ST. TAMMANY PARISH

MICHAEL B. COOPER
PARISH PRESIDENT

NOTICE TO BIDDERS

ST. TAMMANY PARISH

Bid # 21-3-2 – Lake Front Pump Station Phase 3

Sealed bids will be received by the Department of Procurement, until 2:00 p.m., **Thursday, March 4, 2021,** and then opened and read publicly at that time by the Procurement Staff for the following project:

Each paper bid must be submitted in a sealed envelope. The outside of the envelope shall show the Name and Address of the Bidder, the State Contractor's License Number of the Bidder (if the work is estimated at $50k or more), the Project Name and the Bid Number.

The project classification is:

Municipal Public Works, Electrical, and Mechanical

This Bid package is available online at http://www.stpgov.org/ or at www.bidexpress.com.

It is the Bidder's responsibility to check the Parish website frequently for any possible addenda that may be issued. The Parish is not responsible for a Bidder's failure to download any addenda documents required to complete a submission.

Bids will be received at 21454 Koop Dr., Suite 2F, Mandeville, LA 70471 from each bidder or his agent and given a written receipt, by certified mail with return receipt requested, or electronically at www.bidexpress.com.

Due to the COVID-19 pandemic, and in an effort to help slow the spread of the virus, Openings will take place outside at the "Pavilion" of Building B located at 21454 Koop Drive, Mandeville, La. 70471. Any questions regarding this should be directed to the Department of Procurement via email at purchasing@stpgov.org. Please call the Procurement office at 985-898-2520 and we will meet you at the front entrance of Building B to collect bids and issue a receipt.

Procurement Department

BID PROPOSAL

ST. TAMMANY PARISH
GOVERNMENT

BID PACKAGE FOR

LAKEFRONT PUMP STATION, PHASE 3
FEDERAL EMERGENCY MANAGEMENT AGENCY PW #00872-V1
PARISH PROJECT NO. EN14000002
HDCA PROJECT NO. 2016-13

BID NO: 21-3-2

DECEMBER 15, 2020

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Section 02

Instructions to Bidders

Bidders are urged to promptly review the requirements of this specification and submit questions for resolution as early as possible during the bid period. Questions or concerns must be submitted in writing to the Procurement Department no later than 2:00 CST seven (7) working days prior to the bid opening date. Otherwise, this will be construed as acceptance by the bidders that the intent of the specifications is clear and that competitive bids may be obtained as specified herein. Protests with regard to the specification documents will not be considered after bids are opened.

1. Bid security is required. Be sure that your bid includes such security as is necessary to meet Parish requirements and is properly signed. The bid must be fully completed. All applicable Louisiana license numbers must be affixed.

2. The Owner is the St. Tammany Parish Government (the "Parish").

3. The terms "he/his" and "it/its" may be used interchangeably.

4. The terms "Owner," the "Parish," and "St. Tammany Parish" may be used interchangeably.

5. The successful Bidder understands the limited contract time in the contract is (180) One hundred and eighty days, and shall submit any request for an extension of time in accordance with the General and Supplementary Conditions. Said request will reflect the days requested and the reason for same. No extension request is guaranteed or absolute.

6. Bidder specifically understands that acknowledgment of the General Conditions is required. Bidder specifically understands that signature of receipt of the General Conditions is mandated. **The Bidder's signature on the "Louisiana Uniform Public Work Bid Form" will serve as acknowledgment of the Bidder's receipt and understanding of the General Conditions as well as any Supplementary Conditions.**

7. ***If any additional work*** **is performed by the contractor without *written approval* by owner, the cost of the work will be borne by the contractor and will not be reimbursed by the Parish.**

8. **Only** the Louisiana Uniform Public Bid Form, the Unit Price Form (if necessary), the bid security, and written evidence of authority of person signing the bid shall be submitted on or before the bid opening time and date provided for in the Bid Documents. Necessary copies of the Louisiana Uniform Public Work Forms and Unit Price Forms (if necessary) will be furnished for Bidding. Bound sets of the Contract Documents are for Bidder's information and should not be used in submitting Bids.

9. All other documents and information required are to be submitted by the low Bidder within ten (10) days after the opening of the bids, and at the same time of day and location as given for the opening of the bids in the Bid Documents.

10. Each Bid must be submitted in a sealed envelope, unless submitted electronically. The outside of the envelope shall show the name and address of the Bidder, the State Contractor's License Number of the Bidder (if work requires contractor's license), and the Project name and the Bid number. In the case of an electronic bid proposal, a contractor may submit an authentic digital signature on the electronic bid proposal accompanied by the contractor's license number, Project name and the Bid number.

11. The price quoted for the Work shall be stated in words and figures on the Bid Form, and in figures only on the Unit Price Form. The price in the Bid shall include all costs necessary for the complete performance of the Work in full conformity with the conditions of the Contract Documents, and shall include all applicable Federal, State, Parish, Municipal or other taxes. The price bid for the items listed on the Unit Price Form will include the cost of all related items not listed, but which are normally required to do the type of Work bid.

12. The Bid shall be signed by the Bidder. The information required on the Louisiana Uniform Public Work Bid Form must be provided. Evidence of agency, corporate, or partnership authority is required and shall be provided in conformance with LSA-R.S. 38:2212(B).

13. Only a Contractor licensed by the State to do the type of Work as indicated on the Notice to Bidders can submit a Bid. The Bidder's signature on the Bid Form certifies that he holds an active license under the provisions of Chapter 24 of Louisiana Revised Statutes Title 37. Failure to be properly licensed constitutes authority for the Owner to reject the Bid.

14. Bidders shall not attach any conditions or provisions to the Bid. Any conditions or provisions so attached may, at the sole option of the Owner, cause rejection of the Bid.

15. A Bid Guarantee of five percent (5%) of the amount of the total Bid, including Alternates, must accompany the Proposal and, at the option of the Bidder, may be a cashier's check, certified check or a satisfactory Bid Bond. The Bid Guarantee must be attached to the Louisiana Uniform Public Work Bid Form. No Bid will be considered unless it is so guaranteed. Cashier's check or certified check must be made payable to the order of the Owner. Cash deposits will not be accepted. The Owner reserves the right to cash or deposit the cashier's check or certified check. Such guarantees shall be made payable to the Parish of St. Tammany. In accordance with LSA-R.S. 38:2218(C), if a bid bond is used, it shall be written by a surety or insurance company currently on the U.S. Department of the Treasury Financial Management Service list of approved bonding companies which is published annually in the Federal Register, or by a Louisiana domiciled insurance company with at least an A- rating in the latest printing of the A.M. Best's Key Rating Guide to write individual bonds up to ten percent of policyholders' surplus as shown in the A.M. Best's Key Rating Guide or by an insurance company in good standing licensed to write bid bonds which is either domiciled in Louisiana or owned by Louisiana residents. It is **not** required to be on any AIA form.

