightedge and finished with a wood float to a true, even surface. Use of additional mortar to provide a grout finish will not be permitted.

- END OF SECTION -

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SECTION 03806 - REINFORCEMENT

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. The CONTRACTOR shall provide reinforcing steel for Portland cement concrete, complete and in place, in accordance with the contract documents.

1.2 CONTRACTOR SUBMITTALS, SAMPLING, AND TESTING

A. Furnish submittals in accordance with Section 01010.

B. Reinforcing:

1) **Submittal:** Before placing reinforcing steel, a list of all reinforcing steel showing location, mark number, size and type bend shall be furnished to the ENGINEER. The CONTRACTOR shall be responsible for the accuracy of the lists and for furnishing and placing reinforcing steel in accordance with the details shown on the plans and as specified.

2) **Submittal:** Before CONTRACTOR shall also furnish the ENGINEER placing plans for all structures where reinforcing steel is involved, unless the plans contain sufficient detail for proper placement of reinforcing steel. Placing plans shall show the location, type and spacing of supports.

3) **Source Approval:** Prior to fabrication of reinforcing, the CONTRACTOR shall submit to the ENGINEER the name and address of each mill providing reinforcing steel. For each type of reinforcement to be used, the CONTRACTOR shall submit a statement that the material meets the requirements of this section. The CONTRACTOR shall submit the name, address, and current status of mills listed on the LDOTD AML to provide steel for the project.

4) **Acceptance:** For each shipment of each type of reinforcement utilized, the CONTRACTOR shall submit a certified mill report or certificate analysis signed by an authorized representative of the mill providing the material.

5) **Verification:** At his discretion, the ENGINEER may sample any type of reinforcement for verification of compliance with the requirements of this section.

1.3 REFERENCE STANDARDS

A. American Association of State Highway and Transportation Officials (AASHTO)

AASHTO M 284 Standard Specification for Epoxy Coated Reinforcing Bars

B. American Welding Society (AWS)

AWS D1.4 Structural Welding Code – Reinforcing Steel

C. ASTM International (ASTM)

ASTM A615	Standard Specification for Deformed and Plain Carbon – Steel Bars for Concrete Reinforcement
ASTM A996	Standard Specification for Rail – Steel and Axle – Steel Deformed Bars for Concrete Reinforcement
ASTM A1064	Standard Specification for Carbon – Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete

D. Concrete Reinforcement Steel Institute

Manual of Standard Practice

E. Louisiana Department of Transportation and Development (LDOTD)

AML Approved Materials List

PART 2 -- PRODUCTS

2.1 REINFORCING STEEL

A. Reinforcing steel for concrete shall comply with the following unless otherwise specified. Reinforcing steel used in structures shall be Grade 60. Grade 40 steel may be used in Portland cement concrete pavement. Bars smaller than No. 3 need not be deformed. All deformed bars shall comply with items 1, 2, or 3 below. Size W 5 wire complying with item 4 below may be used in lieu of bars smaller than No. 3.

1) Billet-Steel Deformed and Plain Bars shall comply with ASTM 615 and shall be produced at a mill listed on the LDOTD AML (formerly QPL 71).

2) Rail-Steel and Axle-Steel Deformed and Plain Bars shall comply with ASTM A 996.

3) Cold-drawn Steel Wire shall comply with ASTM A 1064 with the following amendment: For material testing over 110,000 psi tensile strength in high strength applications such as spirals and ties, the 25 percent minimum reduction in area shall be reduced 5 percent for each 10,000 psi increment of tensile strength exceeding 110,000 psi.

4) Welded Steel Wire Fabric shall conform to ASTM A 1064.

5) Epoxy Coated Reinforcing Steel and patching materials shall comply with AASHTO M 284 and shall be listed on the LDOTD AML (formerly QPL 51).

PART 3 -- EXECUTION

3.1 FABRICATION

A. **Fabrication:** Unless otherwise authorized, bent bar reinforcement shall be cold bent to the shapes shown on the plans in accordance with the following requirements:

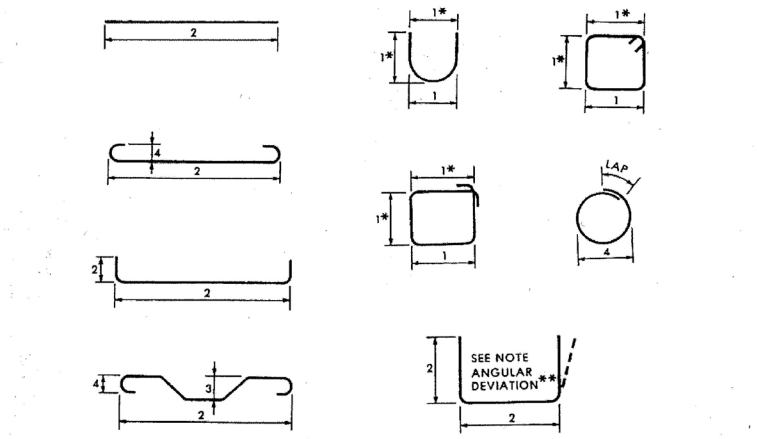
1) **Bending:** Stirrups and ties shall be bent around a pin having a diameter of at least four bar diameters for No. 5 or smaller bars, and at least five bar diameters for larger bars. All other bars, except as otherwise specified herein, shall be bent around a pin having a diameter as specified in the table below:

Pins for Bar Bends

Bar Size	Minimum Pin Diameter
Nos. 3 through 8 (Nos. 10 M through 25 M)	6 bar diameters
Nos. 9, 10 and 11 (Nos. 29, 32 and 36 M)	8 bar diameters
Nos. 14 and 18 (Nos. 43 M and 57 M)	10 bar diameters

No rebending of bars will be allowed. Special fabrication will be required for bending Nos. 14 and 18 bars more than 90 degrees.

2) **Tolerances:** Bars shall be fabricated in accordance with the tolerances specified in the figure below. All dimensions given in the figure below are out-to-out of bars.



Symbol	Tolerance, Inches (mm)
1	±1/2 (± 13)
2	± 1 (± 25)
3	+0, -1/2 (+0, -13)
4	± 1/2 (±13)

*Not to differ for opposite parallel dimension by more than 1/2 inch (13 mm).
**Angular Deviation-Maximum ± 2 1/2° or ± 1/2 inch/ft. (40 mm/m), but not less than 1/2 inch (13 mm).

3) **Shipping:** Bar reinforcement shall be shipped in standard bundles, tagged and marked in accordance with the Manual of Standard Practice of the Concrete Reinforcement Steel Institute (CRSI). The tags shall be made of durable material and marked in a legible manner with waterproof markings. There shall be at least one tag per bundle attached by wire. The tags shall show size of reinforcing, number of pieces, and mark or length of bars.

4) **Handling and Coating Repairs:** Epoxy coated reinforcing steel shall be handled in a manner to avoid damage to the coating. Bundling bands shall be padded. Bundles shall be lifted with multiple supports or strongbacks to prevent abrasion to the coating due to sag. Patching material used by the applicator and the CONTRACTOR shall be the same

as the prequalified patching material. Repairs shall be made in accordance with the patching material manufacturer's recommendations. Repairs to the coating will be required on all damaged areas larger than 1/4 inch square. The total bar surface area covered by patching material shall not exceed 2 percent. Ends of coated bars cut during field fabrication shall also be coated with the patching material before rusting appears; however, the coated ends are not to be included in the 2 percent maximum coverage of patching material. Hairline cracks without bond loss or other minor damage on fabrication bends need not be repaired.

3.2 PROTECTION OF MATERIAL

A. Reinforcing steel shall be stored above ground on platforms, skids or other supports and shall be protected from damage.

B. The various sizes, grades and lengths shall be plainly marked and tagged to facilitate inspection.

C. Epoxy coated steel bars shall be unloaded and stored on the project site in a manner to avoid damage or contamination. Bars shall be stored off the ground and covered such that formation of condensation and exposure to ultraviolet light is avoided.

3.3 PLACING AND FASTENING

A. Steel reinforcement shall be placed in the position shown on the plans and firmly held during placing and setting of concrete. When placed in the work, it shall be free from dirt, loose rust, loose scale, paint, oil, grease, form release agent, or other foreign material. Thin powdery rust and light rust need not be removed. Bars shall be tied with No.14 or 16 gage wire at all intersections, except where spacing is less than 1 foot in each direction, alternate intersections shall be tied.

B. Distance of reinforcement from forms shall be maintained by metal chairs, ties, hangers or other approved supports. Precast mortar or concrete blocks may be used when approved by the ENGINEER in applications where concrete is to be cast against soil. Metal chairs in contact with exterior surfaces of concrete shall be hot-dipped galvanized, electroplated with zinc (GS Grade), plastic-coated or stainless steel. Layers of bars shall be separated by approved devices. The use of pebbles, pieces of broken stone or brick, metal pipe and wooden blocks will not be permitted. Vertical stirrups shall pass around main tension members and shall be securely attached thereto. The minimum covering, measured from the surface of concrete to face of reinforcing bars, shall not be less than 2 inches except as follows: bottom of slab, 1 inch; stirrups and ties in T-Beams, 1 1/2 inches. Additional coverage as shown on the plans shall be provided for reinforcement in bottom of footings or where marine environments, corrosive, abrasive or other severe exposure conditions exist. Reinforcement shall be inspected and will be subject to approval before placing concrete.

C. During and after installation of epoxy coated bars, the CONTRACTOR shall repair all significant cuts, nicks and abraded places in the coating on the bars with the epoxy repair material supplied by the epoxy resin manufacturer. Any damaged metallic accessories shall also be repaired with a suitable material. No more than 0.25 percent of the bar surface area may be left bare.

D. Damaged areas of the reinforcing steel and accessories shall be repaired before rusting occurs. Coated bars when incorporated into the work shall be free from dirt, paint, oil, grease, form release agent, or other foreign substances. Placing of concrete shall be

performed in a timely manner with methods and equipment which will not damage the coated materials.

E. Since the epoxy coating is flammable, the coated bars shall not be exposed to fire or flame. Cutting coated bars by burning will not be permitted. Reinforcing steel to be partially embedded in concrete shall not be field bent unless specified on the plans or permitted by the ENGINEER.

3.4 SPLICING

A. Reinforcement shall be furnished in the full lengths indicated on the plans. Splicing of bars, except where shown on the plans, will not be permitted without written approval. Splices shall be staggered as far as possible. Unless otherwise specified, bars shall be lapped in accordance with the requirements of the table below. Construction joints shall not be made within the limits of lapped bars. In lapped splices, bars shall be placed in contact and wired together in such manner as to maintain the minimum clear distance to other bars and to the surface of concrete. Welding of reinforcement steel shall be done only if detailed on the plans or if authorized in writing. Welding shall comply with the latest edition of AWS D1.4.

Lap Splice Length for Grade 60 Steel

Bar No.	Lap Splice Length, Inches
No. 3	18
No. 4	24
No. 5	30
No. 6	39
No. 7	53
No. 8	69
No. 9	88
No. 10	111
No. 11	137

B. When permitted in the plans or specifications, reinforcing steel splices may be made by an approved mechanical butt splicing device listed on the LDOTD AML (formerly QPL 44) and used in accordance with the manufacturer's recommendations. The splice shall develop at least 125 percent of the specified yield strength of the reinforcing steel bars in tension.

3.5 SUBSTITUTIONS

A. Substitutions of different size bars will be permitted with authorization of the ENGINEER. Substituted steel shall have cross-sectional and surface areas equivalent to the design areas or larger. Allowed substitutions will be made at no additional pay.

- END OF SECTION –

SECTION 03901 – PORTLAND CEMENT CONCRETE

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. The CONTRACTOR shall provide Portland Cement Concrete, complete and in place, in accordance with the contract documents.

B. Structural Concrete is designated by class and pavement concrete is designated by type.

C. Portland cement concrete shall require an approved mix design and shall be produced by a Louisiana Department of Transportation and Development certified plant and shall be transported by Louisiana Department of Transportation and Development certified trucks.

D. The design, control, and transportation of concrete mixtures in accordance with these specifications shall be the responsibility of the CONTRACTOR.

1.2 REFERENCE STANDARDS

A. American Association of State Highway and Transportation Officials (AASHTO)

AASHTO M 85	Standard Specification for Portland Cement
AASHTO M240	Standard Specification for Portland – Limestone Cement
AASHTO M 295	Standard Specification for Coal Fly Ash and Raw or Calcinated Natural Pozzolan for Use in Concrete
AASHTO M 302	Standard Specification for Slag Cement for Use in Concrete and Mortars
AASHTO M 307	Stabdard Specification for Silica Fume Used in Cementitious Mixtures
AASHTO T 19	Standard Method of Test for Bulk Density (Unit Weight) and Voids in Aggregate
AASHTO T 84	Standard Method of Test for Specific Gravity and Absorption of Fine Aggregate
AASHTO T 85	Standard Method of Test for Specific Gravity and Absorption of Coarse Aggregate
AASHTO T 278	Standard Method of Test for Frictional Properties Using the British Pendelum Tester
AASHTO T 279	Standard Method of Test for Accelerated Polishing of Aggregates Using the British Wheel

B. ASTM International (ASTM)

ASTM C91	Standard Specification for Masonry Cement

ASTM C465	Standard Specification for Processing Additions for Use in the Manufacture of Hydraulic Cements

C. Louisiana Department of Transportation and Development (LDOTD)

	Application of Quality Assurance Specifications for Portland Cement Concrete Pavement and Structures
	Application of Quality Assurance Specifications for Precast – Prestressed Concrete Plants
AML	Approved Materials List
TR 106	Determining Total Moisture and Free Moisture in Aggregate
TR 109	Determining the Amount of Foreign Material in Clam Shell, Reef Shell, and Mixtures of Clam and Reef Shell
TR 112	Amount of Material Finer than No. 200 Sieve in Aggregate
TR 113	Sieve Analysis of Fine and Course Aggregates
TR 119	Determination of Deleterious Materials
TR 202	Air Content of Freshly Mixed Concrete
TR 207	Slump of Portland Cement Concrete
TR 226	Making, Field Curing, and Transporting Concrete Test Specimens
TR 230	Curing, Capping, and Determining the Compressive Strength of Molded Concrete Cylinders
TR 643	Determining Chloride Content in Admixtures for Portland Cement Concrete

1.3 QUALITY ASSURANCE

A. The CONTRACTOR’s obligations for quality assurance and design procedures shall be equivalent to the obligations of the CONTRACTOR that are specified in the latest edition of the LDOTD's publication entitled "Application of Quality Assurance Specifications for Portland Cement Concrete Pavement and Structures" and "Application of Quality Assurance Specifications for Precast-Prestressed Concrete Plants"

1.4 CONTRACTOR SUBMITTALS, SAMPLING, AND TESTING

A. The CONTRACTOR shall furnish submittals in accordance with Section 01010.

B. The CONTRACTOR shall submit a proposed concrete mix designs on a form acceptable to the ENGINEER giving the intended sources of materials and the mix design for concrete to be furnished. No work shall be started until the Portland cement concrete mix design has been reviewed and accepted. Review and acceptance of this mix design

does not release the CONTRACTOR from the responsibility of producing concrete that meets the minimum requirements of the specifications.

C. Materials proposed for and utilized in the WORK will be sampled as indicated in herein. The frequency of testing may be altered at the discretion of the ENGINEER. The CONTRACTOR shall provide all materials required for testing at no additional cost to the OWNER.

D. **Tests for Aggregate Properties:** When required, aggregates such as granular material will be classified in accordance with DOTD TR 423. Unless noted otherwise, the following methods will be utilized in testing aggregates:

Aggregate Property	Test Method
Deleterious Materials	DOTD TR 119
Unit Weight	AASHTO T 19
Specific Gravity and Absorption of Fine Aggregate	AASHTO T 84
Specific Gravity and Absorption of Coarse Aggregate	AASHTO T 85
Polish Value	AASHTO T 278 and T 279
Amount of Material Finer than the No. 200 Sieve	DOTD TR 112
Sieve Analysis (Gradation)	DOTD TR 113
Plasticity Index (PI)	DOTD TR 428
Liquid Limit (LL)	DOTD TR 428

E. **Portland Cement**

1. **Submittal/Source Approval:** The CONTRACTOR shall submit product information on all Portland cement products to be utilized for all Portland cement concrete mixes to be incorporated into the WORK. This information shall evidence of the listing of the proposed product on the LDOTD AML for the type of mix or mixes to be utilized on the project. The submittal for source approval shall include information on chemical properties, compliance with AASHTO M 85, alkali content, and any other information required sufficient for the ENGINEER to review the acceptability of the proposed product.

2. **Acceptance:** The CONTRACTOR shall submit a signed certificate of compliance and a certificate of analysis (mill certificate) verifying characteristics for each shipment of Portland cement incorporated into Portland cement concrete mixes incorporated into the WORK.

3. **Verification:** If, in the opinion of the ENGINEER any Portland cement materials are questionable, the ENGINEER will sample the material to test for compliance with these specifications.

F. **Aggregates for Concrete:**

1. **Submittal/Source Approval:** The CONTRACTOR shall submit product information on all coarse and fine aggregates to be utilized for all mixes to be incorporated in the WORK. This information shall evidence of the listing of the proposed aggregate products on the LDOTD AML for the type of mix or mixes to be utilized on the project. The submittal for source approval shall include information on deleterious materials, gradation, friction rating, unit weight, and any other information required sufficient for the ENGINEER to review the acceptability of the proposed product.

2. **Acceptance:** Fine and course aggregate will be sampled for testing for compliance by the ENGINEER from stockpiles or sources utilized by the CONTRACTOR. Fine and course aggregates will be sampled per lot of pavement, structural, or minor concrete, or per 1,000 cubic yards of pavement, structural, or minor concrete placed at the discretion of the ENGINEER. Small quantities of 50 cubic yards of concrete or less may not be sampled unless the ENGINEER determines the material is questionable.

G. **Admixtures for Concrete:**

1. **Submittal/Source Approval:** The CONTRACTOR shall submit product information on all concrete admixtures to be utilized for all mixes to be incorporated in the WORK. This information shall evidence of the listing of the proposed admixture products on the LDOTD AML for the type of mix or mixes to be utilized on the project. The submittal for source approval shall include information on chemical properties, and any other information required sufficient for the ENGINEER to review the acceptability of the proposed product.

2. **Acceptance:** The CONTRACTOR shall submit a signed certificate of compliance and a certificate of analysis (mill certificate) verifying characteristics for each shipment of admixtures incorporated into the WORK.

3. **Verification:** If, in the opinion of the ENGINEER any admixture materials are questionable, the ENGINEER will sample the material to test for compliance with these specifications.

H. **Water**

1. **Submittal/Source Approval:** Source of water shall be indicated in mix designs for all Portland cement concrete mixes to be incorporated into the WORK.

2. **Acceptance:** NOT USED

3. **Verification:** If, in the opinion of the ENGINEER any mixing water is questionable, the ENGINEER will sample the water to test for compliance with these specifications.

I. **Fly Ash**

1. **Submittal/Source Approval:** The CONTRACTOR shall submit product information on all fly ash products to be utilized for all Portland cement concrete mixes to be incorporated into the WORK. This information shall evidence of the listing of the proposed products on the LDOTD AML for the type of mix or mixes to be utilized on the project. The submittal for source approval shall include information on chemical properties, compliance with AASHTO M 295, and any other information required sufficient for the ENGINEER to review the acceptability of the proposed product.