16. Bid securities of the three (3) lowest Bidders will be retained by the Owner until the Contract is executed or until final disposition is made of the Bids submitted. Bid securities of all other Bidders will be returned promptly after the canvas of Bids. Bids shall remain binding for forty-five (45) days after the date set for Bid Opening. The Parish shall act within the forty-five (45) days to award the contract to the lowest responsible bidder or reject all bids. However, the Parish and the lowest responsible bidder, by mutual written consent, may agree to extend the deadline for award by one or more extensions of thirty (30) calendar days. In the event the Owner issued the Letter of Award during this period, or any extension thereof, the Bid accepted shall continue to remain binding until the execution of the Contract.

17. A Proposal may be withdrawn at any time prior to the scheduled closing time for receipt of Bids, provided the request is in writing, executed by the Bidder or its duly authorized representative and is filed with the Owner prior to that time. When such a request is received, the Proposal will be returned to the Bidder unopened. A bid withdrawn under the provisions of LSA-R.S. 38:2214(C) cannot be resubmitted.

18. Written communications, over the signature of the Bidder, to modify Proposals will be accepted and the Proposal corrected in accordance therewith if received by the Owner prior to the scheduled closing time for receipt of Bids. Oral, telephonic or telegraphic Modifications will not be considered.

19. No oral interpretation obligating the Owner will be made to any Bidder as to the meaning of the Drawings, Specifications and Contract Documents. Every request for such an interpretation shall be made in writing and addressed and forwarded to the Owner. Inquiries received within seven (7) days prior to the day fixed for opening of the Bids may not be given consideration. Every interpretation made to the Bidder shall be in the form of an addendum to the Specifications. All such Addenda shall become part of the Contract Documents. Failure of the Owner to send or failure of Bidder to receive any such interpretation shall not relieve any Bidder from any obligation under this Bid as submitted without Modification. All Addenda shall be issued in accordance with the Public Bid Law, LSA-R.S. 38:2212(O).

20. The Owner reserves the right to reject any or all Bids for just cause in accordance with the Public Bid Law, LSA-R.S. 38:2214(B). Incomplete, informal, illegible, or unbalanced Bids may be rejected. Reasonable grounds for belief that any one Bidder is concerned directly or indirectly with more than one Bid will cause rejection of all Bids wherein such Bidder

is concerned. If required, a Bidder shall furnish satisfactory evidence of its competence and ability to perform the Work stipulated in its Proposal. Incompetence will constitute cause for rejection. If the Parish determines that the bidder is not responsive or responsible for any reason whatsoever, the bid may be rejected in accordance with State law.

21. The Contractor shall indemnify and hold harmless the Owner from any and all suits, costs, penalties or claims for infringement by reason of use or installation of any patented design, device, material or process, or any trademark and copyright in connection with the Work agreed to be performed under this Contract, and shall indemnify and hold harmless the Owner for any costs, expenses and damages which it may be obliged to pay by reason of any such infringement at any time during the prosecution or after completion of the Work.

22. Bidders shall familiarize themselves with and shall comply with all applicable Federal and State Laws, municipal ordinances and the rules and regulations of all authorities having jurisdiction over construction of the Project, which may directly or indirectly affect the Work or its prosecution. These laws and/or ordinances will be deemed to be included in the Contract, as though herein written in full.

23. Each Bidder shall visit the site of the proposed Work and fully acquaint itself with all surface and subsurface conditions as they may exist so that it may fully understand this Contract. Bidder shall also thoroughly examine and be familiar with drawings, Specifications and Contract Documents. The failure or omission of any Bidder to receive or examine any form, instrument, Drawing or document or to visit the site and acquaint itself with existing conditions shall in no way relieve any Bidder from any obligation with respect to its Bid and the responsibility in the premises.

24. The standard contract form enclosed with the Proposal documents is a prototype. It is enclosed with the Contract Documents for the guidance of the Owner and the Contractor. It has important legal consequences in all respects and consultation with an attorney is encouraged. Contractor shall be presumed to have consulted with its own independent legal counsel.

25. When one set of Contract plans show the Work to be performed by two or more prime Contractors, it is the responsibility of each Bidder to become knowledgeable of the Work to be performed by the other where the Work upon which this bid is submitted is shown to come into close proximity or in conflict with the Work of the other. In avoiding conflicts, pressure pipe lines must be installed to avoid conflict with gravity pipe lines and the Bidder of the smaller gravity pipe line in conflict with the larger gravity pipe line must include in his Bid the cost of a conflict box at these locations. The location of and a solution to the conflicts do not have to be specifically noted as such on the plans.

26. Bidder shall execute affidavit(s) attesting compliance with LSA-R.S. 38:2212.10, 38:2224, 38:2227, each as amended, and other affidavits as required by law, prior to execution of the contract.

27. Sealed Bids shall be delivered to St. Tammany Parish Government at the office of **St. Tammany Parish Government, Department of Procurement, 21454 Koop Drive, Suite 2-F, Mandeville, LA 70471**, and a receipt given, until the time and date denoted in Notice to Bidders, at which time and place the Bids shall be publicly opened and read aloud to those present. In accordance with LSA-R.S. 38:2212(H), the designer's final estimated cost of construction shall be read aloud upon opening bids. Sealed Bids may also be mailed by certified mail to **St. Tammany Parish Government, Department of Procurement, 21454 Koop Drive, Suite 2-F, Mandeville, LA 70471**, and must be received before the bid opening. Bids may also be submitted electronically. Information concerning links for electronic bidding is contained in the Notice to Bidders. It is the responsibility of the Bidders to insure that bids are delivered in a timely fashion. **Late bids, regardless of reason, will not be considered, and will be returned to bidder.**

28. Paper bids shall be placed in a sealed envelope, marked plainly and prominently as indicated in the Notice to Bidders, and these Instructions, and addressed:

St. Tammany Parish Government
Department of Procurement
21454 Koop Drive, Suite 2-F
Mandeville, LA 70471

29. Complete sets of Drawings, Specifications and Contract Documents may be secured at the Office of the Owner. See Notice to Bidders for deposit schedule and availability via electronic methods.

30. The successful Bidder shall be required to post in each direction a public information sign, 4' x 8' in size, at the location of the project containing information required by the Owner. The Owner shall supply this information.

31. The award of the Contract, if it is awarded, will be to the lowest responsible Bidder, in accordance with State Law. No award will be made until the Owner has concluded such investigations as it deems necessary to establish the responsibility, qualifications, and financial ability and stability of the Bidder to do the Work in accordance with the Contract Documents to the satisfaction of the Owner within the time prescribed as established by the Department based upon the amount of work to be performed and the conditions of same. The written contract and bond shall be issued in conformance with LSA-R.S. 38:2216. If the Contract is awarded, the Owner shall give the successful Bidder written notice of the award within forty-five (45) calendar days after the opening of the Bids in conformance with LSA-R.S. 38:2215(A), or any extension as authorized thereunder.

32. At least three days prior to the execution of the Contract, the Contractor shall deliver to the Owner the required Bonds.

33. Failure of the successful Bidder to execute the Contract and deliver the required Bonds within twenty (20) days of the Notice of the Award shall be just cause for the Owner to annul the award and declare the Bid and any guarantee thereof forfeited. Award may then be made to the next lowest responsible bidder.

34. In order to ensure the faithful performance of each and every condition, stipulation and requirement of the Contract and to indemnify and hold harmless the Owner from any and all damages, either directly or indirectly arising out of any failure to perform same, the successful Bidder to whom the Contract is awarded shall furnish a Performance and Payment Bond in an amount of at least equal to one hundred percent (100%) of the Contract Price. The Contract shall not be in force or binding upon the Owner until such satisfactory Bond has been provided to and approved by the Parish. The cost of the Bond shall be paid for by the Contractor unless otherwise stipulated in the Special Provisions.

35. No surety Company will be accepted as a bondsman which has no permanent agent or representative in the State upon whom notices referred to in the General Conditions of these Specifications may be served. Service of said notice on said agent or representative in the State shall be equal to service of notice on the President of the Surety Company, or such other officer as may be concerned.

36. In conformance with LSA-R.S. 38:2219(A)(1)(a), (b), and (c):

> Any surety bond written for a public works project shall be written by a surety or insurance company currently on the U.S. Department of the Treasury Financial Management Service list of approved bonding companies which is published annually in the Federal Register, or by a Louisiana domiciled insurance company with at least an A- rating in the latest printing of the A.M. Best's Key Rating Guide, to write individual bonds up to ten percent of policyholders' surplus as shown in the A.M. Best's Key Rating Guide or by an insurance company that is either domiciled in Louisiana or owned by Louisiana residents and is licensed to write surety bonds.
>
> For any public works project, no surety or insurance company shall write a bond which is in excess of the amount indicated as approved by the U.S. Department of the Treasury Financial Management Service list or by a Louisiana domiciled insurance company with an A- rating by A.M. Best up to a limit of ten percent of policyholders' surplus as shown by A.M. Best; companies authorized by this Paragraph who are not on the treasury list shall not write a bond when the penalty exceeds fifteen percent of its capital and surplus, such capital and surplus being the amount by which the company's assets exceed its liabilities as reflected by the most recent financial statements filed by the company with the Department of Insurance.
>
> In addition, any surety bond written for a public works project shall be written by a surety or insurance company that is currently licensed to do business in the state

of Louisiana. All contractors must comply with any other applicable provisions of LSA-R.S. 38:2219.

37. Should the Contractor's Surety, even though approved and accepted by the Owner, subsequently remove its agency or representative from the State or become insolvent, bankrupt, or otherwise fail, the Contractor shall immediately furnish a new Bond in another company approved by the Owner, at no cost to the Owner. The new Bond shall be executed under the same terms and conditions as the original Bond. The new bond shall be submitted within thirty (30) days of such time as the Owner notifies Contractor or from the time Contractor learns or has reason to know that the original surety is no longer financially viable or acceptable to the Parish, whichever occurs first. In the event that Contractor fails or refuses to timely secure additional surety, then the Owner may secure such surety and thereafter deduct such cost or expense from any sum due, or to become due to Contractor.

38. The Contractor's bondsman shall obligate itself to all the terms and covenants of these Specifications and of contracts covering the Work executed hereunder. The Owner reserves the right to do Extra Work or make changes by altering, adding to deducting from the Work under the conditions and in the manner herein before described without notice to the Contractor's surety and without in any manner affecting the liability of bondsman or releasing it from any of its obligations hereunder.

39. The Bond shall also secure for the Owner the faithful performance of the Contract in strict accordance with plans, specifications, and other Contract Documents. It shall protect the Owner against all lien laws of the State and shall provide for payment of reasonable attorney's fees for enforcement of Contract and institution or concursus proceedings, if such proceedings become necessary. Likewise, it shall provide for all additional expenses of the Owner occurring through failure of the Contractor to perform.

40. The surety of the Contractor shall be and does hereby declare and acknowledge itself by acceptance to be bound to the Owner as a guarantor, jointly and in solido, with the Contractor, for fulfillment of terms of the Contract.

41. The performance Bond and Labor and Material Bond forming part of this Contract shall be continued by Contractor and its Surety for a period of one (1) year from date of acceptance of the Work/Project by Owner to assure prompt removal and replacement of all defective material, equipment, components thereof, workmanship, etc., and to assure payment of any damage to property of Owner or others as a result of such defective materials, equipment, workmanship, etc.

42. Contractor shall pay for cost of recording the Contract, Bond, and any change orders required to be recorded, as well as the cost of canceling any of the foregoing. Contractor shall also secure and pay for all Clear Lien and Privilege Certificates (together with any updates) which will be required before any final payment is made, and that may be required before any payment, at the request of the Owner, its representative, agent, architect, engineer and the like. All recordation and Clear Lien and Privilege Certificate requirements shall be in accordance with those requirements noted herein before in contract Specifications.

43. Contractor shall secure and maintain at its expense such insurance that will protect it and the Parish from claims for injuries to persons or damages to property which may arise from or in connection with the performance of Services or Work hereunder by the Contractor, his agents, representatives, employees, and/or subcontractors. The cost of such insurance shall be included in Contractor’s bid.