2. **Acceptance:** The CONTRACTOR shall submit a signed certificate of compliance and a certificate of analysis (mill certificate) verifying characteristics for each shipment of fly ash incorporated into Portland cement concrete mixes incorporated into the WORK.

3. **Verification:** If, in the opinion of the ENGINEER any fly ash materials are questionable, the ENGINEER will sample the material to test for compliance with these specifications.

J. **Structural Concrete (Classes AA(M), AA, A(M), A, D, F, P(X), P(M), S**

1. **Submittal/Source Approval:** The CONTRACTOR shall submit a proposed concrete mix designs on a form acceptable to the ENGINEER giving the intended sources of materials and the mix design for concrete to be furnished. No work shall be started until the Portland cement concrete mix design has been reviewed and accepted. Review and acceptance of this mix design does not release the CONTRACTOR from the responsibility of producing concrete that meets the minimum requirements of the specifications.

2. **Acceptance:** The ENGINEER will conduct the following acceptance tests of a per – lot basis. Unless noted otherwise, a lot is defined as an identifiable placement of concrete not to exceed 200 cubic yards.

   a. **Entrained Air:** Plastic concrete will be tested for air content at least once per lot or as otherwise determined by the ENGINEER. The air content will be determined in accordance with LDOTD TR 202.

   b. **Slump:** Plastic concrete will be tested for slump at least once per lot or as otherwise determined by the ENGINEER. The slump of plastic concrete will be determined in accordance with LDOTD TR 207.

   c. **Compressive Strength:** Compressive strength for acceptance of structural concrete will be determined by DOTD TR 226. Two (2) batches of three (3) 6 – inch by 12 – inch cylinders will be made and tested in accordance with DOTD TR 226 for each lot of structural concrete placed.

d. **Batch Tickets:** The CONTRACTOR shall provide batch tickets for each batch of concrete as indicated in Part 3 – Execution.

K. **Minor Structural Concrete (Classes M, R, Y)**

1. **Submittal/Source Approval:** The CONTRACTOR shall submit a proposed concrete mix designs on a form acceptable to the ENGINEER giving the intended sources of materials and the mix design for concrete to be furnished. No work shall be started until the Portland cement concrete mix design has been reviewed and accepted. Review and acceptance of this mix design does not release the CONTRACTOR from the responsibility of producing concrete that meets the minimum requirements of the specifications.

2. **Acceptance:** The ENGINEER will conduct the following acceptance tests of a per – lot basis. Unless noted otherwise, a lot for minor concrete shall be 50 cubic yards, regardless of day placed.

a. **Entrained Air:** Plastic concrete will be tested for air content at least once per lot or as otherwise determined by the ENGINEER. The air content will be determined in accordance with LDOTD TR 202.

b. **Slump:** Plastic concrete will be tested for slump at least once per lot or as otherwise determined by the ENGINEER. The slump of plastic concrete will be determined in accordance with LDOTD TR 207.

c. **Compressive Strength:** Compressive strength for acceptance of structural concrete will be determined by DOTD TR 226. One (1) batches of (3) 6 – inch by 12 – inch cylinders will be made and tested in accordance with DOTD TR 226 for each lot of structural concrete placed.

d. **Batch Tickets:** The CONTRACTOR shall provide batch tickets for each batch of concrete as indicated in Part 3 – Execution.

1.5 MASTER PROPORTION TABLE FOR PORTLAND CEMENT CONCRETE

A. Portland cement concrete shall conform to the requirements of the table below. It shall be a mixture of portland cement, portland – pozzolan cement, or portland blast – furnace slag cement, fine aggregate, coarse aggregate, water, and when specified or allowed, approved admixtures. Fly ash or ground granulated blast furnace slag will be permitted as a partial replacement for portland cement in accordance with this specification.

Master Proportion Table for Portland Cement Concrete

	Average Compressive Strength, psi at 28 days	Grade of Coarse Aggregate	Min. Cement lb/yd^3 of Concrete [9,14]	Maximum Water /Cement ratio, lb/lb[1,9]	Total Air Content (Percent by Volume) [4]	Slump Range[10], inches		
						Non-Vibrated	Vibrated	Slip Form Paving[2]
Structural Class [11]								
AA(M)	4400	A, P	560	0.44	5±1	2-5	2-4	N.A.
AA	4200	A, P	560	0.44	5±1	2-5	2-4	N.A.
A(M)	4400	A, P	510	0.53	5±2	2-5	2-4	N.A.
A	3800	A, F[8], P	510	0.53	5±2	2-5	2-4	1-2.5
D	3300	A, B, D, P	420	0.58	5±2	2-5	1-3	N.A.
F	3400[5]	A, P	460	0.44	5±1	2-5	2-4	N.A.
P(X)	7500[5]	A, F[8], P	700	0.40	5±2	N.A.	2-10	N.A.
P(M)	6000[5]	A, F[8], P	600	0.44	5±2	N.A.	2-6[7]	N.A.
P	5000[5]	A, F[8], P	560	0.44	5±2	N.A.	2-6[7]	N.A.
S	3800	A, P	650	0.53	5±2	6-8	N.A.	N.A.
Minor Structure Class [11]								
M	3000	A, B, P	470	0.56	5±2	2-5	2-4	1-2.5
R	1800	A, B, D, P	370	0.70	5±2	2-5	2-4	N.A.
Y	3000	Y	560	_[3]	6-9	N.A.	1-3	N.A.
Pavement Type [11]								

N.A. – Not Applicable

[1] Except for Class AA, AA (M), or F concrete, the maximum volume of water; gal. shall be reduced 5 percent when a water-reducing admixture is used, and 10 percent when an air-entraining admixture, or air-entraining and water-reducing admixtures, is used. When the coarse aggregate portion of the mix is 100 percent crushed aggregate, the water may be increased by 5 percent provided the maximum water listed in the Master Proportion Table for Portland Cement Concrete is not exceeded.

[2] Also slump range for other concrete placed by extrusion methods.

[3] Because of the absorptive nature of lightweight aggregate and the inability to obtain a true saturated surface dry condition for determining free moisture, a maximum amount of water cannot be specified for Class Y concrete. The slump requirement of the Master Mixture Proportion Table for Portland Cement Concrete or as specified will be the governing factor in determining maximum allowable water.

[4] Total air content ranges when air-entrainment is allowed or specified. Air content shall be designed at midrange.

[5] Values shown represent the minimum compressive strengths allowed.

[6] Average compressive strengths for Pavement Type concrete shall be 3600 psi when air-entrainment is used.

[7] NOT USED

[8] Grade F coarse aggregate shall be used only when specified or permitted. The minimum cement content shall be increased when this aggregate is used.

9 For mixes including partial replacement of cement with fly ash or ground granulated blast furnace slag, the minimum cement and maximum water contents shown apply to the total cement and fly ash or ground granulated blast furnace slag content of the mix. Additional cement may be required to achieve minimum compressive strength.

[10] When a slump range is specified in other sections, that range shall govern.

[11] Allowable Cement Types shall be as specified herein.

[12] NOT USED.

[13] Aggregate grading shall comply with the requirements specified herein.

[14] The minimum cement factors may be waived in writing by the Engineer

1.6 **COMPOSITION OF CONCRETE**

A. Allowable types of cement are as follows:

Use	Allowable Cement Types
General Construction (Structural Class Concrete and Minor Structure Class Concrete	Type I/II portland cement;

B. For concrete placements having a least dimension of 48 inches or greater or if designated on the plans or the project specifications as being mass concrete, the allowable cement type shall by Type II Portland cement, Type IP Portland-pozzolan cement, or Type IS Portland blast-furnace slag cement. The cement, or combination of cement and fly ash or ground granulated blast furnace slag, shall be certified to generate a heat of hydration of not more than 70 calories/gram at 7 days.

C. Due to the gradation of aggregate or other conditions, additional cement may be required to achieve minimum compressive strength.

D. When using only Types I or II Portland cement in concrete mixes, fly ash conforming or ground granulated blast-furnace slag as specified herein may be partially substituted for Portland cement on a pound for pound basis. The CONTRACTOR may use up to 20 percent fly ash by weight of cement for other minor structures and concrete pavement and up to 15 percent fly ash by weight of cement for structural concrete. In lieu of fly ash, the CONTRACTOR may use grade 100 or grade 120 ground granulated blast-furnace slag up to 50 percent by weight of cement. The combination of slag and fly ash will not be allowed as a partial substitution for cement.

E. **Chemical Admixtures**: An air-entraining admixture will be required in paving concrete when placed by slip-form methods or when a central mixing plant or non-agitating haul trucks are used. Air -entraining and water-reducing admixtures will be required in Class AA, F, AA(M) concrete. When an air-entraining admixture is used, the total air content of the concrete mix shall be tested in accordance with DOTD TR 202, and shall be as specified in the Master Proportion Table for Portland Cement Concrete. A water – reducing admixture is required for mass concrete. When the ambient air temperature is 70° F or below, the water-reducing admixture shall be the normal-set type. When the ambient air temperature is above 70°F and below 85°F, the water-reducing admixture may be either the normal-set type or the set-retarding type, except for concrete containing fly ash or ground granulated blast furnace slag where this choice is optional. Set-retarding admixtures shall be used in an amount sufficient to produce the necessary retardation. The CONTRACTOR shall consider the influence of different materials and job conditions, including local weather on setting characteristics. With approval of the mix design, the CONTRACTOR may use approved admixtures other than as stated above in order to control setting characteristics. Water contents for super-plasticized concrete mixes shall not be reduced to levels that will restrict cement hydration. The amount of water in the superplasticizer shall be included as a part of required mixing water. The dosage of superplasticizer may be adjusted depending on the consistency of the mix. Final slump of super-plasticized concrete shall be appropriate for its application. It shall not exhibit excessive bleeding or segregation of aggregates as determined by the ENGINEER. The method of adding and mixing the superplasticizer to the mix shall be as recommended by

the manufacturer. The use of admixtures in other classes or types of concrete will be optional with the CONTRACTOR with written approval.

F. **Water:** The total amount of water in the mixture, including admixtures and free water, shall not exceed the maximum water-cement ratio specified in the Master Proportion Table for Portland Cement Concrete. Free water shall include all water entering the mix with the aggregates, except water absorbed by the aggregate. Because of the absorptive nature of lightweight aggregate and the inability to obtain a true saturated surface dry condition for determining free moisture, a maximum amount of water cannot be specified for Class Y concrete. The slump requirement of the Master Proportion Table for Portland Cement Concrete or as specified will be the governing factor in determining maximum allowable water.

G. **Aggregates:** All aggregates for use in Portland cement concrete shall meet the requirements below and as specified herein:

1. **Coarse Aggregate:** Coarse aggregate, shall be the grade specified in the Master Proportion Table for Portland Cement Concrete and shall comply with the requirements specified herein in Part 2.

2. **Fine Aggregate:** Fine aggregate, shall meet the requirements specified herein in Part 2.

PART 2 -- PRODUCTS

2.1 GENERAL

A. Cement, and fly ash, shall be certified by the supplier in accordance with current procedures of the Louisiana Department of Transportation and Development (LDOTD).

2.2 PORTLAND CEMENT

A. Portland cement shall be from an approved source listed in the LDOTD AML (formerly QPL 7) and shall comply with AASHTO M 85.

B. **Chemical Requirements:** The chemical requirements shall be as specified in AASHTO M85. Alkali content calculated as sodium oxide equivalent shall not exceed 0.60 percent by weight for all types of cement.

C. **Process Additions**: Process additions may be used in amounts not to exceed 3 percent by weight of portland cement clinker provided it meets the requirements for the cement portion of ASTM C 465 and the test results are submitted to the ENGINEER for review and approval.

2.3 AGGREGATES

A. General: Aggregates shall meet the requirements of the Master Proportion Table for Portland Cement Concrete and shall be listed on the LDOTD AML (QPL 2). Aggregates shall meet the requirements specified herein.

B. **Fine Aggregate**: Sand shall be a natural silica sand from a source listed on the LDOTD AML (QPL 2). The percentages of deleterious materials shall not exceed the following values:

Property	Percent, Max
Coal and Lignite	0.25
Clay Lumps	0.05
Clay Lumps and Friable Particles	3.00

Fine aggregate for all portland cement concrete except Types B and D pavements shall conform to the following gradations:

Concrete Sand	
U.S. Sieve	Percent 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
Mortar Sand	
U. S. Sieve	Percent Passing
No. 4	100
No. 8	95-100
No. 100	0-25
No. 200	0-10

C. Coarse Aggregate: Coarse aggregate used in Portland cement concrete for bridge decks shall have a Friction Rating of I, II, or III as defined in the Table below and as indicated on the LDOTD AML (QPL 2).

Friction Rating	**Description**
I	Aggregates that have a Polish Value of greater than 37 or demonstrate the ability to retain acceptable friction numbers for the life of the pavement.
II	Aggregates that have a Polish Value of 35 to 37 or demonstrate the ability to retain acceptable friction numbers for the life of the pavement.
III	Aggregates that have a Polish Value of 30 to 34 or demonstrate the ability to retain acceptable friction numbers for the life of the pavement
IV	Aggregates with a Polish Value of 20 to 29.

The maximum amount of deleterious materials shall not exceed the following:

Property	**Percent, Max**
Clay Lumps	0.05

Total Clay Lumps and Friable Particles	3.0
Iron Ore	2.0
Glassy Particles in Slag	10.0
Flat and Elongated Particles (5:1) (ASTM D4791)	10.0
Coal and Lignite	1.0
Wood (Wet)	0.05
Total Clay Lumps and Friable Particles, Iron Ore, Coal and Lignite, Wood	5.0

D. **Uncrushed Coarse Aggregate**: Uncrushed coarse aggregate for all portland cement concrete shall comply with the table below.

Portland Cement Concrete Aggregates

U.S Sieve	Grade A (Size 57)	Grade B (Size 467)	Grade D (Size 357)	Grade F ---	Grade P (Size 67)
2 1/2 inch	---	---	100	---	---
2 inch	---	100	90-100	---	---
1 1/2 inch	100	85-100	---	---	---
1 inch	90-100	---	35-70	---	100
3/4 inch	---	35-70	---	100	80-100
1/2 inch	25-60	---	10-30	90-100	---
3/8 inch	---	10-30	---	---	20-55
No. 4	0-10	0-5	0-5	15-60	0-10
No. 8	0-5	---	---	0-15	0-5
No. 16	---	---	---	0-5	---
No. 200	0-1	0-1	0-1	0-1	0-1

E. **Crushed Coarse Aggregate:** Crushed coarse aggregate for all portland cement concrete shall comply with the uncrushed coarse aggregate gradations except that when the material finer than the No. 200 (75 µm) sieve consists of the dust fraction from crushing, essentially free of clay, this percentage shall be 0-2 percent. When the total material passing from NO. 200 (75 µm) sieve from the coarse and fine aggregates does not exceed 5 percent, the percent passing the No. 200 sieve from the crushed coarse aggregate may be increased to 3 percent.

Each type of aggregate to be used in the proposed mixture shall be sampled and tested individually. The percent of total combined aggregates retained shall be determined mathematically based on the proportions of the combined aggregate blend. All gradation calculations shall be based on percent of dry weight (mass). The maximum amount of deleterious materials shall not exceed the following:

Property	**Percent, Max**
Clay Lumps	0.05

Total Clay Lumps and Friable Particles	3.0
Iron Ore	2.0
Glassy Particles in Slag	10.0
Flat and Elongated Particles (5:1) (ASTM D4791)	10.0
Coal and Lignite	1.0
Wood (Wet)	0.05
Total Clay Lumps and Friable Particles, Iron Ore, Coal and Lignite, Wood	5.0

2.4 **ADMIXTURES**

A. **Physical Requirements:** Concrete admixtures shall be an approved product listed on the LDOTD AML (formerly QPL 58).

B. **Chemical Requirements:** Unless a chloride type admixture is specified, the contribution of chloride ion resulting from the addition of admixtures to the concrete shall not exceed 0.02 pound per cubic yard of concrete, when tested in accordance with DOTD TR 643.

2.5 **WATER**

A. Water suitable for human consumption shall be used.

2.6 **FLY ASH**

A. Fly Ash shall be from an approved source listed on the LDOTD AML (formerly QPL 50) and shall comply with AASHTO M 295 for Class C and Class F only.

PART 3 -- EXECUTION

3.1 **GENERAL**

A. No concrete shall be mixed, placed, or finished when natural light is insufficient, unless an approved artificial lighting system is provided. No concrete shall be placed on a frozen subgrade nor shall frozen aggregates be used in concrete.

3.2 **EQUIPMENT**

A. **General**: Sufficient plant capacity and transporting equipment to ensure delivery at the required rate shall be provided. Rate of concrete delivery during concreting operations shall provide for proper handling, placing and finishing of concrete and maintain a workable surface. Methods of delivering and handling concrete shall facilitate placing with a minimum of re-handling and without damage to the structure or concrete.

B. **Plant Equipment**: Batch plants shall include approved storage, weigh hoppers, and measuring devices. Equipment shall be properly sealed and vented to minimize dusting and loss of material.

1. Materials shall be incorporated into the mix by methods that will ensure uniform distribution. The amount of each material used in the mix shall be recorded and certified by the contractor's authorized representative.

2. The plant shall be equipped with adequate water storage and a device for automatically controlling the amount of water used in each batch.

3. For plants using direct-fill elevating weigh hoppers, computer controlled indicator lights may be used as an indication of aggregate weights but shall not be the sole means of control for aggregate proportioning. Means of control shall be provided so that, as the quantity desired in the weigh hopper is approached, material may be added slowly and shut off with precision. Weight hoppers shall be constructed as to eliminate accumulation of materials and to discharge completely. Suitable provisions shall be made for removal of overload from the hopper by the operator. The plant shall demonstrate satisfactory performance by producing consistent concrete with adequate compressive strengths.

4. **Storage Bins and Silos:** For plants with overhead storage bins, which feed directly into the weight hopper, or storage bins with belt feed to the weight hopper, the bins shall have adequate separate compartments for fine aggregate and each size of coarse aggregate. Each compartment shall be designed to discharge efficiently and freely into the weigh hopper. Means of control shall be provided so that, as the quantity desired in the weigh hopper is approached, material shall be added slowly and shut off with precision.

5. Silos shall be weatherproof, sealed, free of holes, and shall prevent contamination. Silos shall be designed to freely discharge and shall be equipped with vibrators to maintain flow of material and prevent accumulation. Silos shall be designed with sufficient capacity for the operation. Silos shall be provided with a positive means of shut off without leaking into the weigh hopper. A separate silo shall be used for each dry bulk material, added to the mix. If a silo is divided into compartments for cement, fly ash, ground granulated blast furnace slag and microsilica, a positive means of separation shall be provided.

6. **Measuring Devices:** Materials shall be measured by weighing except where other methods are authorized.

7. Batch plants may be equipped to proportion materials by approved automatic weighing devices. Moisture probes can be used to determine the moisture content of aggregates for batch adjustment provided the accuracy is confirmed by the ENGINEER to be within 0.5 percent of the results obtained by the Certified Concrete Technician in accordance with DOTD TR 106.