44. The Contractor shall not commence work until it has obtained all insurance as required for the Parish Project. If the Contractor fails to furnish the Parish with the insurance protection required and begins work without first furnishing Parish with a currently dated certificate of insurance, the Parish has the right to obtain the insurance protection required and deduct the cost of insurance from the first payment due the Contractor. Further deductions are permitted from future payments as are needed to protect the interests of the Parish including, but not limited to, renewals of all policies.

45. Payment of Premiums: The insurance companies issuing the policy or policies shall have no recourse against the Parish of St. Tammany for payment of any premiums or for assessments under any form of policy.

46. Deductibles: Any and all deductibles in the described insurance policies shall be assumed by and be at the sole risk of the Contractor.

47. Authorization of Insurance Company(ies) and Rating: All insurance companies must be authorized to do business in the State of Louisiana and shall have an A.M. Best rating of no less than A-, Category VII.

48. Policy coverages and limits must be evidenced by Certificates of Insurance issued by Contractor's carrier to the Parish and shall reflect:

Date of Issue: Certificate must have current date.

Named Insured: The legal name of Contractor under contract with the Parish and its principal place of business shall be shown as the named insured on all Certificates of Liability Insurance.

Name of Certificate Holder: St. Tammany Parish Government, Office of Risk Management, P. O. Box 628, Covington, LA 70434

Project Description: A brief project description, including Project Name, Project Number and/or Contract Number, and Location.

Endorsements and Certificate Reference: All policies must be endorsed to provide, and certificates of insurance must evidence the following:

Waiver of Subrogation: The Contractor's insurers will have no right of recovery or subrogation against the Parish of St. Tammany, it being the intention of the parties that all insurance policy(ies) so affected shall protect both parties and be the primary coverage for any and all losses covered by the below described insurance. *Policy endorsements required for all coverages*.

Additional Insured: The Parish of St. Tammany shall be named as additional named insured with respect to general liability, marine liability, pollution/environmental liability, automobile liability and excess liability coverages. *Policy endorsements required.*

Hold Harmless: Contractor's liability insurers shall evidence their cognizance of the Hold Harmless and Indemnification in favor of St. Tammany Parish Government by referencing same on the face of the Certificate(s) of Insurance.

Cancellation Notice: Producer shall provide thirty (30) days prior written notice to the Parish of policy cancellation or substantive policy change.

49. The types of insurance coverage the Contractor is required to obtain and maintain throughout the duration of the Contract shall be designated by a separate document issued by the Office of Risk Management.

50. It is the intent of these instructions that they are in conformance with State Bid Laws. Should there be any discrepancy or ambiguity in these provisions, the applicable State Bid Law shall apply.

51. The letting of any public contract in connection with funds that are granted or advanced by the United States of America shall be subject to the effect, if any, of related laws of said United States and valid rules and regulations of federal agencies in charge, or governing use and payment of such federal funds.

52. Protests based on alleged solicitation improprieties that are apparent before bid opening, or the time set for receipt of initial proposals must be filed with and received by the Procurement Department BEFORE these times. Any other protest shall be filed no later than ten (10) calendar days after: the opening of the bid; the basis of the protest is known; or the basis of the protest should have been known (whichever is earlier).

53. It is the Parish's policy to provide a method to protest exclusion from a competition or from the award of a contract, or to challenge an alleged solicitation irregularity. It is always

better to seek a resolution within the Parish system before resorting to outside agencies and/or litigation to resolve differences. All protests must be made in writing, and shall be concise and logically presented to facilitate review by the Parish. The written protest shall include:

The protester's name, address, and fax and telephone numbers and the solicitation, bid, or contract number;

A detailed statement of its legal and factual grounds, including a description of the resulting prejudice to the protester;

Copies of relevant documents;

All information establishing that the protester is an interested party and that the protest is timely; and

A request for a ruling by the agency; and a statement of the form of relief requested.

The protest shall be addressed to St. Tammany Parish Government Department of Procurement, P.O. Box 628, Covington, LA 70434

The protest review shall be conducted by the Parish Legal Department.

Only protests from interested parties will be allowed. Protests based on alleged solicitation improprieties that are apparent before bid opening, or the time set for receipt of initial proposals, must be filed with and received by the Department of Procurement BEFORE those deadlines.

Any other protest shall be filed no later than ten (10) calendar days after the basis of the protest is known, or should have been known (whichever is earlier).

The Parish will use its best efforts to resolve the protest within thirty (30) days of the date that it is received by the Parish. The written response will be sent to the protestor via mail and fax, if a fax number has been provided by the protestor. The protester can request additional methods of notification.

54. The last day to submit questions and/or verification on comparable products will be no later than 2:00 pm CST, seven (7) working days prior to the opening date of the bid/proposal due date. Further, any questions or inquires must be submitted via fax to 985- 898-5227, or via email to Purchasing@stpgov.org. Any questions or inquiries received after the required deadline to submit questions or inquiries will not be answered.

55. St. Tammany Parish Government contracts to be awarded are dependent on the available funding and/or approval by members designated and/or acknowledged by St. Tammany Parish Government. At any time St. Tammany Parish Government reserves the right to cancel the award of a contract if either or both of these factors is deficient.

56. Any action by the Parish to disqualify any Bidder on the grounds that they are not a responsible Bidder shall be conducted in accordance with LSA-R.S. 38:2212(X).

57. If any part of the provisions contained herein and/or in the Specifications and Contract for the Work shall for any reason be held invalid, illegal or unenforceable in any respect, such invalidity, illegality or unenforceability shall not affect any other provisions of this Agreement or attachment, but it shall be construed as if such invalid, illegal, or unenforceable provision or part of a provision had never been contained herein.

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Section 03

Summary of Work

I. Work to Include:

The WORK of this project includes repairs to the Lakefront Drainage Pump Station, including, but not necessarily limited to the following:

1. Removal, modification, and re – installation of the existing operational 75 HP vertical turbine type drainage pump to elevate the existing motor above the prescribed flood hazard elevation;

2. Removal, rehabilitation, and re – installation of an existing non - operational 350 HP vertical turbine drainage pump to return the drainage pump to operational service and to elevate the pump motor above the prescribed flood hazard elevation;

3. Removal, rehabilitation, and re – installation of a non – operational 350 HP motor for 54" drainage pump;

4. Removal of and delivery to the OWNER of an existing non – operational 350 HP vertical turbine drainage pump and non – operational drainage pump motor to the OWNER;

5. Relocation of existing power distribution and control gear to an adjacent elevated platform;

6. Provision, installation, and startup of new power distribution and control gear on a adjacent elevated platform;

7. Appurtenant demolition, mechanical, structural, and electrical WORK as prescribed by the Contract Documents.

II. Location of Work:

The WORK is located south of Slidell at the Lakefront Drainage Pump Station, located near the end of East Howze Beach Road, off the Oak Harbor exit of I-10, Section 4 Township 10 Range 14E.

III. Documents: Bid Documents dated December, 2020, and entitled:

Lakefront Pump Station, Phase 3, Federal Emergency Management

Agency PW #00872-V1, St. Tammany Parish, Louisiana

Bid# 21-3-2

IV. OTHER REQUIREMENTS (as applicable)

When not otherwise specified herein, all work and materials shall conform to the requirements of the Louisiana Department of Transportation and Development hereafter called LSSRB (2016 Edition of Louisiana Standard Specifications for Roads and Bridges).

In the case of conflict between the Technical Specifications and the LSSRB, the Technical Specifications contained within this Bid Proposal take precedence.

LOUISIANA UNIFORM PUBLIC WORK BID FORM

TO: St. Tammany Parish Government 21454 Koop Dr., Suite 2F Mandeville, La 70471

(Owner to provide name and address of owner)

BID FOR: Lakefront Pump Station, Phase 3
Project #: EN14000002
Bid #: 21-3-2

(*Owner to provide name of project and other identifying information.)*

The undersigned bidder hereby declares and represents that she/he; a) has carefully examined and understands the Bidding Documents, b) has not received, relied on, or based his bid on any verbal instructions contrary to the Bidding Documents or any addenda, c) has personally inspected and is familiar with the project site, and hereby proposes to provide all labor, materials, tools, appliances and facilities as required to perform, in a workmanlike manner, all work and services for the construction and completion of the referenced project, all in strict accordance with the Bidding Documents prepared by: H. Davis Cole & Associates, LLC (HDCA) and dated: December, 2020.
(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 R.S. 38:2218(A) attached to and made a part of this bid.

LOUISIANA UNIFORM PUBLIC WORK BID FORM
UNIT PRICE FORM

TO: St. Tammany Parish Government 21454 Koop Dr., Suite 2F Mandeville, La 70471

(Owner to provide name and address of owner)

BID FOR: Lakefront Pump Station, Phase 3
Project #: EN14000002
Bid #: 21-3-2

(*Owner to provide name of project and other identifying information.)*

UNIT PRICES: This form shall be used for any and all work required by the Bidding Documents and described as unit prices. Amounts shall be stated in figures and only in figures.

DESCRIPTION:	q Base Bid or q Alt.# MOBILIZATION			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
1	1.0	LUMP SUM		

DESCRIPTION:	q Base Bid or q Alt.# TEMPORARY SIGNS AND BARRICADES			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
2	1.0	LUMP SUM		

DESCRIPTION:	q Base Bid or q Alt.# CONSTRUCTION LAYOUT AND ELEVATION CERTIFICATE			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
3	1.0	LUMP SUM		

DESCRIPTION:	q Base Bid or q Alt.# REMOVE AND DELIVER EXISTING 54" PUMP MOTORS TO REPAIR FACILITY			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
4	1.0	LUMP SUM		

DESCRIPTION:	q Base Bid or q Alt.# DISMANTLE 54" PUMP MOTORS AT REPAIR FACILITY			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
5	1.0	LUMP SUM		

DESCRIPTION:	q Base Bid or q Alt.# REPAIR OF 54" PUMP MOTOR			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
6	1.0	LUMP SUM		

DESCRIPTION:	q Base Bid or q Alt.# REMOVE AND DELIVER 54" PUMPS TO REPAIR FACILITY			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
7	1.0	LUMP SUM		

DESCRIPTION:	q Base Bid or q Alt.# DISMANTLE 54" PUMPS AT REPAIR FACILITY			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
8	1.0	LUMP SUM		

DESCRIPTION:	q Base Bid or q Alt.# REBUILD, MODIFY, TEST, AND INSTALL 54" DRAINAGE PUMP			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
9	1.0	LUMP SUM		

DESCRIPTION:	q Base Bid or q Alt.# REMOVE AND DELIVER 20" PUMP AND MOTOR TO REPAIR FACILITY			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
10	1.0	LUMP SUM		

DESCRIPTION:	q Base Bid or q Alt.# MODIFY, TEST, AND INSTALL 20" DRAINAGE PUMP			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
11	1.0	LUMP SUM		

DESCRIPTION:	q Base Bid or q Alt.# MODIFY STRUCTURAL PLATFORM FOR ELECTRICAL PANELS			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
12	1.0	LUMP SUM		

DESCRIPTION:	q Base Bid or q Alt.# ELECTRICAL WORK			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
13	1.0	LUMP SUM		

DESCRIPTION:	q Base Bid or q Alt.# DELIVER UNREPAIRED PUMP TO OWNER			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
14	1.0	LUMP SUM		

DESCRIPTION:	q Base Bid or q Alt.# DELIVER UNREPAIRED PUMP MOTOR TO OWNER			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
15	1.0	LUMP SUM		

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Section 05

AFFIDAVIT PURSUANT TO LSA-R.S. 38:2224 and 38:2227 FOR BIDDERS FOR PUBLIC WORKS CONTRACTS

STATE OF _____

PARISH/COUNTY OF _____

BEFORE ME, the undersigned authority, in and for the above stated State and Parish (or County), personally came and appeared:

_____

Print Name

who, after first being duly sworn, did depose and state:

1. That affiant is appearing on behalf of_____, who is seeking a public contract with St. Tammany Parish Government.

2. That affiant employed no person, corporation, firm, association, or other organization, either directly or indirectly, to secure the 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 affiant; and

3. That no part of the contract price received by affiant was paid or will be paid to any person, corporation, firm, association, or otherorganization 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 affiant.

4. If affiant is a sole proprietor, that after July 2, 2010, he/she has not been convicted of, or has not entered a plea of guilty or nolo contendere to any of the crimes or equivalent federal crimes listed in LSA-R.S. 38:2227(B).

5. If affiant is executing this affidavit on behalf of a juridical entity such as a partnership, corporation, or LLC, etc., that no individual partner, incorporator, director, manager, officer, organizer, or member, who has a minimum of a ten percent ownership in the bidding entity, has been convicted of, or has entered a plea of guilty or *nolo contendere* to any

of the crimes or equivalent federal crimes listed in LSA-R.S. 38:2227(B).