8. Fine aggregates and each size of coarse aggregate from separate bins shall be weighed either separately or cumulatively on scales in the weigh hopper. The allowable quantities of bulk fly ash, bulk ground granulated blast furnace slag, or bulk microsilica may be weighed cumulatively in the same hopper with the cement, provided the cement is weighed first and the scale system is separate from that used for the aggregates.

9. Weight hoppers shall be constructed to eliminate accumulation of materials and to discharge completely. Suitable provisions shall be made for removal of an overload from the hopper by the operator.

10. Scales shall be accurate to 0.5 percent throughout the range of use. Maximum graduation on scales shall be 0.1 percent of the rated scale capacity. When bean type scales are used poises shall be designed to be locked in any position to prevent accidental change of position, and the weigh beam and a telltale device shall be in view of the operator. Plant and laboratory measuring devices shall be subject to approval and shall be tested, inspected, and certified by a qualified independent scale service or the Weights and Measures Division of the Louisiana Department of Agriculture and Forestry at no cost to the OWNER every 90 calendar days, and more often when the ENGINEER deems it necessary to assure their accuracy.

11. Individual aggregates shall be batched within 2 percent, and the total weight of aggregate shall be within 1 percent of the required weight.

12. Cement, fly ash, ground granulated blast furnace slag, and microsilica shall be within 1 percent of the required weight (mass). Cement in standard bags need not be weighted; however, when used, they shall be used in full bag increments and the quantities of other materials shall be adjusted accordingly. Bagged fly ash and bagged ground granulated blast furnace slag will not be allowed.

13. Mixing water shall be measured by volume or weight. Water measuring devices shall be accurate to 1 percent at ½ the maximum allowable water per batch and the maximum graduation shall be gallon.

14. **Ticket Printer System**: Certified concrete plants may be equipped with an approved automatic ticket printer system for recording required batching information. When an automatic ticket printer system is not used, quantities and batching information shall be determined by visual observation, recorded, and certified correct by the CONTRACTOR's authorized representative. The approved ticket printer system shall be tamper-proof and shall print time of batching, amount of water, batch weights, moisture content of aggregates, and quantities of admixtures. The Certified Concrete Technician may add moisture content of aggregates or quantities of admixtures to the printed ticket when the automatic system does not have these capabilities. During a breakdown, quantities shall be determined by visual observation and certified as stated above. All records of batches shall show batch number, day, month, year, and time of day to the nearest minute for each batch. The maximum quantity of water that can be added at the jobsite shall be shown on the batch ticket. The ENGINEER shall be provided with a legible copy of all batch records identified with lot number and mix design number

C. **Hauling Equipment**: Hauling equipment shall be watertight and shall be capable of discharging concrete at a satisfactorily controlled rate without segregation.

1. **Truck Mixer**: Truck mixers shall be the revolving drum type, equipped with pressurized, calibrated tanks for carrying a portion of the mixing water. Only the prescribed and verifiable amount of water is permitted in

the tank unless the tank is equipped with a device by which the quantity of water added can be readily verified. Truck mixers shall be equipped with electrically or mechanically actuated revolution counters, which display the number of revolutions. Counters shall be located to provide safe and convenient inspection. Each truck mixer shall have attached thereto in a prominent place a metal plate on which is plainly marked the uses for which the equipment is designed, the maximum rated capacity of the drum in terms of concrete volume and rotation speed for both agitation and mixing speeds. Truck mixers shall be equipped with means for accurately measuring the amount of water used in each batch.

2. **Agitator Hauling Equipment:** Agitators shall be supplied with adequate mixing blades or paddles to agitate the mix and prevent segregation. Covers shall be provided when directed. Each agitator shall have attached thereto in a prominent place a metal plate on which is plainly marked the uses for which the equipment is designed, the maximum rated capacity in terms of concrete volume, and agitation speed

3. **Non-Agitator Hauling Equipment**: The bodies of non-agitating hauling equipment shall be smooth, metal, and mortar tight containers. Covers shall be provided when directed.

4. **Portable Mixers:** Portable mixers shall have a minimum capacity of one cubic yard (cu m) and shall be capable of uniformly mixing and discharging concrete without segregation.

3.3 TRANSPORTATION AND STORAGE OF CEMENTITIOUS MATERIALS

A. Cement, fly ash, ground granulated blast furnace slag, and microsilica shall be transported in watertight conveyances and stored in separate approved facilities so that cement, fly ash, ground granulated blast furnace slag, and microsilica will be protected from dampness or water intrusion. Material that is contaminated, is partially set, or contains lumps of caked material will be rejected. When the use of bagged cement, fly ash, ground granulated blast furnace slag or microsilica is permitted, the handling and storage will be as directed.

B. Different brands or types or the same brand or type from different mills, shall not be mixed or used alternately unless authorized by the ENGINEER. This requirement may be waived in case of plant breakdown during production to allow concrete conforming to the requirements of this section to be furnished from another plant to finish the placement in progress.

3.4 HANDLING AND STORAGE OF AGGREGATES

A. Equipment and methods for stockpiling aggregates shall be such that no detrimental degradation or segregation of aggregate will result; no appreciable amount of foreign material will be incorporated into aggregate; and there will be no intermingling of stockpiled materials. Stockpiles of aggregates shall be well drained and shall have uniform moisture content. Material shall not be added to working faces of the stockpiles during continuous operations.

B. When specified, coarse aggregate shall be separated into two or more sizes to ensure greater uniformity of the concrete mixture. Different grades and types of aggregates shall be stored in separate stockpiles separated by bulkheads or sufficiently separated from each other to prevent material of edges of piles from intermingling. When segregation

occurs in the processing and handling of Grade D coarse aggregate, the aggregate shall be separated at the 1-inch sieve into two stockpiles. The stockpiled material shall be reproportioned to meet the gradation requirements of Grade D. Activity that results in contamination or intermingling of aggregates, including overhead handling for the loading of bins or building of stockpiles, will not be permitted.

C. Aggregates shall be handled from stockpiles or other sources to the batch plant so as to secure uniform grading of material. Aggregates that have become segregated or contaminated shall not be used. Aggregates processed or handled by hydraulic methods, and washed aggregates, shall be stockpiled or placed in bins for adequate drainage. Transport containers will be accepted as an adequate bin when adequate drainage is provided. Drainage of aggregates shall meet the approval of the ENGINEER prior to batching. The ENGINEER may require water sprinkling of coarse aggregates in stockpiles that have dried to the extent that the aggregates absorb mixing water. Such sprinkling shall continue until aggregates are saturated.

3.5 QUALITY CONTROL OF CONCRETE

A. The CONTRACTOR shall be responsible for quality control of materials during handling, proportioning, mixing, and placement operations; for initial determination and necessary subsequent adjustments in proportioning of materials used to produce the specified concrete; and for providing suitable equipment for determination of aggregate gradation, moisture, air content, slump, unit weight, temperature, and trial mixes as necessary. Testing and analysis of the mix for quality control purposes, the setting of dials, gages, scales or meters, adjusting batch weights, and accurate batching shall be the responsibility of the CONTRACTOR.

B. The CONTRACTOR shall have a Certified Concrete Technician present at the plant or job site to make adjustments in batch weights for moisture content, perform necessary adjustments in proportioning materials to produce the specified concrete, and perform tests necessary for control of the concrete mix within specifications requirements. Daily plant operations shall not begin unless the Certified Concrete Technician is at the plant to determine that gradations, moisture contents, and adjusted batch weights are within specifications limits. If a Certified Concrete Technician is not available at the job site, an Authorized Concrete Technician is not available at the job site, an Authorized Concrete Field Tester is allowed to perform the job site control tests for slump, air content, and mix temperature and report the results to the Certified Concrete Technician. The use of an Authorized Concrete Field Tester at the job site will not relieve the Certified Concrete Technician from performing the remaining duties as outlined in these specifications.

C. The CONTRACTOR'S Certified Concrete Technician and Authorized Concrete Field Tester shall be certified or authorized upon satisfactory completion of the Louisiana Department and Transportation and Development requirements for such personnel.

D. Mixtures shall produce concrete of suitable workability. Slumps shall be within the ranges show in the Master Proportion Table for Portland Cement Concrete or as specified when tested in accordance with DOTD TR 207. The ENGINEER may authorize an increase in maximum slump, by use of water reducers, for concrete used in the construction of walls and diaphragms less than 8 inches thick, and where the ENGINEER considers necessary provided the water-cement ratio is not exceeded and conventional forms are used.

1. Concrete mixes shall be formulated to produce concrete which, when molded and cured in accordance with DOTD TR 226 and tested in accordance with DOTD TR 230, shall show an average compressive strength not less than as shown in the Master Proportion Table for

Portland Cement Concrete. Class P, Class P (M) and Class P (X) concrete cylinders for compressive strength tests shall be cured by the same methods used in curing the members they represent.

2. Proportioning for volume of coarse aggregates in concrete mixes, excluding concrete pipe, Types B and D pavement, and minor structure concrete shall be in accordance with the table below. An example of proportioning of coarse aggregate is shown in the LDOTD publication entitled "Application of Quality Assurance Specifications for Portland Cement Concrete Pavement and Structures".

Volume of Coarse Aggregate Per Unit of Volume of Concrete

Maximum Size of Aggregate, Inches (mm)	Volume of Dry-Rodded Coarse Aggregate Per Unit Volume of Concrete for Different Fineness Moduli of Fine Aggregate[1]				
	2.20	2.40	2.60	2.80	3.00
3/8 (9.50)	0.52	0.50	0.48	0.46	0.44
1/2 (12.5)	0.61	0.59	0.57	0.55	0.53
3/4 (19.0)	0.68	0.66	0.64	0.62	0.60
1 (25.0)	0.73	0.71	0.69	0.67	0.65
1 1/2 (37.5)	0.77	0.75	0.73	0.71	0.69
2 (50.0)	0.80	0.78	0.76	0.74	0.72
3 (75.0)	0.84	0.82	0.80	0.78	0.76

[1] Volumes are based on aggregates in dry-rodded condition as described in AASHTO T19, Unit Weight of Aggregate. These volumes are selected from empirical relationships to produce concrete with a degree of workability suitable for usual reinforced concrete construction. For less workable concrete such as required for concrete pavement construction, they may be increased up to 10%. For more workable concrete, as may be required for pumping, they may be reduced up to 10%.

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4. Where indicated, trial mixes will be required to demonstrate the mix performance and the compatibility of mix components for the following:

   (1) Fly Ash

   (2) Ground Granulated Blast Furnace Slug

   (3) Microsilica

(4) Heavyweight Concrete

(5) Flexural Strength (when required)

(6) Unusual Materials and Applications

5. For the above trial mixes, the CONTRACTOR shall submit test results for slump, unit weight, air content, set times, and compressive strength (flexural strength for pavements) at 3, 7, and 28 days. The CONTRACTOR shall furnish materials to the ENGINEER for verification of trial mixes.

6. CONTRACTOR shall be responsible for determination of gradation, unit weight, specific gravity and absorption factor of the aggregates.

7. Trial mixes may be waived in writing by the ENGINEER at his discretion.

D. **Quality Control Tests:** The CONTRACTOR shall be responsible for determining gradation and moisture content of fine and coarse aggregates used in the concrete mixture and for testing the mixture at the job site for slump, unit weight, temperature, and air content (when used). The CONTRACTOR shall conduct operations to produce a mix complying with the reviewed and accepted mix design, except that variations will be permitted within specified control limits for individual samples.

E. **Mix Adjustments:** With prior notification given to the ENGINEER, the CONTRACTOR may adjust the ratio of fine to coarse aggregate as reviewed and accepted, by no more than 5 percent. In no case shall it be adjusted so as to materially affect the volume of concrete. If the proportions of the aggregate sizes used do not satisfy the gradation requirements specified herein due to changes in the gradation of one or more stockpiles, the proportions shall be adjusted to bring the combined aggregates back within specification limits. These minor adjustments for gradation will not require a new mix design. The mix produced shall be uniform, workable and within the specification limits of the Master Proportion Table for Portland Cement Concrete. When plant operations do not produce a uniform and workable mix, plant operations shall cease and corrective action shall be taken prior to restart.

1) When individual slump, air content, concrete temperature, or gradation measurements indicate that the mix is not uniform and may fall outside tolerance limits, the CONTRACTOR shall immediately make adjustments to keep the mix within specified limits. If the CONTRACTOR fails to make proper adjustments and the mix deviates from specification requirements of if the mix is obviously defective, the mix will be rejected.

2) For workability properties only, changes in mix proportions will be permitted provided the water-cement ratio is not exceeded, minimum cement factor is maintained, proper batch adjustments are made, and prior notification is given to the ENGINEER.

3) No changes in source of materials or percentages of cement, fly ash, ground granulated blast furnace slag, or microsilica shall be made until a new Mix Design form showing the new material or adjusted proportions has been submitted by the CONTRACTOR and approved.

3.6 SUBSTITUTIONS

A. Mixtures may be substituted with approval in accordance with the table below:

Portland Cement Concrete Mixture Substitutions

Structural Class [1]	Substitute
AA (m)	No Substitutions
AA	AA(M)
A	AA(M), AA
D	AA(M), AA, A(M)
F	No Substitutions
P(X)	No Substitutions
P(M)	No Substitutions
P	P(M)
S	No Substitutions
Minor Structure Class [1]	
M	AA(M), AA, A(M), A, B
R	AA(M), AA, A(M), A, B, M
Y	No Substitutions

[1] The mixture being substituted shall meet the requirements of the Master Proportion Table for Portland Cement Concrete and the mix design for its class or type. The compressive strength of the substituted mix shall meet the strength requirements of the original mixture specified.

3.7 **BATCHING AND MIXING**

A. **General**: Concrete shall be thoroughly mixed in a mixer of an approved size and type, which will ensure uniform distribution of materials through the mass.

B. Pick-up and throw-over blades or mixing paddles in the mixing drum or mixing unit shall be replaced when worn beyond the limit recommended by the manufacturer. The contractor shall have available a copy of the manufacturer's design, showing dimensions and arrangements of blades in reference to original height and depth.

C. Mixing operations shall begin within 30 minutes after addition of cement to the aggregates. When cement is charged into a mixer drum containing surface-wet aggregate and the ambient temperature is above 90°F, or when high early strength cement is used, this limit shall be reduced to 15 minutes. When there is an interruption to the mixing operations, the mixer shall be thoroughly cleaned. The entire contents of the mixer shall be removed from the drum before materials for a succeeding batch are placed therein. Materials composing a batch shall be deposited simultaneously in an operating mixer. A portion of mixing water shall entire in advance of cement and aggregates. No mixer having a rated capacity of less than one cubic yard shall be used nor shall a mixer be charged in excess of its rated capacity. The minimum size batch shall be one cubic yard. Mixers with worn blades or excessive build-up will be rejected. Concrete exposed to salt water or a corrosive environment shall be mixed for 2 minutes and the water content of the m mixture shall be carefully controlled.

D. **Central Plant And Site Mixing:** Concrete shall be mixed for at least 50 seconds. Mixing time shall begin after all materials, including water, are in the mixer. Mixing time ends when the discharge chute opens. The mixer shall be equipped with an approved timing device, which will automatically lock the discharge lever when the drum has been charged and release it at the end of the mixing period. During mixing, the mixer shall be operated at a drum speed for which it has been designed as shown on the manufacturer's name plate on the mixer.

E. **Truck Mixing**: Aggregates, cement, fly ash, ground granulated blast furnace slag and microsilica for concrete shall be measured as specified herein and charged into the drum at the proportioning plant.

1. Size of batch in truck mixers shall not exceed the maximum rated mixing capacity of the mixer as stated by the manufacturer and stamped on a metal plate on the mixer. When a truck mixer is used for complete mixing, each batch shall be mixed for not less than 70 nor more than 130 revolutions of the mixer drum at the rate of rotation designated as the mixing speed by the equipment manufacturer on the metal plate on the mixer. Any additional mixing shall be at the speed designated by the equipment manufacturer as the agitating speed. All materials, including mixing water, shall be in the mixer drum before actuating the revolution counter or taking an initial reading.

2. When the prescribed amount of water is added at the beach plant and slump is on the low side at the jobsite it will be permissible to add a minimum of 75 percent of the mixing water at the time cement and aggregates are added at the batch plant and the remaining mixing water at the job site prior to discharging concrete into forms. Water added at the job site may be added in 1 or 2 increments with additional mixing within the range of 20 to 30 revolutions at designated mixer speed for each increment; however, the total of 130 revolutions shall not be exceeded. Water added at the jobsite shall not cause the maximum allowable water-cement ratio or slump of the batch to be exceeded.

3. If water or superplasticizer is allowed to be added to a partial load, only a proportional amount will be added. The method of adding and mixing superplasticizer to the mix shall be in accordance with the manufacturer's recommendation. When the slump is more than the maximum specification limit, the batch will be rejected; additional mixing or agitation to reduce the slump will not be allowed even though the maximum time limit or number of revolutions have not been exceeded.

4. Slump tests, unit weight, acceptance cylinders, and temperature measurements will not be made until all mixing water has been added to the batch.

F. **Partial Mixing at Central Plant**: When partial mixing is allowed at a central plant, the mixing time at the central plant may be reduced to 30 seconds. Additional required mixing shall be completed in a truck mixer at mixing speed. Mixing time in the truck mixer shall be a minimum of 10 and a maximum of 70 revolutions.

3.8 TEMPERATURE LIMITATIONS

A. **General:** Air temperature and mix temperature shall be determined at the point of placement in the shade away from artificial heat.

B. **Hot Weather Limitations:** Hot weather limitations shall apply to concrete for:

1. Bridge Decks, Approach Slabs, And Mass Concrete: Hot weather concreting practices will be required when the job site temperature in the shade and away from artificial heat is 80°F and rising. When internal temperature of plastic concrete reaches 85°F, the contractor shall prevent the temperature of succeeding batches from going beyond 90°F by approved methods. If necessary, forms shall be precooled by approved methods immediately prior to concrete placement.

C. **Cold Weather Limitations:** Mixing and concreting operations for concrete mixes not containing ground granulated blast-furnace slag or Type IS cement shall be discontinued when a descending air temperature in the shade and away from artificial heat reaches 40°F, and shall not be resumed until an ascending air temperature in the shade and away from artificial heat reaches 35°F provided the high temperature forecasted by the U.S. Weather Service is above 40°F. For concrete mixes, containing ground granulated blast-furnace slag or Type IS cement, operations shall be discontinued at a descending air temperature in the shade and away from artificial heat of 55°F. Production shall not begin until the temperature at the point of placement is within the above limitations. Concrete shall not be placed if the U.S Weather Service forecasts the temperature to be less than 35°F within the 24-hour period following placement unless authorized in writing.

1. When concrete placement at lower air temperatures is authorized in writing, aggregates may be heated by either steam or dry heat prior to being placed in the mixer. The apparatus used shall heat the mass uniformly and shall be arranged to prevent occurrence of overheated areas. If the air temperature is less than 35°F at the time of placing concrete, the ENGINEER may require water or aggregates to be heated to not less than 70° nor more than 150°F. After placement, the concrete shall be protected by additional covering, insulating materials, or other methods approved by the ENGINEER.