6. If affiant is a sole proprietor, that neither affiant, nor his/her immediate family is a public servant of St. Tammany Parish Government or the Contract is not under the supervision or jurisdiction of the public servant's agency.

7. If affiant is executing this affidavit on behalf of a juridical entity such as a partnership, corporation, or LLC, etc., that no public servant of St. Tammany Parish Government, or his/her immediate family, either individually or collectively, has more than a 25% ownership interest in the entity seeking the Contract with St. Tammany Parish Government if the Contract will be under the supervision or jurisdiction of the public servant's agency.

_____

Printed Name: _____

Title:_____

Entity name: _____

THUS SWORN TO AND SUBSCRIBED BEFORE ME,

THIS_____, DAY OF_____, 202_.

_____

Notary Public

Print Name: _____

Notary I.D./Bar No.: _____

My commission expires: _____

AFFIDAVIT PURSUANT TO LSA-R.S. 38:2212.10 CONFIRMING REGISTRATION AND PARTICIPATION IN A STATUS VERIFICATION SYSTEM

STATE OF _____

PARISH/COUNTY OF _____

BEFORE ME, the undersigned authority, in and for the above stated State and Parish (or County), personally came and appeared:

_____

Print Name

who, after first being duly sworn, did depose and state:

1. That affiant is appearing on behalf of_____, a private employer seeking a bid or a contract with St. Tammany Parish Government for the physical performance of services within the State of Louisiana.

2. That affiant is registered and participates in a status verification system to verify that all employees in the state of Louisiana are legal citizens of the United States or are legal aliens; and

3. That affiant shall continue, during the term of the contract, to utilize a status verification system to verify the legal status of all new employees in the state of Louisiana.

4. That affiant shall require all subcontractors to submit to the affiant a sworn affidavit verifying compliance with this law.

_____

Printed Name: _____

Title:_____

Name of Entity: _____

THUS SWORN TO AND SUBSCRIBED BEFORE ME,
THIS_____, DAY OF_____, 202_.

_____

Notary Public

Print Name: _____

Notary I.D./Bar No.: _____

My commission expires: _____

INSURANCE REQUIREMENTS*

Construction Project: Lakefront Pump Station Phase 3

Bid#: 21-3-2

IMPORTANT – PLEASE READ

Prior to submitting your quote or bid, it is recommended that you review these insurance requirements with your insurance broker/agent.

These requirements modify portions of the insurance language found in the General Conditions and/or* Supplementary *General Conditions; however, there is no intention to remove all sections pertaining to insurance requirements and limits set forth in the General Conditions and/or Supplementary General Conditions, only to amend and specify those items particular for this Project.

A. The Provider shall secure and maintain at its expense such insurance that will protect it and St. Tammany Parish Government (the "Parish") from claims for bodily injury, death or property damage as well as from claims under the Workers' Compensation Acts that may arise from the performance of services under this agreement. All certificates of insurance shall be furnished to the Parish and provide thirty (30) days prior notice of cancellation to the Parish, in writing, on all of the required coverage.

B. All policies shall provide for and certificates of insurance shall indicate the following:

1. Waiver of Subrogation: The Provider's insurers will have no right of recovery or subrogation against the Parish of St. Tammany, it being the intention of the parties that all insurance policy(ies) so affected shall protect both parties and be the primary coverage for any and all losses covered by the below described insurance.

2. Additional Insured: St. Tammany Parish Government shall be named as Additional Insured with respect to general liability, automobile liability and excess liability coverages, as well as marine liability and pollution/environmental liability, when those coverages are required or necessary.

3. Payment of Premiums: The insurance companies issuing the policy or policies will have no recourse against St. Tammany Parish Government for payment of any premiums or for assessments under any form of policy.

4. Deductibles/Self-Insured Retentions: Any deductibles and/or self-insured retentions in the described insurance policies **must be declared on the Certificate of Insurance,** and are both assumed by and the sole risk of the Provider. The Parish will have the sole discretion to accept or reject deductibles and/or self-insured retentions exceeding $100,000 as it deems appropriate. The Parish may require Provider to produce evidence of verifiable financial ability to satisfy its deductibles and/or self-insured retentions; however, the Parish assumes no liability or obligation resulting from its examination, acceptance, or rejection of information presented.

5. Project Reference: The project(s) and location(s) shall be referenced in the Comment or Description of Operations section of the Certificate of Insurance (Project ##-###, or Bid # if applicable, Type of Work, Location).

C. Coverage must be issued by insurance companies authorized to do business in the State of Louisiana. Companies must have an A.M. Best rating of no less than A-, Category VII. St. Tammany Parish Risk Management Department may waive this requirement only for Workers Compensation coverage at their discretion.

Provider shall secure and present proof of insurance on forms acceptable to St. Tammany Parish Government, Office of Risk Management no later than the time of submission of the Contract to the Parish. However, should any work performed under this Contract by or on behalf of Provider include exposures that are not covered by those insurance coverages, Provider is not relieved of its obligation to maintain appropriate levels and types of insurance necessary to protect itself, its agents and employees, its subcontractors, St. Tammany Parish Government (Owner), and all other interested third parties, from any and all claims for damage or injury in connection with the services performed or provided throughout the duration of this Project, as well as for any subsequent periods required under this Contract.

The insurance coverages checked (✓) below are those required for this Contract.

☑ 1. **Commercial General Liability*** insurance – **Occurrence Form** - with a Combined Single Limit for bodily injury and property damage of at least $1,000,000 per Occurrence / $2,000,000 General Aggregate and $2,000,000 Products-Completed Operations. Contracts over $1,000,000 may require higher limits. The insurance shall provide for and the certificate(s) of insurance shall indicate the following coverages:
   a) Premises - operations;
   b) Broad form contractual liability;
   c) Products and completed operations;
   d) Personal/Advertising Injury;
   e) Broad form property damage (for Projects involving work on Parish property);
   f) Explosion, Collapse and Damage to underground property.
   g) Additional Insured forms CG 2010 and CG 2037 in most current edition are required.

☑ 2. **Business Automobile Liability*** insurance with a Combined Single Limit of $1,000,000 per Occurrence for bodily injury and property damage, and shall include coverage for the following:
   a) Any auto;
   or
   b) Owned autos; **and**
   c) Hired autos; **and**
   d) Non-owned autos.