3.9 TIME LIMITATIONS

A. The maximum allowable time from the addition of cement to the mix to complete discharge of the concrete shall be 90 minutes or a maximum of 300 revolutions, whichever may occur first. When transport is by non-agitator truck, the maximum allowable time from the addition of cement to the mix to complete discharge of the concrete shall be 45 minutes. In hot weather or any other conditions contributing to rapid loss of plasticity or uniformity of concrete, maximum allowable time may be reduced by the ENGINEER.

3.10 HAULING EQUIPMENT

A. Wet batches of concrete may be transported in a truck mixer, agitator or other approved equipment. Non-agitator trucks will not be allowed for structural concrete, but will be permitted for pavement concrete when air-entrainment admixture is used. Maximum volume of mixed concrete transported in an agitator truck at agitation speed shall be in accordance with the manufacturer’s specified rating.

3.11 PORTABLE MIXERS

A. Portable mixers shall be approved in writing for mixing one cubic yard of concrete or less per day for minor structure concrete

3.12 **DELIVERY**

A. Sufficient plant capacity and transporting equipment to ensure delivery at the required rate shall be provided. Rate of concrete delivery during concreting operations shall provide for proper handling, placing and finishing of concrete and maintain a workable surface. Methods of delivering and handling concrete shall facilitate placing with a minimum of re-handling and without damage to the structure or concrete.

3.13 **ACCEPTANCE AND PAYMENT SCHEDULE**

A. Acceptance and payment schedules in the tables below will apply to all cast-in-place structural Portland cement concrete.

Acceptance and Payment Schedule
Cast-In-Place Structural Concrete

Average Compressive Strength per Lot, PSI (28 to 31 days)					
Class A or S	Class AA	Class A(M) or AA(M)	Class D	Class F	Percent of Contract Price
3800 & Above 3400 – 3799 3000 – 3399 Below 3000	4200 & Above 3800-4199 3500-3799 Below 3500	4400 & above 4200-4199 4000-4199 Below 4000	3300 & above 3000-3299 2500-2999 Below 2500	3400 & above --- --- Below 3400	100 98 90 50 or remove and replace[2]

[1]When concrete is part of an item or not a direct pay item, lot sizes, sampling and acceptance testing for the required quantities will be in accordance with Subsection 805.18. The value for each cubic yard required will be assessed at $350 ($460) for the purpose of applying payment adjustment percentages. The amount of payment adjustment for the quantity of concrete involved will be deducted from payment.

Acceptance and payment schedules shall apply to the contract item itself for cast-in-place piling.

[2]When the average compressive strength of **any batch in a lot** is less than 4000 psi for Class A(M) or AA(M), less than 3500 psi for Class AA, less than 3000 psi for Class A or S, less than 2500 psi for Class D, or less than 3400 psi for Class F, an investigation will be made. If concrete is allowed to remain in place, payment will be based on the average compressive strength for the lot. If concrete is not allowed to remain in place, the identifiable deficient areas shall be removed and replaced at no direct pay.

When the average compressive strength for a **lot** is less than 4000 psi for Class A(M) or AA(M), less than 3500 psi for Class AA, less than 3000 psi for Class A or S, less than 2500 psi for Class D, or less than 3400 psi for Class F, an investigation will be made. If concrete is allowed to remain in place, payment for the lot will be based on 50 percent of the contract price.

Any cores obtained in these investigations will be used for evaluation purposes only and payment will be based on original acceptance samples.

Acceptance and Payment Schedule
Minor Structural Concrete

Average Compressive Strength, psi (28 to 31 days)		
Class M or Y	Class R	Percent of Contract Price [1]
3000 & Above Below 3000	1800 & Above Below 1800	100 50 or Remove [2]

[1]When concrete is part of an item or not a direct pay item, sampling and acceptance testing for the required quantities shall be in accordance with this section. The value for each cubic yard of concrete required will be assessed at $350 for the purpose of applying payment adjustment percentages. The amount of payment adjustment for the quantity of concrete involved will be deducted from payment.

[2]When the average compressive strength is less than 3,000 psi for Class M or Y, and 1,800 psi for Class R, an investigation will be made. If concrete is allowed to remain in place, payment will be based on 50 percent of the contract price.

Any cores obtained in these investigations will be used for evaluation purposes only. Payment will be based on original acceptance samples.

- END OF SECTION -

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SECTION 05500 - MISCELLANEOUS METALWORK

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. The CONTRACTOR shall provide miscellaneous metalwork and appurtenances, complete and in place, in accordance with the Contract Documents.

1.2 CONTRACTOR SUBMITTALS, SAMPLING, AND TESTING

A. The CONTRACTOR shall furnish submittals in accordance with Section 01010.

B. **Structural Steel:** The CONTRACTOR shall submit the following:

1) **Source Approval/Submittal:** The CONTRACTOR shall submit shop drawings for all structural steel fabrications. Shop Drawings shall conform to AISC recommendations and specifications and shall show all holes, etc. required for other work. Drawings shall include complete details showing all members and their connections, anchor bolt layouts, schedules for fabrication procedures, and diagrams showing the sequence of erection. Mill certificates for all fabrications indicating compliance with all referenced specifications shall be submitted.

2) **Acceptance:** Prior to acceptance of the WORK, the CONTRACTOR shall submit a signed certificate certifying compliance with the requirements of this specification section with each shipment of structural steel to the WORK.

3) **Verification:** If desired, the ENGINEER may conduct inspection of all fabrications as indicated in Part 3 of this specifications section.

C. **Aluminum Railings:**

1) **Source Approval/Submittal:** The CONTRACTOR shall submit shop drawings for all aluminum railings. Drawings shall include complete details showing all members and their connections, anchor bolt layouts, schedules for fabrication procedures, and diagrams showing the sequence of erection. Mill certificates for all fabrications indicating compliance with all referenced specifications shall be submitted.

2) **Acceptance:** Prior to acceptance of the WORK, the CONTRACTOR shall submit a signed certificate certifying compliance with the requirements of this specification section with each shipment of aluminum railing to the WORK.

D. **Metal Grating:**

1) **Source Approval/Submittal:** The CONTRACTOR shall submit shop drawings for all metal grating. Drawings shall include complete details showing all members and their connections, anchor bolts, schedules for fabrication procedures, and diagrams showing the sequence of erection. Layout drawings for grating, showing the direction of span, type and depth of grating, size and shape of grating panels, seat angle details, and

details of grating hold down fasteners shall be submitted. Load and deflection tables shall be submitted for each style and depth of grating used.

2) Mill certificates for all fabrications indicating compliance with all referenced specifications shall be submitted.

3) **Acceptance:** Prior to acceptance of the WORK, the CONTRACTOR shall submit a signed certificate certifying compliance with the requirements of this specification section with each shipment of grating stair treads to the WORK.

E. **Bolts and Anchors:**

1) **Source Approval/Submittal:** The CONTRACTOR shall submit product data for all bolts and anchors. Anchors shall be submitted with an ICBO report listing the ultimate load capacity in tension and shear for each size and type of concrete anchor. CONTRACTOR shall submit manufacturer's recommended installation instructions and procedures for adhesive anchors. Upon review by ENGINEER, these instructions shall be followed specifically.

2) **Acceptance:** Prior to acceptance of the WORK, the CONTRACTOR shall submit a signed certificate certifying compliance with the requirements of this specification section with each shipment of bolts and anchors to the WORK.

F. **Powder Driven Pins:**

1) **Source Approval/Submittal:** The CONTRACTOR shall submit product data for all powder driven pins. Powder driven pins shall be submitted with an ICBO report listing the ultimate load capacity in tension and shear for each size and type of powder driven pins. CONTRACTOR shall submit manufacturer's recommended installation instructions and procedures for the pins. Upon review by ENGINEER, these instructions shall be followed specifically.

2) **Acceptance:** Prior to acceptance of the WORK, the CONTRACTOR shall submit a signed certificate certifying compliance with the requirements of this specification section with each shipment of powder driven pins to the WORK.

G. **Impact Anchors:**

1) **Source Approval/Submittal:** The CONTRACTOR shall submit product data for all impact anchors. Anchors shall be submitted with an ICBO report listing the ultimate load capacity in tension and shear for each size and type of impact anchor. CONTRACTOR shall submit manufacturer's recommended installation instructions and procedures for the pins. Upon review by ENGINEER, these instructions shall be followed specifically.

2) **Acceptance:** Prior to acceptance of the WORK, the CONTRACTOR shall submit a signed certificate certifying compliance with the requirements of

this specification section with each shipment of impact anchors to the WORK.

1.3 REFERENCE STANDARDS

A. Aluminum Association

AA	Aluminum Association Designation System for Anodized Aluminum Finishes

B. American Association of State Highway and Transportation Officials

AASHTO HS-20	Standard Live Loads for Bridges

C. American Institute for Steel Construction

AISC LRFD	Standard Specification for Structural Steel Buildings
AISC CSP	Code of Standard Practice

D. American Welding Society (AWS)

AWS D1.1	Structural Welding Code
AWS WH	Welding Handbook

E. ASTM International (ASTM)

ASTM A36	Standard Specification for Carbon Structural Steel
ASTM A48	Standard Specification for Gray Iron Castings
ASTM A53	Standard Specification for Pipe, Steel, Black and Hot – Dipped, Zinc Coated, Welded and Seamless
ASTM A193	Standard Specification for Alloy-Steel and Stainless Steel Bolting for High – Temperature or High Pressure Service and Other Special Purpose Applications
ASTM A194	Standard Specification for Carbon Steel, Alloy Steel, and Stainless Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both
ASTM A307	Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod
ASTM A325	Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Streated, 120 KSI
ASTM A500	Standard Specification for Cold – Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
ASTM A992	Standard Specification for Structural Steel Shapes

F. Code of Federal Regulations

29CFR1910	General Occupational Industry Health and Safety Standards

G. International Organization for Standardization

ISO 898	Mechanical and Physical Properties for Fasteners

PART 2 -- PRODUCTS

2.1 GENERAL REQUIREMENTS

A. **Corrosion Protection:** Unless otherwise indicated, fabricated steel metalwork which will be used in a corrosive environment and/or will be submerged in water/wastewater shall be coated in accordance with Section 09800 - Protective Coating and shall not be galvanized prior to coating. Other miscellaneous steel metalwork shall be hot-dip galvanized after fabrication.

B. **Stainless Steel:** Unless otherwise indicated, stainless steel metalwork and bolts shall be of Type 316 stainless steel. Where anaerobic conditions are noted, Type 304 stainless steel shall be used.

C. **Aluminum:** Unless otherwise indicated, aluminum metalwork shall be of Alloy 6061-T6. Aluminum in contact with concrete, masonry, wood, porous materials, or dissimilar metals shall have contact surfaces coated in accordance with Section 09800.

D. **Cast Iron:** Unless otherwise indicated, iron castings shall conform to the requirements of ASTM A 48, Class 50B or better.

2.2 STRUCTURAL STEEL

A. **Structural Steel:** Structural steel shall comply with the table below:

Wide Flange Shapes	ASTM A 992
Other Shapes, Plates, Bars	ASTM A 36
Pipe, Pipe Columns, Bollards	ASTM A 53, Type E or S, Grade B standard weight unless noted otherwise
HSS	ASTM A 500 Grade B

B. Bolts for connections shall be ASTM A 325, unless indicated otherwise. Bolts used to connect dissimilar metals shall be ASTM A 193 and A 194, Type 316 stainless steel.

C. Welded anchor studs shall be headed concrete anchor studs (HAS), or deformed bar anchors (DBA), or threaded studs (TAS), as indicated on the Drawings and as supplied by **Nelson Stud Welding Company**, Lorain, OH; **Omark Industries, KSM Fastening Systems Division**, Seattle, WA, or Portland, OR; or equal.

D. Structural steel shall be cleaned and coated in accordance with Section 09800 - Protective Coating.

E. Steel members in contact with aluminum shall be galvanized as specified herein, unless indicated otherwise.

F. Structural members shall be furnished full length without splices unless otherwise indicated or approved by the ENGINEER.

2.3 ALUMINUM RAILINGS

A. **General:** Aluminum handrails and railings shall be component systems complete with anchors, attachments, balusters, brackets, caps, fasteners, gates (swing with self-latching hardware or be removable), posts, sleeves, trim, and any other related items required or necessary for a complete installation. Gates and removable rail sections shall be complete with hardware such as self-closing hinges, self-latching latches, hasps, etc. Railings shall conform to the International Building Code and OSHA General Industry Occupational Safety and Health Standards (29CFR1910).

B. **Materials:** Materials shall conform to the following:

1. **Aluminum:** Aluminum shall be U.S. Alloy 6063 T-5 or T-6. Aluminum pipe rail shall not be less than 1-1/2 inch diameter Schedule 40 pipe.

2. **Electrolysis Protection:** Electrolysis protective material shall be in accordance with Section 09800.

3. **Sleeves:** Sleeves shall be of galvanized steel or PVC.

4. **Grout:** Grout for handrail posts shall consist of an inorganic, non-shrink, non-metallic premixed grout in accordance with Section 03315 - Grout with a minimum 28 Day compressive strength of 4,000 psi.

5. **Fasteners:** Fasteners, screws, and bolts shall be concealed and shall be of stainless steel or aluminum.

6. **Welding Rods:** Aluminum welding rods shall be of a type recommended by the aluminum manufacturer for anodized finished products.

7. **Kickplates:** Kickplates shall be provided on railings, not set in curbs.

C. **Finishes:** Pipe railing system including handrails, railings, tube caps, and other miscellaneous parts of rails shall be provided with a clear anodized finish, AA-M32C22A41.

D. **Manufacturers or Equal**

1. **C-V Pipe Rail** by **Crane Veyor Corp.**

2. **Connectorail** by **Julius Blum and Co.**

3. **Speed – Rail** by **Hollaender**

2.4 METAL GRATING

A. **General:** Metal grating shall be of the design, sizes, and types indicated. Grating shall be completely banded at edges and cutouts using material and cross section equivalent to the bearing bars. Such banding shall be welded to each cut bearing bar. Grating shall be supported around an opening by support members. Where grating is supported on concrete, embedded support angles matching grating material shall be used, unless indicated otherwise. Such angles shall be mitered and welded at corners.

1. Pieces of grating shall be fastened in 2 locations to each support.

2. Where grating forms the landing at the top of a stairway, the edge of the grating that forms the top riser shall have an integral non-slip nosing, width equal to that of the stairway.

3. Where grating depth is not given, grating shall be provided that will be within allowable stress levels and which shall not exceed a deflection of 1/4-inch or the span divided by 180, whichever is less. For standard duty plank and safety grating, the loading to be used for determining stresses and deflections shall be the uniform live load of the adjacent floor or 100 psf, whichever is greater or a concentrated load of 1000 pounds. For heavy duty grating, the loading used for determining stresses and deflections shall be AASHTO HS-20.

B. **Material**

1. Except where indicated otherwise, bar grating shall be fabricated entirely of aluminum as follows: Bearing and banding bars, alloy 6061-T6; cross bars, alloy 6063-T5.

2. Safety grating shall be fabricated of aluminum alloy 5052-H32.

3. Plank grating shall be fabricated of aluminum alloy 6063-T6.

4. Grating that may be partially or wholly submerged shall be fabricated entirely of stainless steel, Type 316.

C. **Standard-Duty Grating**

1. No single piece of grating shall weigh more than 80 pounds, unless indicated otherwise. Standard duty grating shall be serrated bar grating.

2. Cross bars shall be welded or mechanically locked tightly into position so that there is no movement allowed between bearing and cross bars.

D. **Safety Grating**

1. Safety grating shall be made of sheet metal punched into an open serrated diamond pattern and be formed into plank sections. The open diamond shapes shall be approximately 1-7/8 inch by 11/16-inch in size. Safety grating shall be **Grip Strut** by **Metal Products Division, United States Gypsum Company; Deck Span** by **IKG Industries**, or equal.

E. **Heavy-Duty Grating:** Heavy-duty grating shall be welded steel, galvanized after fabrication. Cross bars shall be welded in position.

F. **Plank Grating**

1. Plank grating shall be extruded in 6-inch widths with a minimum of 6 integral 1-bar type bearing bars per plank. The top surface shall be solid with raised ribs, unless indicated otherwise. Where punched grating is required, the top surface shall be provided with a pattern of 3-inch by 19/32-inch rectangular openings spaced at 4-inches on center. The planks shall have continuous tongue and groove type interlock at each side, except that interlocking planks shall be arranged so that any 4-foot wide section may be removed independently from the other grating sections.

2. Plank grating shall be provided with a clear anodized finish, except that punched grating may have standard mill finish.

2.5 **BOLTS AND ANCHORS**

A. Unless otherwise indicated, stainless steel bolts, anchor bolts, nuts, and washers shall be Type 316 stainless steel, Class 2, conforming to ASTM A 193 for bolts and to ASTM A 194 for nuts. Threads on stainless steel bolts shall be protected with an antiseize lubricant suitable for submerged stainless steel bolts, to meet government specification MIL-A-907E. Buried bolts in poorly drained soil shall be coated the same as the buried pipe.

1. Antiseize lubricant shall be classified as acceptable for potable water use by the NSF.

2. Antiseize lubricant shall be "PURE WHITE" by **Anti-Seize Technology,** Franklin Park, IL, 60131, AS-470 by **Dixon Ticonderoga Company,** Lakehurst, NJ, 08733, or equal.

B. **Bolt Requirements**

1. The bolt and nut material shall be free-cutting steel.

2. The nuts shall be capable of developing the full strength of the bolts. Threads shall be Coarse Thread Series conforming to the requirements of the American Standard for Screw Threads. Bolts and cap screws shall have hexagon heads and nuts shall be Heavy Hexagon Series.

3. Bolts and nuts shall be installed with washers fabricated of material matching the base material of bolts, except that hardened washers for high strength bolts shall conform to the requirements of the AISC Specification. Lock washers fabricated of material matching the bolts shall be installed where indicated.

4. The length of each bolt shall be such that the bolt extends at least 1/8-inch beyond the outside face of the nut before tightening, except for anchor bolts, which shall be flush with the face of the nut before tightening.

C. **Adhesive Anchors and Rods:** Unless otherwise indicated, drilled concrete or masonry anchors shall be adhesive anchor and rod systems as specified below.

1. Adhesive anchors and rods shall employ an injectable adhesive. Adhesive shall be furnished in side-by-side refill packets that keep components separate prior to installation. Side – by – side refill packets shall accept static mixing nozzles which thoroughly combines components and allows injection directly into drilled hole. Only

injection tools and static mixing nozzles as recommended by manufacturer shall be used. Manufacturer's recommended instructions shall be followed. Injection adhesive shall be **HILTI – HY 500 MAX – SD** or equal.

2. Anchor rods shall be furnished with chamfered ends so that either end will accept a nut and washer. Alternatively, anchor rods shall be furnished with at 45 degree chisel end on one end to allow for easy insertion into an adhesive – filled hole. Anchor rods shall be manufactured to meet ISO 898 Class 5.8, ASTM A193 Grade B7 (high strength carbon steel anchor). Anchor rods shall be **HILTI HAS Rods** or equal.

D. **Expanding-Type Anchors:** Expanding-type anchors if indicated or permitted, shall be galvanized steel expansion type **ITW Ramset/Redhead "Trubolt" anchors; McCullock Industries "Kwick-Bolt;"** or equal. Lead caulking anchors will not be permitted. Size shall be as indicated. Embedment depth shall be as the manufacturer recommends for the load to be supported. Expansion type anchors that are to be embedded in grout may be steel. Non-embedded buried or submerged anchors shall be stainless steel.

E. **Non-Shrink Grouted Anchors**: Anchors, if indicated or permitted, shall be grouted with a non-shrink cementitious grout in accordance with the manufacturer's recommendation. Embedment depth shall be as the manufacturer recommends for the load to be supported. Non-shrink grout material shall be Class B or C in accordance with Section 03315 - Grout.

PART 3 -- EXECUTION

3.1 GENERAL

A. **Measurements:** The CONTRACTOR shall verify all dimensions and shall make any field measurements necessary and shall be fully responsible for accuracy and layout of work. The CONTRACTOR shall review the Drawings, and any discrepancies shall be reported to the ENGINEER for clarification prior to starting fabrication.

3.2 STRUCTURAL STEEL

A. **Fabrication:** Structural steel shall be fabricated in accordance with the Drawings, AISC Specifications, and as shown on the Shop Drawings. Materials shall be properly marked and match-marked for field assembly. Where finishing is required, assembly shall be completed including bolting and welding of units, before start of finishing operations.

B. **Connections:** Shop and field connections shall be bolted or welded as indicated. All connections shall develop full strength of members joined and shall conform to AISC standard connections. Unless otherwise indicated, welds shall conform to AISC LRFD Specification for Structural Steel Buildings.

C. **Welded Construction:** The CONTRACTOR shall comply with the current AWS D1.1 Code for procedures, appearance, and quality of welds and welders, and methods used in correcting welding work. All welded architectural metal work where exposed to view shall have welds ground smooth. Shielded metal arc welding method or gas metal arc welding methods shall be used for welding structural steel.

D. **Holes for Other Work:** Holes shall be provided as necessary or as indicated for securing other work to structural steel framing, and for the passage of other work through steel framing members. No torch cut holes will be permitted.

E. **Shop Paint Primer:** Shop paint primer shall be applied in accordance with Section 09800. Omit shop applied primer at field weld locations, for the portion of a member to be embedded in concrete, and where galvanizing with no further coating is required.

F. **Delivery, Storage, and Handling:** Structural members shall be loaded in such a manner that they may be transported and unloaded without being excessively stressed, deformed, or otherwise damaged. Structural steel members and packaged materials shall be protected from corrosion and deterioration. Material shall be stored in a dry area and shall not be placed in direct contact with the ground. Materials shall not be placed on the structure in a manner that might cause distortion or damage to the members or the supporting structures. The CONTRACTOR shall repair or replace damaged materials or structures as directed.

G. **Erection:** The CONTRACTOR shall comply with the AISC Specifications and Code of Standard Practice, and with indicated requirements. High-strength bolts shall be installed in accordance with the AISC Specification for Structural Joints using ASTM A 325 Bolts. The connections shall be the friction type, unless indicated otherwise. Anchor bolts and other connectors required for securing structural steel to in-place WORK and templates and other devices for presetting bolts and other anchors to accurate locations shall be furnished by the CONTRACTOR. The CONTRACTOR shall be responsible for designing and installing any temporary bracing required for the safe erection of all structural steel members.

H. **Field Assembly:** Structural frames shall be set accurately to the lines and elevations indicated. The various members shall be aligned and adjusted to form a part of a complete frame or structure before permanently fastening. Bearing surfaces and other surfaces which will be in permanent contact shall be cleaned before assembly. Necessary adjustments to compensate for discrepancies in elevations and alignments shall be performed. Individual members of the structure shall be leveled and plumbed within AISC tolerances. Required leveling and plumbing measurements shall be established on the mean operating temperature of the structure.

I. **Misfits at Bolted Connections:** Where misfits in erection bolting are encountered, the ENGINEER shall be immediately notified. The CONTRACTOR shall submit a method to remedy the misfit for review by the ENGINEER. The ENGINEER will determine whether the remedy is acceptable or if the member must be refabricated. Incorrectly sized or misaligned holes in members shall not be enlarged by burning or by the use of drift pins. Correction of misfits is part of the WORK.

J. **Gas Cutting:** Gas cutting torches shall not be used in the field for correcting fabrication errors in the structural framing, except when approved by the ENGINEER. Gas-cut sections shall be finished equal to a sheared appearance.

K. **Touch – Up Painting:** Immediately after erection, field welds, bolted connections, and abraded areas shall be cleaned of the shop paint primer. Touch-up paint primer shall be applied by brush or spray which is the same thickness and material as that used for the shop paint. Galvanized surfaces which have been field welded or damaged shall be repaired in accordance with Section 05500. Finish painting of all structural steel shall be as indicated in Section 09800.

3.3 RAILINGS

A. **Aluminum Railings:** Aluminum railing fabrication and installation shall be performed by craftsmen experienced in the fabrication of architectural metalwork. Exposed surfaces

shall be free from defects or other surface blemishes. Dimensions and conditions shall be verified in the field. Joints, junctions, miters, and butting sections shall be precision fitted with no gaps occurring between sections, and with surfaces flush and aligned. Electrolysis protection of materials shall be provided.

B. **Steel Railings:** Field welding of steel pipe handrail joints will be permitted only if approved by the ENGINEER, and then only in accordance with its instructions.

3.4 WELDING

A. **Method:** Welding shall be by the metal-arc method or gas-shielded arc method as described in the American Welding Society's "Welding Handbook" as supplemented by other pertinent standards of the AWS. Qualification of welders shall be in accordance with the AWS Standards governing same.

B. **Quality:** In assembly and during welding, the component parts shall be adequately clamped, supported, and restrained to minimize distortion and for control of dimensions. Weld reinforcement shall be as indicated by the AWS Code. Upon completion of welding, weld splatter, flux, slag, and burrs left by attachments shall be removed. Welds shall be repaired to produce a workmanlike appearance, with uniform weld contours and dimensions. Sharp corners of material that is to be painted or coated shall be ground to a minimum of 1/32-inch on the flat.

3.5 GALVANIZING

A. Structural steel plates shapes, bars, and fabricated assemblies required to be galvanized shall, after the steel has been thoroughly cleaned of rust and scale, be galvanized in accordance with the requirements of ASTM A 123. Any galvanized part that becomes warped during the galvanizing operation shall be straightened. Bolts, anchor bolts, nuts, and similar threaded fasteners, after being properly cleaned, shall be galvanized in accordance with the requirements of ASTM A 153.

B. Field repairs to damaged galvanizing shall be made by preparing the surface and applying a coating.

1. Surface preparation shall consist of removing oil, grease, soil, and soluble material by cleaning with water and detergent (SSPC SP1) followed by brush off blast cleaning (SSPC SP7), over an area extending at least 4-inches into the undamaged area.

2. Coating shall be applied to at least 3-mils dry film thickness. Use **Zinc-Clad XI** by **Sherwin-Williams**, **Galvax** by **Alvin Products**, or **Galvite** by **ZRC Worldwide**.

3.6 DRILLED ANCHORS

A. Drilled anchors and reinforcing bars shall be installed in strict accordance with the manufacturer's instructions. Holes shall be roughened with a brush on a power drill, cleaned and dry. Drilled anchors shall not be installed until the concrete has reached the required 28-day compressive strength. Adhesive anchors shall not be loaded until the adhesive has reached its indicated strength in accordance with the manufacturer's instructions.

- END OF SECTION -

SECTION 09800 - PROTECTIVE COATINGS

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. The CONTRACTOR shall provide protective coatings, complete and in place, in accordance with the Contract Documents.

B. Definitions

1. The term "paint," "coatings," or "finishes" as used herein, shall include surface treatments, emulsions, enamels, paints, epoxy resins, and all other protective coatings, excepting galvanizing or anodizing, whether used as a pretreatment, primer, intermediate coat, or finish coat.

2. The term "DFT" means minimum dry film thickness, without any negative tolerance.

C. The following surfaces shall not be protective coated:

1. Concrete, unless required by items on the concrete coating schedule below or the Drawings.

2. Stainless steel

3. Machined surfaces

4. Grease fittings

5. Equipment nameplates

6. Platform gratings, stair treads, door thresholds, and other walk surfaces, unless specifically indicated to be coated.

7. Galvanized steel, unless specifically noted to be coated on the drawings.

D. The coating system schedules included herein and/or on the drawings summarize the surfaces to be coated, the required surface preparation, and the coating systems to be applied. Coating notes on the Drawings are used to show or extend the limits of coating schedules, to show exceptions to the schedules, or to clarify or show details for application of the coating systems.

1.2 REFERENCE STANDARDS

A. American Water Works Association (AWWA)

AWWA/ANSI C213 Fusion Bonded Epoxy Coating

B. ASTM International (ASTM)

ASTM C309 Standard Specification for Liquid Membrane Forming Compounds for Curing Concrete

ASTM D412	Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers – Tension
ASTM D624	Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers

C. Code of Federal Regulations

29CFR1910.1200	Occupational Safety and Health Standards

D. United States Environmental Protection Agency (US EPA)

Method 524.1	Measurement of Volatile Organic Compounds in Water by Purge and Trap Gas Chromatography/Mass Spectrometry
Method 524.2	Measurement of Purgeable Organic Copmounds in Water by Capillary Column Gas Chromatography/Mass Spectrometry

E. Federal Specifications

TT-P-28	Paint, Aluminum, Heat Resisting

F. National Association of Corrosion Engineers (NACE)

TM-01-70	Standard Test Method – Visual Standard for Surfaces of New Steel Air – Blast Cleaned with Sand Abrasive
TM-01-75	Visual Standard for Surfaces of New Steel Centrifugally Blast Cleaned with Steel Grit and Shot

G. National Sanitation Foundation (NSF)

NSF 61	Drinking Water System Components – Health Effects

H. Society for Protective Coatings (SSPC)

SSPC SP1	Surface Preparation – Solvent Cleaning
SSPC SP2	Surface Preparation – Hand Tool Cleaning
SSPC SP3	Surface Preparation – Power Tool Cleaning
SSPC SP5	Surface Preparation – White Metal Blasting
SSPC SP6	Surface Preparation – Commercial Blasting
SSPC SP7	Surface Preparation – Brush Off Blasting
SSPC SP10	Surface Preparation – Near White Blasting

1.3 CONTRACTOR SUBMITTALS, SAMPLING, AND TESTING

A. **General:** Submittals shall be furnished in accordance with Section 01010 unless indicated otherwise below.

B. Submittal/Source Approval: Submittals shall include the following information and be submitted at least 30 days prior to protective coating work:

1. Coating Materials List: Submit a coating materials list showing the manufacturer and the coating number, keyed to the coating systems herein.

2. Paint Manufacturer's Information: For each coating system to be used, the following data:

1. Paint manufacturer's data sheet for each product proposed, including statements on the suitability of the material for the intended use.

2. Technical and performance information that demonstrates compliance with the system performance and material requirements.

3. Paint manufacturer's instructions and recommendations on surface preparation and application.

4. Colors available for each product (where applicable).

5. Compatibility of shop and field applied coatings (where applicable).

6. Material Safety Data Sheet for each product used.

C. **Piping and Valve Identification:** Submit product information for piping and valve identification materials.

1.4 SPECIAL CORRECTION OF DEFECTS REQUIREMENTS

A. **Warranty Inspection:** A warranty inspection may be conducted during the eleventh month following completion of all coating and painting work. The CONTRACTOR and a representative of the coating material manufacturer shall attend this inspection. All defective work shall be repaired in accordance with these specifications and to the satisfaction of the OWNER. The OWNER may, by written notice to the CONTRACTOR, reschedule the warranty inspection to another date within the one-year correction period, or may cancel the warranty inspection altogether. If a warranty inspection is not held, the CONTRACTOR is not relieved of its responsibilities under the Contract Documents.

B. **Extended Maintenance of Chemical Tank Lining Systems:** The CONTRACTOR shall promptly repair any defects in the chemical resistant sheet lining system for a period of 2 years after the lining has been placed into service. Such maintenance shall include repair of the chemical tank and any equipment or facilities damaged by the corrosive action of the chemicals.

C. **Steel Reservoir Coating System Inspection:** The CONTRACTOR shall conduct an inspection during the eleventh month after the date when the reservoir was filled with water and placed into service. The CONTRACTOR shall require a representative of the coating material manufacturer to attend the inspection. All coating defects shall be repaired in accordance with these specifications and to the satisfaction of the OWNER. If a warranty inspection is not held during or before the eleventh month, the CONTRACTOR is not relieved of its warranty responsibilities under the Contract Documents. If the CONTRACTOR fails to conduct an 11 month inspection for reasons not attributed to the OWNER, the CONTRACTOR is not relieved of the warranty

responsibilities under the Contract Documents, and the warranty period shall be extended until the 11 month inspection is conducted and defective work is repaired.

1.5 PIPING AND VALVE IDENTIFICATION

A. The CONTRACTOR shall provide identification for exposed piping and valves, complete and in place, in accordance with the Contract Documents.

PART 2 -- PRODUCTS

2.1 GENERAL

A. **Suitability:** The CONTRACTOR shall use suitable coating materials as recommended by the manufacturer. Materials shall comply with Volatile Organic Compound (VOC) limits applicable at the Site.

B. **Material Sources:** Where manufacturers and product numbers are listed, it is to show the type and quality of coatings that are required. If a named product does not comply with VOC limits in effect at the time of bid opening, that product will not be accepted, and the CONTRACTOR shall propose a substitution product of equal quality that does comply. Unless indicated otherwise, proposed substitute materials will be considered as indicated above. Coating materials shall be materials that have a record of satisfactory performance in industrial plants, manufacturing facilities, and water and wastewater treatment plants.

C. **Compatibility:** In any coating system only compatible materials from a single manufacturer shall be used in the work. Particular attention shall be directed to compatibility of primers and finish coats. If necessary, a barrier coat shall be applied between existing prime coat and subsequent field coats to ensure compatibility.

D. **Containers:** Coating materials shall be sealed in containers that plainly show the designated name, formula or specification number, batch number, color, date of manufacture, and name of manufacturer, all of which shall be plainly legible at the time of use.

E. **Colors:** All colors and shades of colors of all coats of paint shall be as indicated or selected by the ENGINEER. Each coat shall be of a slightly different shade, to facilitate inspection of surface coverage of each coat. Finish colors shall be as selected from the manufacturer's standard color samples by the ENGINEER.

F. Substitute or "Or-Equal" Products

1. To establish equality of products in accordance with the Contract Documents, the CONTRACTOR shall furnish satisfactory documentation from the manufacturer of the proposed substitute or "or-equal" product that the material meets the indicated requirements and is equivalent or better in the following properties:

    1. Quality

    2. Durability

    3. Resistance to abrasion and physical damage

    4. Life expectancy

5. Ability to recoat in future

6. Solids content by volume

7. Dry film thickness per coat

8. Compatibility with other coatings

9. Suitability for the intended service

10. Resistance to chemical attack

11. Temperature limitations in service and during application

12. Type and quality of recommended undercoats and topcoats

13. Ease of application

14. Ease of repairing damaged areas

15. Stability of colors

2. Protective coating materials shall be standard products produced by recognized manufacturers who are regularly engaged in production of such materials for essentially identical service conditions. Where requested, the CONTRACTOR shall provide the ENGINEER with the names of not less than 10 successful applications of the proposed manufacturer's products that comply with these requirements.

3. If a proposed substitution requires changes in the WORK, the CONTRACTOR shall bear all such costs involved as part of the WORK.

2.2 INDUSTRIAL COATING SYSTEMS

A. **System 3 - Aluminum Silicone Resin:** Aluminum silicone resin material shall be suitable for a service temperature of up to 1,000 degrees F, and shall comply with Federal Specification TT-P-28 - Paint, Aluminum, Heat Resisting (1200 degrees F).

1. Option 1:

1. Prime coat (DFT = 0.7-1.0 mils), **Sherwin Williams N43S150 Aluminum** or equal.

2. Finish coat (DFT = 0.7-1.0 mils), **Sherwin Williams N43S150 Aluminum** or equal

3. Total system DFT = 1.4-2.0 mils.

2. Option 2:

1. Prime coat (DFT = 3-4 mils), **Carboline Thermaline** or Equal

B. **System 4 - Aliphatic Polyurethane:** Two component aliphatic acrylic polyurethane coating material shall provide superior color and gloss retention, resistance to splash from acid and alkaline chemicals, resistance to chemical fumes and severe weathering

and with a minimum solids content of 58 percent by volume. Primer shall be a rust inhibitive two component epoxy coating with a minimum solids content of 68 percent by volume.

1. Prime coat DFT = 4 mils, **Ameron 385, Carboline 890, Tnemec 69**, **Sherwin – Williams Macropoxy 646 FC Epoxy B58-600 Series**, or equal.

2. Finish coat (one or more, DFT = 3 mils), **Ameron Amershield, Carbothane 134 HG, Tnemec 1074U, Sherwin – Williams Acroline 218 HS Polyurethane B65-600 Series,** or equal.

3. Total system DFT = 7 mils.

4. More than one finish coat shall be applied as necessary to produce a finish with uniform color and texture.

C. **System 5 - Inorganic Zinc/Polyurethane:** The inorganic zinc primer shall be a water or solvent based, self-curing, zinc silicate two-component inorganic coating which contains at least 85 percent of metallic zinc by weight in the dried film, and is recommended by the coating manufacturer as a primer for this system. The intermediate coat shall be a high-build two component epoxy with a solids content of at least 69 percent by volume. Finish coats shall be a 2-component aliphatic acrylic or polyester polyurethane coating material that provides superior color and gloss retention, resistance to chemical fumes and severe weathering, and a minimum solids content of 58 percent by volume.

1. Prime coat DFT = 3 mils, **Tnemec 90-98, Carboline Carbozinc 11, Sherwin Williams Zinc Clad II ES,** or equal.

2. Intermediate coat DFT = 4 mils, **Tnemec N69, Carboline Carboguard 890, Sherwin Williams Macropoxy 646 FC,** or equal.

3. Finish coats (one or more, DFT = 3 mils), **Tnemec 1074U, Carboline Carbothane 134HG, Sherwin Williams Acrolon 218 HS** or equal.

4. Total system DFT = 10 mils.

5. Intermediate coat shall be applied in excess of 4 mils DFT or in more than one coat as necessary to completely cover the inorganic zinc primer and prevent application bubbling of the polyurethane finish coat.

6. More than one finish coat shall be applied as necessary to produce a finish with uniform color and texture. If the inorganic zinc primer is used as a pre-construction or shop applied primer, all damaged and uncoated areas shall be spot abrasive blasted and coated after construction using the indicated material.

D. **System 6 - Inorganic Zinc, Silicone Topcoat:** Self curing, zinc silicate coating material shall be a two component inorganic coating material that contains at least 85 percent of metallic zinc by weight in the dried film. System shall be suitable for a service temperature of up to 500 degrees F.