☑ 3. **Workers' Compensation/Employers Liability insurance*** - Workers' Compensation coverage as required by State law. Employers' liability limits shall be a minimum of $1,000,000 each accident, $1,000,000 each disease, $1,000,000 disease policy aggregate. When water activities are expected to be performed in connection with this project, coverage under the USL&H Act, Jones Act and/or Maritime Employers Liability (MEL) must be included. **Coverage for owners, officers and/or partners in any way engaged in the Project shall be included in the policy.** The names of any excluded individual must be shown in the Description of Operations/Comments section of the Certificate**.**

☐ 4. **Pollution Liability and Environmental Liability*** insurance in the minimum amount of $1,000,000 per occurrence / $2,000,000 aggregate including full contractual liability and third party claims for bodily injury and/or property damage, for all such hazardous waste, pollutants and/or environmental exposures that may be affected by this project stemming from pollution/environmental incidents as a result of Contractor's operations.

If coverage is provided on a claims-made basis, the following conditions apply:
   1) the retroactive date must be prior to or coinciding with the effective date of the Contract, or prior to the commencement of any services provided by the Contractor on behalf of the Parish, whichever is earlier; AND
   2) continuous coverage must be provided to the Parish with the same retro date for 24 months following acceptance or termination of the Project by the Parish either by

a) continued renewal certificates **OR**
b) a 24 month Extended Reporting Period

*The Certificate must indicate whether the policy is written on an occurrence or claims-made basis and, if claims-made, the applicable retro date must be stated.

☑ 5. **Contractor's Professional Liability/Errors and Omissions*** insurance in the sum of at least $1,000,000 per claim / $2,000,000 aggregate is required when work performed by Contractor or on behalf of Contractor includes professional or technical services including, but not limited to, construction administration and/or management, engineering services such as design, surveying, and/or inspection, technical services such as testing and laboratory analysis, and/or environmental assessments. An occurrence basis policy is preferred.

If coverage is provided on a claims-made basis, the following conditions apply:

1) the retroactive date must be prior to or coinciding with the effective date of the Contract, or prior to the commencement of any services provided by the Contractor on behalf of the Parish, whichever is earlier; AND
2) continuous coverage must be provided to the Parish with the same retro date for 24 months following acceptance or termination of the Project by the Parish either by
   a) continued renewal certificates **OR**
   b) a 24 month Extended Reporting Period

*The Certificate must indicate whether the policy is written on an occurrence or claims-made basis and, if claims-made, the applicable retro date must be stated.

☐ 6. **Marine Liability/Protection and Indemnity*** insurance is required for any and all vessel and/or marine operations in the minimum limits of $1,000,000 per occurrence / $2,000,000 per project general aggregate. The coverage shall include, but is not limited to, the basic coverages found in the Commercial General Liability insurance and coverage for third party liability

***Excess/Umbrella Liability** insurance may be provided to meet the limit requirements for any Liability coverage. For example: if the General Liability requirement is $3,000,000 per occurrence, but the policy is only $1,000,000 per occurrence, then the excess policy should be at least $2,000,000 per occurrence thereby providing a combined per occurrence limit of $3,000,000.)

☐ 7. **Owners Protective Liability (OPL)** shall be furnished by the Contractor and shall provide coverage in the minimum amount of $1,000,000 CSL each occurrence / $1,000,000 aggregate. **St. Tammany Parish Government, ATTN: Risk Management Department, P. O. Box 628, Covington, LA 70434 shall be the first named insured on the policy**.

☐ 8. **Builder's Risk Insurance** written on an "all-risk" policy form shall be furnished by Contractor for 100% of the contract cost. Any contract modifications increasing the contract cost will require an increase in the limit of the Builder's Risk policy. Deductibles should not exceed $5,000 and Contractor shall be responsible for all policy deductibles. This insurance shall cover materials at the site, stored off the site, and in transit. The Builder's Risk Insurance shall include the interests of the Owner, Contractor and Subcontractors and shall terminate only when the Project is accepted in writing. **St. Tammany Parish Government, ATTN: Risk Management Department, P. O. Box 628, Covington, LA 70434 shall be the first named insured on the policy**.

☐ 9. **Installation Floater Insurance**, on an "all-risk" form, shall be furnished by Contractor and carried for the full value of the materials, machinery, equipment and labor for each location. The Contractor shall be responsible for all policy deductibles. The Installation Floater Insurance shall provide coverage for property owned by others and include the interests of the Owner, Contractor and Subcontractors and shall terminate only when the Project is accepted in writing. **St. Tammany Parish Government, ATTN: Risk Management Department, P. O. Box 628, Covington, LA 70434 shall be the first named insured on the policy**.

D. All policies of insurance shall meet the requirements of the Parish prior to the commencing of any work. The Parish has the right, but not the duty, to approve all insurance coverages prior to commencement of work. If any of the required policies are or become unsatisfactory to the Parish as to form or substance; or if a company issuing any policy is or becomes unsatisfactory to the Parish, the Provider shall promptly obtain a new policy, timely submit same to the Parish for approval, and submit a certificate thereof as provided above. The Parish agrees not to unreasonably withhold approval of any insurance carrier selected by Provider. In the event that Parish cannot agree or otherwise authorize a carrier, Provider shall have the option of selecting and submitting a 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 Provider and thereafter deduct from Provider's fee the cost of such insurance.

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

F. Provider shall maintain a current copy of all annual insurance policies and agrees to provide a certificate of insurance to the Parish on an annual basis or as may be reasonably requested for the term of the contract or any required Extended Reporting Period. Provider further shall ensure that all insurance policies are maintained in full force and effect throughout the duration of the Project and shall provide the Parish with annual renewal certificates of insurance evidencing continued coverage, without any prompting by the Parish.

G. It shall be the responsibility of Provider to require that these insurance requirements are met by all contractors and sub-contractors performing work for and on behalf of Provider. Provider shall further ensure the Parish is named as an additional insured on all insurance policies provided by said contractor and/or sub-contractor throughout the duration of the project.

H. Certificates of Insurance shall be issued as follows:

St. Tammany Parish Government
Attn: Risk Management
P O Box 628
Covington, LA 70434

To avoid contract processing delays, be certain the project name/number is included on all correspondence including Certificates of Insurance.