1. Option 1

    1. Prime coat (DFT = 2.0-3.0 mils), **Sherwin Williams Zinc Clad II ES** or equal.

2. Finish coat (DFT = 2.0-2.5 mils), **Sherwin Williams Heat Flex HiTemp 500** or equal

3. Total system DFT = 4-5 mils.

2. Option 2

1. Prime coat (DFT = 3 mils), **Carboline Carbozinc 11,** or equal

E. **System 12 - Aliphatic Polyurethane, Fiber Glass:** Two-component aliphatic polyurethane coating material shall provide superior color and gloss retention, resistance to splash from acid and alkaline chemicals, and resistance to chemical fumes and severe weathering. A primer, tie coat, or mist coat shall be used as recommended by the manufacturer.

1. Prime coat (Tie coat), **Ameron 385, Tnemec 66**, **Carboline Carboguard 890**, **Sherwin – Williams Macropoxy 646 FC Epoxy B58-600 Series**, or equal.

2. Finish coats (2 or more, DFT = 3 mils), **Ameron Amershield, Tnemec 1074U, Carboline Carbothane 134 HG, Sherwin – Williams Acrolon 218 HS Polyurethane B65-600 Series,** or equal.

2.3 SUBMERGED AND SEVERE SERVICE COATING SYSTEMS

A. **Material Sources:** The manufacturers' products listed in this paragraph are materials which satisfy the material descriptions of this paragraph and have a documented successful record for long term submerged or severe service conditions. Proposed substitute products will be considered as indicated above.

B. **System 100 - Amine Cured Epoxy:** High build, amine cured, epoxy resin shall have a solids content of at least 80 percent by volume, and shall be suitable for long-term immersion service in potable water and municipal wastewater. For potable water service, the coating material shall be listed by the NSF International as in compliance with NSF Standard 61 - Drinking Water System Components - Health Effects.

1. Prime coat and finish coats (3 or more, DFT = 16 mils), **Ameron 395, Tnemec 104 for Water or Tnemec N140 for all other, Carboline Carboguard 891 HS, Sherwin – Williams Macropoxy 5500,** or equal.

2.4 SPECIAL COATING SYSTEMS

A. **System 200 - PVC Tape:** Prior to wrapping the pipe with PVC tape, the pipe and fittings first shall be primed using a primer recommended by the PVC tape manufacturer. After being primed, the pipe shall be wrapped with a 20-mil adhesive PVC tape, half-lapped, to a total thickness of 40 mils.

B. **System 207 – Coal Tar Epoxy**: Two coat coal tar epoxy with minimum solids content of 72% by volume. Total DFT = 16.0 mils. **Carboline Bitumastic 300, Tnemec Series 46H-413, Sherwin Williams HiMil Sher Tar,** or equal.

C. **System 208 - Aluminum Metal Isolation:** Two coats of a high build polyamide epoxy paint such as **Tnemec 66, PPG Amercoat 385, Carboguard 890, Sherwin Williams Macropoxy 646 FC**, or equal (8 mils). Total thickness of system DFT = 8.0 mils.

PART 3 -- EXECUTION

3.1 MANUFACTURER'S SERVICES

A. The CONTRACTOR shall require the protective coating manufacturer to furnish a qualified technical representative to visit the Site for technical support as may be necessary to resolve field problems attributable or associated with the manufacturer's products.

3.2 WORKMANSHIP

A. Skilled craftsmen and experienced supervision shall be used on all WORK.

B. Coating shall be done in a workmanlike manner so as to produce an even film of uniform thickness. Edges, corners, crevices, and joints shall receive special attention to insure thorough cleaning and an adequate thickness of coating material. The finished surfaces shall be free from runs, drops, ridges, waves, laps, brush marks, and variations in color, texture, and finish. The hiding shall be so complete that the addition of another coat would not increase the hiding. Special attention shall be given to insure that edges, corners, crevices, welds, and similar areas receive a film thickness equivalent to adjacent areas, and installations shall be protected by the use of drop cloths or other precautionary measures.

C. All damage to surfaces resulting from the WORK shall be cleaned, repaired, and refinished to original condition.

3.3 STORAGE, MIXING, AND THINNING OF MATERIALS

A. **Manufacturer's Recommendations:** Unless otherwise indicated, the coating manufacturer's printed recommendations and instructions for thinning, mixing, handling, applying, and protecting its coating materials, for preparation of surfaces for coating, and for all other procedures relative to coating shall be strictly observed.

B. All protective coating materials shall be used within the manufacturer's recommended shelf life.

C. **Storage and Mixing:** Coating materials shall be stored under the conditions recommended by the Material Safety Data Sheets, and shall be thoroughly stirred, strained, and kept at a uniform consistency during application. Coatings of different manufacturers shall not be mixed together.

3.4 PREPARATION FOR COATING

A. **General:** All surfaces to receive protective coatings shall be cleaned as indicated prior to application of coatings. The CONTRACTOR shall examine all surfaces to be coated, and shall correct all surface defects before application of any coating material. All marred or abraded spots on shop-primed and on factory-finished surfaces shall receive touch-up restoration prior to any coating application. Surfaces to be coated shall be dry and free of visible dust.

B. **Protection of Surfaces Not to be Coated:** Surfaces that are not to receive protective coatings shall be protected during surface preparation, cleaning, and coating operations.

C. All hardware, lighting fixtures, switchplates, machined surfaces, couplings, shafts, bearings, nameplates on machinery, and other surfaces not to be painted shall be removed, masked or otherwise protected. Drop cloths shall be provided to prevent coating materials from falling on or marring adjacent surfaces. The working parts of all mechanical and electrical equipment shall be protected from damage during surface preparation and coating operations. Openings in motors shall be masked to prevent entry of coating or other materials.

D. Care shall be exercised not to damage adjacent work during blast cleaning operations. Spray painting shall be conducted under carefully controlled conditions. The CONTRACTOR shall be fully responsible for and shall promptly repair any and all damage to adjacent work or adjoining property occurring from blast cleaning or coating operations.

E. **Protection of Painted Surfaces:** Cleaning and coating shall be coordinated so that dust and other contaminants from the cleaning process will not fall on wet, newly coated surfaces.

3.5 SURFACE PREPARATION STANDARDS

A. The following referenced surface preparation specifications of the Steel Structures Painting Council shall form a part of this specification:

1. Solvent Cleaning (SSPC SP1): Removal of oil, grease, soil, salts, and other soluble contaminants by cleaning with solvent, vapor, alkali, emulsion, or steam.

2. Hand Tool Cleaning (SSPC SP2): Removal of loose rust, loose mill scale, loose paint, and other loose detrimental foreign matter, by hand chipping, scraping, sanding, and wire brushing.

3. Power Tool Cleaning (SSPC SP3): Removal of loose rust, loose mill scale, loose paint, and other loose detrimental foreign matter, by power tool chipping, descaling, sanding, wire brushing, and grinding.

4. White Metal Blast Cleaning (SSPC SP5): Removal of all visible rust, oil, grease, soil, dust, mill scale, paint, oxides, corrosion products and foreign matter by blast cleaning.

5. Commercial Blast Cleaning (SSPC SP6): Removal of all visible oil, grease, soil, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except that staining shall be limited to no more than 33 percent of each square inch of surface area.

6. Brush-Off Blast Cleaning (SSPC SP7): Removal of all visible oil, grease, soil, dust, loose mill scale, loose rust, and loose paint.

7. Near-White Blast Cleaning (SSPC SP10): Removal of all visible oil, grease, soil, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except that staining shall be limited to no more than 5 percent of each square inch of surface area.

3.6 METAL SURFACE PREPARATION (UNGALVANIZED)

A. The minimum abrasive blasting surface preparation shall be as indicated in the coating system schedules included at the end of this Section. Where there is a conflict between these specifications and the coating manufacturer's printed recommendations for the intended service, the higher degree of cleaning shall apply.

B. Workmanship for metal surface preparation shall be in conformance with the current SSPC Standards and this Section. Blast cleaned surfaces shall match the standard samples available from the National Association of Corrosion Engineers, NACE Standard TM-01-70 - Visual Standard for Surfaces of New Steel Airblast Cleaned with Sand Abrasive and TM-01-75 - Visual Standard for Surfaces of New Steel Centrifugally Blast Cleaned with Steel Grit.

C. All oil, grease, welding fluxes, and other surface contaminants shall be removed by solvent cleaning per SSPC SP1 - Solvent Cleaning prior to blast cleaning.

D. All sharp edges shall be rounded or chamfered and all burrs, and surface defects and weld splatter shall be ground smooth prior to blast cleaning.

E. The type and size of abrasive shall be selected to produce a surface profile that meets the coating manufacturer's recommendation for the particular coating and service conditions. Abrasives for submerged and severe service coating systems shall be clean, hard, sharp cutting crushed slag. Automated blasting systems shall not be used for surfaces that will be in submerged service. Metal shot or grit shall not be used for surfaces that will be in submerged service, even if subsequent abrasive blasting is planned to be one with hard, sharp cutting crushed slag.

F. The abrasive shall not be reused unless an automated blasting system is used for surfaces that will be in non-submerged service. For automated blasting systems, clean oil-free abrasives shall be maintained. The abrasive mix shall include at least 50 percent grit.

G. The CONTRACTOR shall comply with the applicable federal, state, and local air pollution control regulations for blast cleaning.

H. Compressed air for air blast cleaning shall be supplied at adequate pressure from well maintained compressors equipped with oil and moisture separators that remove at least 95 percent of the contaminants.

I. Surfaces shall be cleaned of all dust and residual particles of the cleaning operation by dry air blast cleaning, vacuuming, or another approved method prior to painting.

J. Enclosed areas and other areas where dust settling is a problem shall be vacuum cleaned and wiped with a tack cloth.

K. Damaged or defective coating shall be removed by the blast cleaning to meet the clean surface requirements before recoating.

L. If the required abrasive blast cleaning will damage adjacent work, the area to be cleaned is less than 100 square feet, and the coated surface will not be submerged in service, then SSPC SP2 or SSPC SP3 be used.

M. Shop applied coatings of unknown composition shall be completely removed before the indicated coatings are applied. Valves, castings, ductile or cast iron pipe, and fabricated pipe or equipment shall be examined for the presence of shop-applied temporary coatings. Temporary coatings shall be completely removed by solvent cleaning per SSPC SP1 before the abrasive blast cleaning work has been started.

N. Shop primed equipment shall be solvent cleaned in the field before finish coats are applied.

3.7 SURFACE PREPARATION FOR GALVANIZED FERROUS METAL

A. Galvanized ferrous metal shall be alkaline cleaned per SSPC SP1 to remove oil, grease, and other contaminants detrimental to adhesion of the protective coating system to be used, followed by brush off blast cleaning per SSPC SP7.

B. Pretreatment coatings of surfaces shall be in accordance with the printed recommendations of the coating manufacturer.

3.8 SURFACE PREPARATION OF FERROUS SURFACES WITH EXISTING COATINGS, EXCLUDING STEEL RESERVOIR INTERIORS

A. **General:** All grease, oil, heavy chalk, dirt, or other contaminants shall be removed by solvent or detergent cleaning prior to abrasive blast cleaning. The generic type of the existing coatings shall be determined by laboratory testing.

B. **Abrasive Blast Cleaning:** The CONTRACTOR shall provide the degree of cleaning indicated in the coating system schedule for the entire surface to be coated. If the degree of cleaning is not indicated in the schedule, deteriorated coatings shall be removed by abrasive blast cleaning to SSPC SP6. Areas of tightly adhering coatings shall be cleaned to SSPC SP7, with the remaining thickness of existing coating not to exceed 3 mils.

C. **Incompatible Coatings:** If coatings to be applied are not compatible with existing coatings the CONTRACTOR shall apply intermediate coatings per the paint manufacturer's recommendation for the indicated coating system or shall completely remove the existing coating prior to abrasive blast cleaning. A small trial application shall be conducted for compatibility prior to painting large areas.

D. **Unknown Coatings:** Coatings of unknown composition shall be completely removed prior to application of new coatings.

E. **Water Abrasive or Wet Abrasive Blast Cleaning:** Where indicated or where Site conditions do not permit dry abrasive blasting for industrial coating systems due to dust or air pollution considerations, water abrasive blasting or wet abrasive blasting may be used. In both methods, paint-compatible corrosion inhibitors shall be used, and coating application shall begin as soon as the surfaces are dry. Water abrasive blasting shall be done using high pressure water with sand injection. In both methods, the equipment used shall be commercially produced equipment with a successful service record. Wet blasting methods shall not be used for submerged and severe service coating systems unless indicated.

3.9 PLASTIC, FIBER GLASS AND NONFERROUS METALS SURFACE PREPARATION

A. Plastic and fiber glass surfaces shall be sanded or brush off blast cleaned prior to solvent cleaning with a chemical compatible with the coating system primer.

B. Non-ferrous metal surfaces shall be solvent-cleaned to remove all soluble surface contaminants followed by brush-off blast cleaning to remove insoluble contaminants and to achieve a uniformly profiled surface.

C. All surfaces shall be clean and dry prior to coating application.

3.10 SHOP COATING REQUIREMENTS

A. Unless otherwise indicated, all items of equipment, or parts of equipment which are not submerged in service, shall be shop primed and then finish coated in the field after installation with the indicated or selected color. The methods, materials, application equipment and all other details of shop painting shall comply with this section. If the shop primer requires topcoating within a specified period of time, the equipment shall be finish coated in the shop and then touch-up painted after installation.

B. All items of equipment, or parts and surfaces of equipment which are submerged or inside an enclosed hydraulic structure when in service, with the exception of pumps and valves, shall have all surface preparation and coating work performed in the field.

C. The interior surfaces of steel water reservoirs, except for Part A surfaces, shall have all surface preparation and coating work performed in the field.

D. For certain pieces of equipment it may be undesirable or impractical to apply finish coatings in the field. Such equipment may include engine generator sets, equipment such as electrical control panels, switchgear or main control boards, submerged parts of pumps, ferrous metal passages in valves, or other items where it is not possible to obtain the indicated quality in the field. Such equipment shall be primed and finish coated in the shop and touched up in the field with the identical material after installation. The CONTRACTOR shall require the manufacturer of each such piece of equipment to certify as part of its Shop Drawings that the surface preparation is in accordance with these specifications. The coating material data sheet shall be submitted with the Shop Drawings for the equipment.

E. For certain small pieces of equipment the manufacturer may have a standard coating system that is suitable for the intended service conditions. In such cases, the final determination of suitability will be made during review of the Shop Drawing submittals. Equipment of this type generally includes only indoor equipment such as instruments, small compressors, and chemical metering pumps.

F. Shop painted surfaces shall be protected during shipment and handling by suitable provisions including padding, blocking, and the use of canvas or nylon slings. Primed surfaces shall not be exposed to the weather for more than 2 months before being topcoated, or less time if recommended by the coating manufacturer.

G. Damage to shop-applied coatings shall be repaired in accordance with this Section and the coating manufacturer's printed instructions.

H. The CONTRACTOR shall make certain that the shop primers and field topcoats are compatible and meet the requirements of this Section. Copies of applicable coating manufacturer's data sheets shall be submitted with equipment Shop Drawings.

3.11 APPLICATION OF COATINGS

A. The application of protective coatings to steel substrates shall be in accordance with SSPC PA1 - Paint Application Specification No. 1.

B. Cleaned surfaces and all coats shall be inspected prior to each succeeding coat. The CONTRACTOR shall schedule such inspection with the ENGINEER in advance.

C. Blast cleaned ferrous metal surfaces shall be painted before any rusting or other deterioration of the surface occurs. Blast cleaning shall be limited to only those surfaces that can be coated in the same working day.

D. Coatings shall be applied in accordance with the manufacturer's instructions and recommendations, and this Section, whichever has the most stringent requirements.

E. Special attention shall be given to edges, angles, weld seams, flanges, nuts and bolts, and other places where insufficient film thicknesses are likely to be present. Use stripe painting for these areas.

F. Special attention shall be given to materials that will be joined so closely that proper surface preparation and application are not possible. Such contact surfaces shall be coated prior to assembly or installation.

G. Finish coats, including touch-up and damage repair coats shall be applied in a manner that will present a uniform texture and color matched appearance.

H. Coatings shall not be applied under the following conditions:

1. Temperature exceeding the manufacturer's recommended maximum and minimum allowable.

2. Dust or smoke laden atmosphere.

3. Damp or humid weather.

4. When the substrate or air temperature is less than 5 degrees F above dewpoint.

5. When air temperature is expected to drop below 40 degrees F or less than 5 degrees F above the dewpoint within 8 hours after application of coating.

6. When wind conditions are not calm.

I. Dewpoint shall be determined by use of a sling psychrometer in conjunction with U.S. Dept. of Commerce, Weather Bureau psychometric tables.

J. Unburied steel piping shall be abrasive blast cleaned and primed before installation.

K. The finish coat on all work shall be applied after all concrete, masonry, and equipment installation is complete and the work areas are clean and dust free.

3.12 CURING OF COATINGS

A. The CONTRACTOR shall maintain curing conditions in accordance with the conditions recommended by the coating material manufacturer or by this Section, whichever is the most stringent, prior to placing the completed coating system into service.

B. In the case of enclosed areas, forced air ventilation, using heated air if necessary, may be required until the coatings have fully cured.

C. **Forced Air Ventilation of Steel Reservoirs and Enclosed Hydraulic Structures:** Forced air ventilation is required for the application and curing of coatings on the interior surfaces of steel reservoirs and enclosed hydraulic structures. During application and curing periods, continuously exhaust air from a manhole in the lowest shell ring, or in the case of an enclosed hydraulic structure, from the lowest level of the structure using portable ducting. After all interior coating operations have been completed, provide a final curing period for a minimum of 10 days, during which the forced ventilation system shall operate continuously. For additional requirements, refer to the specific coating system requirements in Part 2 above.

3.13 SHOP AND FIELD INSPECTION AND TESTING

A. General: The CONTRACTOR shall give the ENGINEER a minimum of 3 days advance notice of the start of any field surface preparation work or coating application work, and a minimum of 7 days advance notice of the start of any shop surface preparation work.

B. All such work shall be performed only in the presence of the ENGINEER, unless the ENGINEER has granted prior approval to perform such work in its absence.

C. Inspection by the ENGINEER, or the waiver of inspection of any particular portion of the WORK, shall not relieve the CONTRACTOR of its responsibility to perform the work in accordance with these Specifications.

D. Scaffolding shall be erected and moved to locations where requested by the ENGINEER to facilitate inspection. Additional illumination shall be furnished to cover all areas to be inspected.

E. **Inspection Devices:** The CONTRACTOR shall furnish, until final acceptance of such coatings, inspection devices in good working condition for the detection of holidays and measurement of dry-film thicknesses of protective coatings. Dry-film thickness gauges shall be made available for the ENGINEER'S use at all times while coating is being done, until final acceptance of such coatings. The CONTRACTOR shall furnish the services of a trained operator of the holiday detection devices until the final acceptance of such coatings. Holiday detection devices shall be operated only in the presence of the ENGINEER.

F. **Holiday Testing:** The CONTRACTOR shall holiday test all coated ferrous surfaces inside a steel reservoir, other surfaces which will be submerged in water or other liquids, or surfaces which are enclosed in a vapor space in such structures and surfaces coated with any of the submerged and severe service coating systems. Areas that contain holidays shall be marked and repaired or recoated in accordance with the coating manufacturer's printed instructions and then retested.

1. Coatings With Thickness Exceeding 20 Mils: For surfaces having a total dry film coating thickness exceeding 20 mils: pulse-type holiday detector such as **Tinker &**

Rasor Model AP-W, D.E. Stearns Co. Model 14/20, or equal shall be used. The unit shall be adjusted to operate at the voltage required to cause a spark jump across an air gap equal to twice the required coating thickness.

2. Coatings With Thickness of 20 Mils or Less: For surfaces having a total dry film coating thickness of 20 mils or less: **Tinker & Rasor Model M1 non-destructive type holiday detector, K-D Bird Dog,** or equal shall be used. The unit shall operate at less than 75-volts. For thicknesses between 10 and 20 mils, a non-sudsing type wetting agent, such as **Kodak Photo-Flo,** or equal, shall be added to the water prior to wetting the detector sponge.

G. **Film Thickness Testing:** On ferrous metals, the dry film coating thickness shall be measured in accordance with the SSPC "Paint Application Specification No. 2" using a magnetic-type dry film thickness gauge such as **Mikrotest model FM, Elcometer model 111/1EZ,** or equal. Each coat shall be tested for the correct thickness. No measurements shall be made until at least 8 hours after application of the coating. On non-ferrous metals and other substrates, the coating thicknesses shall be measured at the time of application using a wet film gauge.

H. **Surface Preparation:** Evaluation of blast cleaned surface preparation work will be based upon comparison of the blasted surfaces with the standard samples available from the NACE, using NACE standards TM-01-70 and TM-01-75.

3.14 COATING SYSTEM SCHEDULES - FERROUS METALS

A. Coating System Schedule, Ferrous Metal - Not Galvanized:

	Item	**Surface Prep.**	**System No.**
FM-1	All surfaces indoors and outdoors, exposed or covered, except those included below.	Near white metal blast cleaning SSPC SP10	(5) inorganic zinc/polyurethane
FM-3	Surfaces of equipment and ferrous surfaces submerged or intermittently submerged in water	White metal blast cleaning SSPC SP5	(100) amine-cured epoxy
FM-4	Surfaces exposed to high temperature (between 251 and 500 degrees F).	Near white metal blast cleaning SSPC SP10	(6) inorganic zinc, silicone resin
FM-5	Surfaces exposed to high temperature (between 501 and 1000 degrees F).	Near white metal blast cleaning SSPC SP10	(3) aluminum silicone resin
FM-6	Buried small steel pipe and conduit.	Removal of dirt, grease, oil	(200) PVC tape

FM-14	Structural steel, miscellaneous	Near white metal blast cleaning SSPC SP10	Galvanized per Section 05500.

	metalwork, and supports for prefabricated metal buildings.		
FM-18	Buried pipe couplings, valves, and flanged joints (where piping is ductile or cast iron, not tape-coated), including factory-coated surfaces.	As specified by reference specification	(205) polyethylene encasement
FM-19	Structural steel plate dividing walls in drainage pump station sump	White metal blast cleaning SSPC SP5	(207) Coal Tar Epoxy

3.15 **COATING SYSTEM SCHEDULE, NON-FERROUS METAL, PLASTIC, FIBER GLASS**

A. Where isolated non-ferrous parts are associated with equipment or piping, the CONTRACTOR shall use the coating system for the adjacent connected surfaces. Do not coat handrails, gratings, frames or hatches. Only primers recommended by the coating manufacturer shall be used.

	Item	**Surface Prep.**	**System No.**
NFM-1	All exposed surfaces, indoors and outdoors, except those included below.	Solvent cleaned SSPC SP1	(4) aliphatic polyurethane
NFM-3	Aluminum surfaces in contact with concrete, or with any other metal except galvanized ferrous metal.	Solvent cleaned SSPC SP1	(208) aluminum metal isolation
NFM-4	Polyvinyl chloride plastic piping, indoors and outdoors, or in structures, not submerged.	Solvent cleaned SSPC SP1	(7) acrylic latex
NFM-5	Fiber glass surfaces.	See plastic, fiber glass and nonferrous metals surface preparation as specified herein	(12) aliphatic polyurethane fiber glass
NFM-6	Buried non-ferrous metal pipe.	Removal of dirt, grease, oil	(200) PVC tape

- END OF SECTION -

SECTION 11000 - EQUIPMENT GENERAL PROVISIONS

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. The CONTRACTOR shall provide equipment and appurtenant WORK, complete and operable, in accordance with the Contract Documents.

B. The provisions of this Section shall apply to all equipment except where otherwise indicated.

C. **Equipment Arrangement:** Unless specifically indicated otherwise, the arrangement of equipment shown on the Drawings is based upon information available at the time of design and is not intended to show exact dimensions particular to a specific manufacturer in all cases. Some aspects of the Drawings are diagrammatic and some features of the illustrated equipment arrangement may require revision to meet the actual equipment requirements. Structural supports, foundations, piping and valve connections, and electrical and instrumentation connections indicated may have to be altered to accommodate the equipment provided. No additional payment will be made for such revisions and alterations. Substantiating calculations and drawings shall be submitted prior to beginning the installation of equipment.

1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Equipment shall be in accordance with the following standards, as applicable and as indicated in each equipment specification:

1. American Society for Testing and Materials (ASTM).

2. American National Standards Institute (ANSI).

3. American Society of Mechanical Engineers (ASME).

4. American Water Works Association (AWWA).

5. American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE).

6. American Welding Society (AWS).

7. National Fire Protection Association (NFPA).

8. Federal Specifications (FS).

9. National Electrical Manufacturers Association (NEMA).

10. Manufacturer's published recommendations and specifications.

11. General Industry Safety Orders (OSHA).

B. The following standards are referenced in this Section:

ASME B16.1 Cast Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250, and 800

ASME B16.5 Pipe Flanges and Flanged Fittings, Steel, Nickel Alloy and other Special Alloys

ASME B46.1 Surface Texture

ANSI S12.6 Method for the Measurement of the Real-Ear Attenuation of Hearing Protectors

ASME B1.20.1 General Purpose Pipe Threads (Inch)

ASME B31.1 Power Piping

AWWA C206 Field Welding of Steel Water Pipe

AWWA C207 Steel Pipe Flanges for Waterworks Service - Sizes 4 In. Through 144 In. (100 mm through 3,600 mm)

AWWA D100 Welded Steel Tanks for Water Storage

ASTM A 48 Gray Iron Castings

ASTM A 108 Steel Bars, Carbon, Cold-Finished, Standard Quality

1.3 CONTRACTOR SUBMITTALS

A. Furnish submittals in accordance with Section 01010.

B. Shop Drawings: Furnish complete drawings and technical information for equipment, piping, valves, and controls. Where indicated or required by the ENGINEER, Shop Drawings shall include clear, concise calculations showing equipment anchorage forces and the capacities of the anchorage elements proposed by the CONTRACTOR.

C. Spare Parts List: The CONTRACTOR shall obtain from the manufacturer and submit at the same time as Shop Drawings a list of suggested spare parts for each piece of equipment. CONTRACTOR shall also furnish the name, address, and telephone number of the nearest distributor for each piece of equipment.

D. Torsion and Vibration Analyses

1. The CONTRACTOR shall arrange for and submit torsional and lateral vibration analyses for the following equipment types:

a. Engine drives except engine generators.

b. Pumps, blowers, and compressors with constant speed drives of 500 horsepower and greater.

c. Pumps, blowers and compressors with variable speed drives of 100 horsepower and greater.

d. Vertical pumps with universal joints and extended shafts.

e. Other equipment as indicated.

2. An experienced specialist from the equipment manufacturer shall perform a complete torsional and lateral vibration analysis of each distinct equipment, motor, and variable speed drive. These analyses shall identify the dry and wet lateral critical speeds plus the torsional critical speeds of the system. Appropriate lateral and critical speed maps shall be produced and submitted.

3. No active critical speed shall be allowed within 25 percent of the operating speed range. No fabrication of the equipment shall be started until the analyses have been approved by the ENGINEER.

E. Certifications that equipment and equipment supports comply with seismic and wind design criteria from Code.

1.4 QUALITY ASSURANCE

A. Costs: Responsibility shall be the CONTRACTOR's for performing and paying the costs of inspection, startup, testing, adjustment, and instruction services performed by factory representatives. The OWNER will pay for costs of power and water. If available, the OWNER's operating personnel will provide assistance in the field testing.

B. Inspection: The CONTRACTOR shall inform the local authorities, such as building and plumbing inspectors, fire marshal, OSHA inspectors, and others, to witness required tests for piping, plumbing, fire protection systems, pressure vessels, safety systems, and related items to obtain required permits and certificates, and shall pay inspection fees.

C. Quality and Tolerances: Tolerances and clearances shall be as shown on the Shop Drawings and shall be closely adhered to.

1. Machine work shall be of high-grade workmanship and finish, with due consideration to the special nature or function of the parts. Members without milled ends and which are to be framed to other steel parts of the structure may have a variation in the detailed length of not greater than 1/16-inch for members 30-feet or less in length, and not greater than 1/8-inch for members over 30-feet in length.

2. Castings shall be homogeneous and free from non-metallic inclusions and defects. Surfaces of castings which are not machined shall be cleaned to remove foundry irregularities. Casting defects not exceeding 12.5 percent of the total thickness and where defects will not affect the strength and serviceability of the casting may be repaired by approved welding procedures. The ENGINEER shall be notified of larger defects. No repair welding of such defects shall be carried out without the ENGINEER'S written approval. If the removal of metal for repair reduces the stress resisting cross-section of the casting by more than 25 percent or to such an extent that the computed stress in the remaining metal exceeds the allowable stress by more than 25 percent, then the casting may be rejected. Costs of casting new material shall be the CONTRACTOR'S responsibility as part of the WORK.

3. Materials shall meet the physical and mechanical properties in accordance with the reference standards.

D. Machine Finish: The type of finish shall be the most suitable for the application and shall be shown in micro-inches in accordance with ANSI B46.1. The following finishes shall be used:

1. Surface roughness not greater than 63 micro-inches shall be required for surfaces in sliding contact.

2. Surface roughness not greater than 250 micro-inches shall be required for surfaces in contact where a tight joint is not required.

3. Rough finish not greater than 500 micro-inches shall be required for other machined surfaces.

4. Contact surfaces of shafts and stems which pass through stuffing boxes and contact surfaces of bearings shall be finished to not greater than 32 micro-inches.

PART 2 -- PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Noise Level: When in operation, no single piece of equipment shall exceed the OSHA noise level requirement of 105 dBA for one hour exposure per day.

B. High Noise Level Location: The CONTRACTOR shall provide one personal hearing protection station at each high noise level location. Locations are defined as follows:

1. Outdoor Location: Any single equipment item or any group of equipment items that produce noise exceeding OSHA noise level requirements for a 2 hour exposure. Where such equipment is separated by a distance of more than 20-feet, measured between edges of footings, each group of equipment shall be provided with a separate hearing protection station.

2. Indoor Location

   a. Any single equipment item or any group of equipment items located within a single room not normally occupied, that produces noise exceeding OSHA noise level requirements for a 2 hour exposure.

   b. Any single equipment item or any group of equipment items located within a single room normally occupied by workers, that produces noise exceeding OSHA noise level requirements for an 8 hour exposure.

C. Personal Hearing Protection: The CONTRACTOR shall furnish 3 pairs of high attenuation hearing protectors in the original unopened packaging. The ear protectors shall be capable of meeting the requirements of ANSI S12.6 and shall produce a noise level reduction of 25 dBA at a frequency of 500 Hz. The hearing protectors shall have fluid filled ear cushions and an adjustable, padded headband. The protectors shall be stored in a weatherproof, labeled, steel cabinet, provided at an approved location near the noise producing equipment.

D. Drive Trains and Service Factors: Service factors shall be applied in the selection or design of mechanical power transmission components. All components of drive train assemblies between the prime mover and the driven equipment shall be designed and rated to deliver the maximum peak or starting torque, speed, and horsepower. All of the applicable service factors shall be considered, such as mechanical (type of prime mover), load class, start frequency, ventilation, ambient temperature, and fan factors. Drive train components include couplings, shafts, gears and gear drives, drive chains,

sprockets, and V-belt drives. Unless otherwise indicated, the following load classifications shall apply in determining service factors:

Type of Equipment	Service Factor	Load Classification
Blowers		
centrifugal or vane	1.0	Uniform
lobe	1.25	Moderate Shock
Pumps		
centrifugal or rotary	1.0	Uniform
reciprocating	1.8	Moderate Shock
progressing cavity	1.0	Uniform
Mixers		
constant density	1.0	Uniform
variable density	1.25	Moderate Shock
rapid mixer	1.25	Moderate Shock
flocculator	1.25	Moderate Shock
sludge mixer	2.5	Moderate Shock
surface aerator	2.5	Heavy Shock
Grit Handling Equipment	1.25	Moderate Shock
Mechanical Bar Screens	1.0	Uniform
Cranes or Hoists	1.25	Moderate Shock

E. Mechanical Service Factors

	Mechanical Service Factors	
	Electric Motor	**Internal Combustion Engine**
Uniform	1.25	1.50
Moderate Shock	1.50	1.75
Heavy Shock	2.00	2.25

F. For thermal rating adjustments such as start frequency, ambient temperature, and hourly duty cycle factor, ventilation factor, and fan factor, refer to gear manufacturer sizing information.

G. For service factors of electric motors, see the electrical specifications.

H. Where load classifications are not indicated, service factors shall be for standard load classifications and for flexible couplings.

I. **Welding:** Unless otherwise indicated, welding shall conform to the following:

1. Latest revision of AWWA D100.

2. Latest revision of AWWA C206.

3. Composite fabricated steel assemblies that are to be erected or installed inside a hydraulic structure, including any fixed or movable structural components of mechanical equipment, shall have continuous seal welds to prevent entrance of air or moisture.

4. Welding shall be by the metal-arc method or gas-shielded arc method as described in the American Welding Society's "Welding Handbook" as supplemented by other pertinent standards of the AWS. Qualification of welders shall be in accordance with the AWS Standards.

5. In assembly and during welding, the component parts shall be adequately clamped, supported, and restrained to minimize distortion and for control of dimensions. Weld reinforcement shall be as specified by the AWS code. Upon completion of welding, weld splatter, flux, slag, and burrs left by attachments shall be removed. Welds shall be repaired to produce a workmanlike appearance, with uniform weld contours and dimensions. Sharp corners of material that is to be painted or coated shall be ground to a minimum of 1/32-inch on the flat.

J. Protective Coating: Equipment shall be painted or coated in accordance with Section 09800 - Protective Coating, unless otherwise indicated. Non-ferrous metal and corrosion-resisting steel surfaces shall be coated with grease or lubricating oil. Coated surfaces shall be protected from abrasion or other damage during handling, testing, storing, assembly, and shipping.

K. Protection of Equipment: Equipment shall be boxed, crated, or otherwise protected from damage and moisture during shipment, handling, and storage. Equipment shall be protected from exposure to corrosive fumes and shall be kept thoroughly dry at all times. Pumps, motors, drives, electrical equipment, and other equipment having anti-friction or sleeve bearings shall be stored in weathertight storage facilities prior to installation. For extended storage periods, plastic equipment wrappers should be avoided, to prevent accumulation of condensate in gears and bearings. In addition, motor space heaters shall be energized and shafts shall be rotated. Equipment delivered to the Site with rust or corroded parts shall be rejected. If equipment develops defects during storage, it shall be disassembled, cleaned, and recoated to restore it to original condition.

L. Identification of Equipment Items

1. At the time of shipping, each item of equipment shall have a legible identifying mark corresponding to the equipment number in the Contract Documents for the particular item.

1. After installation, each item of equipment shall be given permanent identification. Identification shall consist of stainless steel plate, 1/16-inch thick, at least 4-inches by 6 inches, lettering embossed into the plate, at least 1-inch tall.

M. Vibration Isolators: Air compressors, blowers, engines, inline fans shall be provided with restrained spring-type vibration isolators or pads per manufacturer's written recommendations. Vibration isolations shall be provided with seismic restraint.

N. Shop Fabrication: Shop fabrication shall be performed in accordance with the Contract Documents and the Shop Drawings.

O. Controls: Equipment and system controls shall be in accordance with Division 17 - Instrumentation.

2.2 EQUIPMENT SUPPORTS AND FOUNDATIONS

A. Equipment Supports: Unless otherwise indicated, equipment supports, anchors, and restrainers shall be adequately designed for static, dynamic, wind, and seismic loads. The design horizontal seismic force shall be the greater of: that noted in the general structural notes or as required by the governing building code, or 10 percent of gravity. Submitted design calculations for equipment supports shall bear the signature and seal of an engineer registered in the State wherein the project is to be built, unless otherwise indicated. Calculations shall account for forces and distribution of forces on supporting structures resulting from normal operation, normal operation plus seismic loadings, and normal operation plus wind loadings.

1. Wall-mounted equipment weighing more than 250 pounds or which is within 18-inches above the floor shall be provided with fabricated steel supports. Pedestals shall be of welded steel. If the supported equipment is a panel or cabinet or is enclosed with removable sides, the pedestal shall match the supported equipment in appearance and dimensions.

2. Seismic requirements: Freestanding and wall-hung equipment shall be anchored in place by methods that satisfy the building code. Calculations shall be performed and signed and stamped for equipment weighing more that 400 pounds. Calculations shall analyze lateral and overturning forces and shall include a factor of safety against overturning equal to 1.5. Calculations shall include the distribution of forces imposed on the supporting structure and anchors, verifying that each anchor can develop the required resistance forces.

3. Wind requirements: Exterior freestanding equipment shall be anchored in place by methods that satisfy the building code. Calculations shall be performed and signed and stamped, analyzing lateral and overturning forces and shall include a factor of safety against overturning equal to 1.5. Calculations shall include the distribution of forces imposed on the supporting structure and anchors, verifying that each anchor can develop the required resistance forces.

B. Anchors: Anchor bolts shall be in accordance with Section 05500 - Miscellaneous Metalwork. CONTRACTOR shall determine the size, type, capacity, location, and other placement requirements of anchorage elements. Anchoring methods and leveling criteria in the manufacturer's literature shall be followed. Submit methods and criteria with the Shop Drawings.

C. Equipment Foundations: Mechanical equipment, tanks, control cabinets, enclosures, and related equipment shall be mounted on minimum 3.5-inch high concrete bases, unless otherwise indicated. Equipment foundations are indicated on Drawings. The CONTRACTOR through the equipment manufacturer shall verify the size and weight of equipment foundation to insure compatibility with equipment.

2.3 COUPLINGS

A. Mechanical couplings shall be provided between the driver and the driven equipment. Flexible couplings shall be provided between the driver and the driven equipment to accommodate slight angular misalignment, parallel misalignment, end float, and to cushion shock loads. Unless otherwise indicated or recommended by the equipment manufacturer, coupling type shall be furnished with the respective equipment as follows:

Equipment Type	Coupling Type
Horizontal and end suction pumps	Gear or flexible spring
Vertical turbine pumps	3 piece spacer for solid shaft or double nut for hollow shaft
Vertical nonclog pumps, close coupled	Flexible disc pack
Vertical nonclog pumps with extended shaft	Flexible disc pack or Universal joint with carbon fiber composite shaft and steady bearing support(s)
Belt conveyors	Gear coupling for fractional to 7.5 horsepower, Silicone filled fluid coupling for 10 hp and larger
Single stage centrifugal blowers	Flexible disc pack

B. Each coupling size shall be determined based on the rated horsepower of the motor, speed of the shaft, and the load classification service factor. The CONTRACTOR shall have the equipment manufacturer select or recommend the size and type of coupling required to suit each specific application.

C. **Differential Settlement:** Where differential settlement between the driver and the driven equipment may occur, 2 sets of universal type couplings shall be provided.

D. **Taper-Lock** or equal bushings may be used to provide for easy installation and removal of shafts of various diameters.

2.4 SHAFTING

A. **General:** Shafting shall be continuous between bearings and shall be sized to transmit the power required. Keyways shall be accurately cut in line. Shafting shall not be turned down at the ends to accommodate bearings or sprockets whose bore is less than the diameter of the shaft. Shafts shall rotate in the end bearings and shall be turned and polished, straight, and true.

B. **Design Criteria**: All shafts shall be designed to carry the steady state and transient loads suitable for unlimited number of load applications, in accordance with ASME B106.1M - Design of Transmission Shafting. Where shafts are subjected to fatigue stresses, such as frequent start and stop cycles, the mean stress shall be determined by using the modified Goodman Diagram. The maximum torsional stress shall not exceed the endurance limit of the shaft after application of the factor of safety of 2 in the

endurance limit and the stress concentration factor of the fillets in the shaft and keyway. Stress concentration factor shall be in accordance with ASME Standard B17.1 - Keys and Keyseats.

C. Materials: Shafting materials shall be appropriate for the type of service and torque transmitted. Environmental elements such as corrosive gases, moisture, and fluids shall be taken into consideration. Materials shall be as indicated unless furnished as part of an equipment assembly.

1. Low carbon cold-rolled steel shafting shall conform to ASTM A 108, Grade 1018.

2. Medium carbon cold-rolled shafting shall conform to ASTM A 108, Grade 1045.

3. Other grades of carbon steel alloys shall be suitable for service and load.

4. Corrosion-resistant shafting shall be stainless steel or Monel, whichever is most suitable for the intended service.

D. Differential Settlement: Where differential settlement between the driver and the driven equipment may occur, a shaft of sufficient length with 2 sets of universal type couplings shall be provided.

2.5 GEARS AND GEAR DRIVES

A. Unless otherwise indicated, gears shall be of the spur, helical, or spiral-bevel type, designed and manufactured in accordance with AGMA Standards, with a service factor suitable for load class, mechanical service and thermal rating adjustment, a minimum L-10 bearing life of 60,000 hours, and a minimum efficiency of 94 percent. Peak torque, starting torque, and shaft overhung load shall be checked when selecting the gear reducer. Worm gears shall not be used unless specifically approved by the ENGINEER.

B. Gear speed reducers or increasers shall be of the enclosed type, oil- or grease-lubricated and fully sealed, with a breather to allow air to escape but keep dust and dirt out. The casing shall be of cast iron or heavy-duty steel construction with lifting lugs and an inspection cover for each gear train. An oil level sight glass and an oil flow indicator shall be provided, located for easy reading.

C. Gears and gear drives that are part of an equipment assembly shall be shipped fully assembled for field installation.

D. Material selections shall be left to the discretion of the manufacturer, provided the above AGMA values are met. Input and output shafts shall be adequately designed for the service and load requirements. Gears shall be computer-matched for minimum tolerance variation. The output shaft shall have 2 positive seals to prevent oil leakage.

E. Oil level and drain locations shall be easily accessible. Oil coolers or heat exchangers with all required appurtenances shall be provided when necessary.

F. Where gear drive input or output shafts from one manufacturer connect to couplings or sprockets from a different manufacturer, the CONTRACTOR shall have the gear drive manufacturer furnish a matching key taped to the shaft for shipment.

2.6 DRIVE CHAINS

A. Power drive chains shall be commercial type roller chains meeting ASME Standards.

B. A chain take-up or tightener shall be provided in every chain drive arrangement to provide easy adjustment.

C. A minimum of one connecting or coupler link shall be provided in each length of roller chain.

D. Chain and attachments shall be of the manufacturer's best standard material and be suitable for the process fluid.

2.7 SPROCKETS

A. General: Sprockets shall be used in conjunction with chain drives and chain-type material handling equipment.

B. Materials: Unless otherwise indicated, materials shall be as follows:

1. Sprockets with 25 teeth or less, normally used as a driver, shall be made of medium carbon steel in the 0.40 to 0.45 percent carbon range.

2. Type A and B sprockets with 26 teeth or more, normally used as driven sprockets, shall be made of minimum 0.20 percent carbon steel.

3. Large diameter sprockets with Type C hub shall be made of cast iron conforming to ASTM A 48, Class 30.

C. Sprockets shall be accurately machined to ASME Standards. Sprockets shall have deep hardness penetration in tooth sections.

D. Finish bored sprockets shall be furnished complete with keyseat and set screws.

E. To facilitate installation and disassembly, sprockets shall be of the split type or shall be furnished with **Taper-Lock** bushings as required.

F. Idler sprockets shall be provided with brass or Babbitt bushings, complete with oil hole and axial or circumferential grooving with stainless steel tubing and grease fitting extended to an accessible location. Steel collars with set screws may be provided in both sides of the hub.

2.8 V-BELT DRIVES

A. V-belts and sheaves shall be of the best commercial grade and shall conform to ASME, MPTA, and RMA Standards.

B. Unless otherwise indicated, sheaves shall be machined from the finest quality gray cast iron.

C. Sheaves shall be statically balanced. In some applications where vibration is a problem, sheaves shall be dynamically balanced. Sheaves operating at belt speeds exceeding 6,500 fpm may be required to be of special materials and construction.

D. To facilitate installation and disassembly, sheaves shall be provided complete with **Taper-Lock** or **QD** bushings as required.

E. Finish bored sheaves shall be complete with keyseat and set screws.

F. Sliding motor bases shall be provided to adjust the tension of V-belts.

2.9 DRIVE GUARDS

A. Power transmission trains, prime movers, machines, shaft extensions, and moving machine parts shall be guarded to conform with the OSHA Safety and Health Standards (29CFR1910). The guards shall be constructed of minimum 10 gauge expanded, flattened steel with smooth edges and corners, galvanized after fabrication, and securely fastened. Where required for lubrication or maintenance, guards shall have hinged and latched access doors.

2.10 BEARINGS

A. General: Bearings shall conform to the standards of the American Bearing Manufacturers Association, Inc. (ABMA).

B. To assure satisfactory bearing application, fitting practice, mounting, lubrication, sealing, static rating, housing strength, and lubrication shall be considered in bearing selection.

C. Re-lubricatable type bearings shall be equipped with a hydraulic grease fitting in an accessible location and shall have sufficient grease capacity in the bearing chamber.

D. Lubricated-for-life bearings shall be factory-lubricated with the manufacturer's recommended grease to insure maximum bearing life and best performance.

E. Anti-Friction Type Bearing Life: Except where otherwise indicated, bearings shall have a minimum L-10 life expectancy of 5 years or 20,000 hours, whichever occurs first. Where so indicated, bearings shall have a minimum rated L-10 life expectancy corresponding to the type of service, as follows:

Type of Service	Design Life, years	L-10 Design Life, hours
	(whichever comes first)	
8-hour shift	10	20,000
16-hour shift	10	40,000
Continuous	10	60,000

F. Bearing housings shall be of cast iron or steel and bearing mounting arrangement shall be as indicated or as recommended in the published standards of the manufacturer. Split-type housings may be used to facilitate installation, inspection, and disassembly.

G. Sleeve Type Bearings: Sleeve-type bearings shall have a cast iron or ductile iron housing and Babbitt or bronze liner. Bearing housing shall be bolted and doweled to the lower casing half. These housings shall be provided with cast iron caps bolted in place and the bearing end caps shall be bored to receive the bearing shells. Sleeve bearings

shall be designed on the basis of the maximum allowable load permitted by the bearing manufacturer. If the sleeve bearing is connected to an equipment shaft with a coupling, the coupling transmitted thrust will be assumed to be the maximum motor or equipment thrust. Lubricant, lubrication system, and cooling system shall be as recommended by the bearing manufacturer.

H. Plate Thrust Bearings: Thrust bearings shall be the **Kingsbury** Type, designed and manufactured to maintain the shaft in the fixed axial position without undue heating or the necessity of adjustment or attention. Bearings shall be oil lubricated to suit the manufacturer's standard method of lubrication for the specific bearing. If bearing cooling is required, manufacturer shall provide necessary piping, filters, and valves.

2.11 PIPING CONNECTIONS

A. Pipe Hangers, Supports, and Guides: Pipe connections to equipment shall be supported, anchored, and guided to avoid stresses and loads on equipment flanges and equipment. Supports and hangers shall be in accordance with Section 15006 - Pipe Supports.

B. Flanges and Pipe Threads: Flanges on equipment and appurtenances shall conform to ASME B16.1, Class 125, or B16.5, Class 150, unless otherwise indicated. Pipe threads shall be in accordance with ASME B1.20.1 and Section 15000 - Piping, General.

C. Flexible Connectors: Flexible connectors shall be installed in all piping connections to engines, blowers, compressors, and other vibrating equipment and in piping systems in accordance with the requirements of Section 15000. Flexible connectors shall be harnessed or otherwise anchored to prevent separation of the pipe where required by the installation.

D. Insulating Connections: Insulating bushings, unions, couplings, or flanges, as appropriate, shall be used in accordance with the requirements of the Section 15000.

2.12 GASKETS AND PACKINGS

A. Gaskets shall be in accordance with Section 15000.

B. Packing around valve stems and reciprocating shafts shall be of compressible material, compatible with the fluid being used. Chevron-type "V" packing shall be **Garlock No. 432, John Crane "Everseal,"** or equal.

C. Packing around rotating shafts (other than valve stems) shall be "O"-rings, stuffing boxes, or mechanical seals, as recommended by the manufacturer and approved by the ENGINEER, in accordance with Section 11100 - Pumps, General.

2.13 NAMEPLATES

A. Equipment nameplates of stainless steel shall be engraved or stamped and fastened to the equipment in an accessible location with No. 4 or larger oval head stainless steel screws or drive pins. Nameplates shall contain the manufacturer's name, model, serial number, size, characteristics, and appropriate data describing the machine performance ratings.

2.14 TOOLS AND SPARE PARTS

A. Tools: The CONTRACTOR shall furnish one complete set of special wrenches and other special tools necessary for the assembly, adjustment, and dismantling of the equipment. Tools shall be of best quality hardened steel forgings with bright finish. Wrench heads shall have work faces dressed to fit nuts. Tools shall be suitable for professional work and manufactured by **Snap On, Crescent, Stanley,** or equal. The set of tools shall be neatly mounted in a labeled toolbox of suitable design provided with a hinged cover.

B. Spare parts shall be furnished as indicated in the individual equipment sections. All spare parts shall be suitably packaged in a metal box and labeled with equipment numbers by means of stainless steel or solid plastic nametags attached to the box.

2.15 EQUIPMENT LUBRICANTS

A. The CONTRACTOR shall install lubricants for all equipment during storage and prior to initial testing of the equipment. After successful initial testing, final testing, and satisfactory completion startup testing as specified in Section 01660 - Equipment Testing and Plant Startup, the CONTRACTOR shall conduct one complete lubricant change on all equipment. In addition, the CONTRACTOR shall be responsible for the proper disposal of all used lubricants. The OWNER will then be responsible for subsequent lubricant changes

PART 3 -- EXECUTION

3.1 SERVICES OF MANUFACTURER

A. Inspection, Startup, and Field Adjustment: Where required by individual sections, an authorized, experienced, and competent service representative of the manufacturer shall visit the Site for the number of days indicated in those sections to witness or perform the following and to certify in writing that the equipment and controls have been properly installed, aligned, lubricated, adjusted, and readied for operation.

1. Installation of equipment

2. Inspection, checking, and adjusting the equipment and approving its installation

3. Startup and field testing for proper operation, efficiency, and capacity

4. Performing field adjustments during the test period to ensure that the equipment installation and operation comply with requirements

B. Instruction of the Owner's Personnel

1. Where required by the individual equipment sections, an authorized training representative of the manufacturer shall visit the Site for the number of days indicated in those sections to instruct the OWNER's personnel in the operation and maintenance of the equipment, including step-by-step troubleshooting with necessary test equipment. Instruction shall be specific to the models of equipment provided.

2. The representative shall have at least 2 years experience in training. A resume of the representative shall be submitted.

3. Training shall be scheduled 3 weeks in advance of the scheduled session.

4. Proposed training material and a detailed outline of each lesson shall be submitted for review. Review comments from the ENGINEER shall be incorporated into the material.

5. The training materials shall remain with the trainees after the session.

6. The OWNER may videotape the training for later use by the OWNER's personnel.

C. Vibration Monitoring: For the equipment types listed in paragraph 1.3D, the CONTRACTOR shall arrange for at least two Site visits by the manufacturer's specialist during testing of the equipment covered by torsional and vibration analysis submittals to measure the amount of vibration and prepare written recommendations for keeping the vibration within acceptance limits. If vibration readings exceed the specified or the applicable referenced standard vibration limits for the type of equipment, the CONTRACTOR shall make necessary corrections for the equipment to meet the acceptance criteria.

3.2 INSTALLATION

A. General: Equipment shall be installed in accordance with the manufacturers written recommendations.

B. Alignment: Equipment shall be field tested to verify proper alignment.

3.3 PACKAGED EQUIPMENT

A. When any system is furnished as pre-packaged equipment, the CONTRACTOR shall coordinate all necessary space and structural requirements, clearances, utility connections, signals, and outputs with subcontractors to avoid later change orders.

B. If the packaged system has any additional features (as safety interlocks, etc.) other than required by the Contract Documents, the CONTRACTOR shall coordinate such features with the ENGINEER and provide all material and labor necessary for a complete installation as required by the manufacturer.

3.4 FIELD ASSEMBLY

A. Studs, cap screws, bolt and nuts used in field assembly shall be coated with "**Never Seize"** compound or equal.

3.5 WELDING

A. Welds shall be cleaned of weld-slag, splatter, etc. to provide a smooth surface.

3.6 FIELD TESTS

A. Where indicated by the individual equipment sections, equipment shall be field tested after installation to demonstrate satisfactory operation without excessive noise, vibration, or no overheating of bearings or motor.

B. The following field testing shall be conducted:

1. Start equipment, check, and operate the equipment over its entire operating range. Vibration level shall be within the amplitude limits as indicated or as recommended by the reference applicable Standards.

2. Obtain concurrent readings of motor voltage, amperage, capacity, vibration and bearing temperatures.

3. Operate equipment indicated in the Special Provisions.

C. The ENGINEER shall witness field-testing. The CONTRACTOR shall notify the ENGINEER of the test schedule three days in advance.

D. In the event that any equipment fails to meet the test requirements, the equipment shall be modified and resettled until it satisfies the requirement.

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SECTION 12000 – TILTING WEIR GATES

PART 1 -- GENERAL

1.1 GENERAL

A. This section covers Fabricated Overshot Gates. The equipment provided under this section shall be fabricated, assembled, erected, and placed in proper operating condition in full conformity with the drawings, specifications, engineering data, instructions, and recommendations of the equipment manufacturer.

B. Gates and operators shall be supplied with all the necessary parts and accessories indicated on the drawings, specified, or otherwise required for a complete, properly operating installation, and shall be the latest standard product of a manufacturer regularly engaged in the production of fabricated gates.

1.2 APPROVED MANUFACTURERS

A. Gates supplied under this section shall be Model GH-11000 Overshot gates as manufactured by Golden Harvest Inc. (800-338-6238) or engineer approved equal

1.3 GOVERNING STANDARDS

A. Except as modified or supplemented herein, all gates and operators shall conform to the applicable requirements of AWWA standards.

1.4 QUALITY ASSURANCE

A. The manufacturer shall have 5 years experience in the production of substantially similar equipment. The manufacturer's shop welds, welding procedures and welders shall be qualified and certified in accordance with the requirement of the latest edition of AWS Sections D1.1, 1.2 and 1.6.

B. The fully assembled gates shall be shop inspected, tested for operation and adjusted before shipping. There shall be no assembling or adjusting on the job sites other than for the side rub plates and lifting mechanism.

PART 2 -- MATERIALS AND CONSTRUCTION

2.1 GENERAL

A. The overshot gate shall offer an infinite overflow adjustment with its full open and full closed range. The gate shall consist of a hoist mechanism, side rub plates, gate leaf and mounting hinge.

2.2 DESIGN CRITERIA

A. The gate leaf and operator system shall be designed based on the hydraulic loads acting on the gate though it's full operating range.

B. The gate hinge shall be designed such that the load to be transferred from the gate to the concrete sill is evenly distributed across the structure.

C. Gate operator supports and wire rope connections to the gate shall be designed with a minimum safety factor of five (5) based on the ultimate strength or a safety factor of two (2) based on the yield strength of the materials used.

2.3 LEAF

A. The gate leaf shall lie flat in the full open (down) position and shall be mechanically stopped at 60 deg from the horizontal when in the closed position. The gate shall open under its own weight. Gate leaf shall be stainless steel plate adequately reinforced for the maximum head requirements specified with a minimum material thickness of ¼".

2.4 MOUNTING ANGLE

A. The mounting angle shall include stud anchors for embedment in the concrete sill and threaded bolts for bolting the gate hinges to the mounting angle.

2.5 SEALS

A. Resilient neoprene double flat wiper seal with stainless steel retainer bar. Bars shall be held in place with stainless steel fasteners. Seals shall be field replaceable without removing gate. Invert seal shall be neoprene and attached to both frame and leaf.

B. The hinge or invert seal shall be a neoprene flap attached on one edge to cover and seal the hinge area.

2.6 SEAL PLATES

A. Embedded or in-channel mounted stainless steel rub plate shall be supplied and installed on each side of the channel acting as the seal contact surface material through the full range of gate travel.

2.7 CABLE DRUM HOIST

A. Cable drum hoist is to consist of a self-locking worm and worm gear, with reduction spur gears as required, totally enclosed in a cast iron or cast steel housing. Hoist assembly shall be self locking at all positions of gate swing to prevent gate drift.

B. The hoist shall be furnished with a fabricated steel drum with attachments for wire rope allowing for 3 wraps plus the normal hoisting length requirements. Support bearing to be self-aligning grease lubricated pillow block bearing assembly.

C. Materials:

Part	***Material***
Gate Leaf	Stainless Steel Type 316L
Mounting Angle, Hinges, Side seal rub plates	Stainless Steel Type 316L ASTM A-276 / 312
Hoist Assembly & Drums	Carbon Steel per ASTM A-36, ASTM-A53, ASTM A500 et al.
Seal	Neoprene ASTM D-2000
Fasteners and Anchor bolts	Stainless steel Type 316 ASTM F593/594
Cable	Stainless Steel Type 316

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