***NOTICE*: St. Tammany Parish Government reserves the rights to remove, replace, make additions to and/or modify any and all of the insurance requirements at any time.**

Any inquiry regarding these insurance requirements should be addressed to:

St. Tammany Parish Government
Office of Risk Management
P O Box 628
Covington, LA 70434
Telephone: 985-898-5226
Email: riskman@stpgov.org

HOLD HARMLESS AGREEMENT

_____ (Contractor) agrees to protect, defend, indemnify, save, and hold harmless St. Tammany Parish Government, its elected and appointed officials, departments, agencies, boards and commissions, its officers, agents servants, employees, including volunteers, from and against any and all claims, demands, expense and liability arising out of injury or death to any person or the damage, loss or destruction of any property to the extent caused by any act or omission of Contractor, its agents, servants, employees, and subcontractors, or any and all costs, expense and/or attorney fees incurred as a result of any claim, demands, and/or causes of action that results under the performance or non-performance of this contract.

_____ (Contractor) agrees to investigate, handle, respond to, provide defense for and defend any such claims, demand, or suit, as described in the paragraph above, at its sole expense and agrees to bear all other costs and expenses related thereto, even if it (claims, etc.) is groundless, false or fraudulent.

SIGNED, this ____ day of _____, 20___

WITNESSES:

_____

Print Name: _____

_____

Print Name: _____

_____
(Name of Contractor)

BY:_____
(Signature of Authorized Officer)

Print Name: :_____

Title: _____

STATE OF _____

PARISH/COUNTY OF_____

SWORN TO and subscribed before me, Notary, on this ____ day of _____, 20___.

_____
NOTARY PUBLIC

My Commission Expires: _____

Please complete the following:

Claims contact for this project will be:

_____
(Print name and title of Contact Person)

_____
Address

_____
Email address

_____ _____ _____
Telephone# Cell # Fax #

Section 07

Project Signs

1. General

a. Work to include providing and installing project sign(s) at the beginning of the project. Some projects may require multiple signs. Should more than one sign be required, it will be reflected in the bidding documents.

2. Materials

a. The printed project sign(s) shall be 3/8" primed Medium Density Overlay (MDO) **OR** 3 millimeter corrugated plastic secured to exterior plywood (4' x 4').

b. Contractor shall not use previously provided templates and/or fonts.

3. Execution

a. The sign(s) shall be printed on a project-by-project basis in black and white, using the template and font provided to the Contractor by the St. Tammany Parish Government Project Manager.

b. All signage proofed and approved by State Tammany Parish Government before project sign(s) are to be produced by the Contractor.

c. Exact placement of the project sign(s) must be coordinated with, and approved by, the St. Tammany Parish Government Project Manager prior to sign installation.

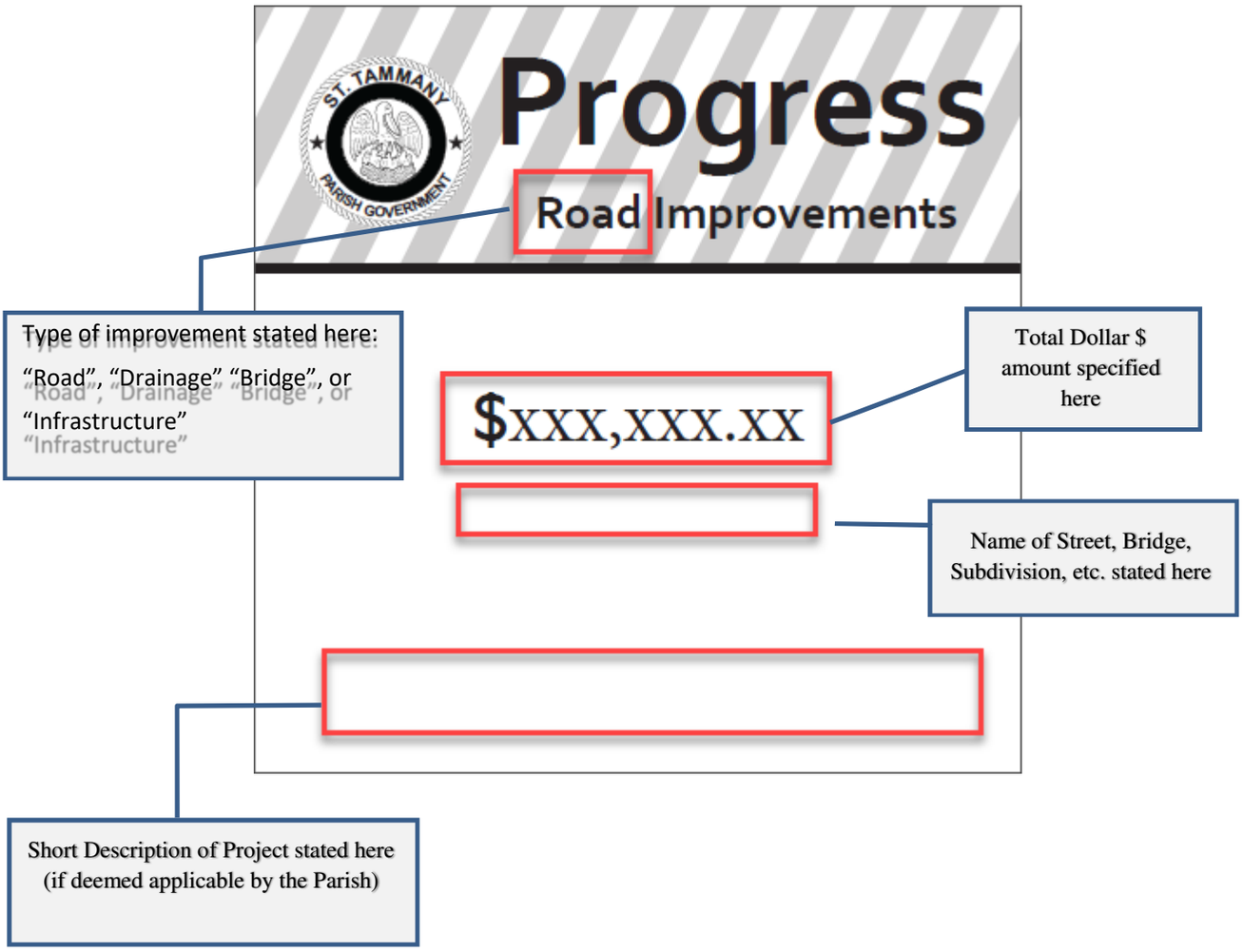
d. The sign(s) is to be installed such that the bottom of the sign is a minimum of 5' above the existing ground elevation.

e. Sign(s) is to be maintained throughout the period of construction. If sign(s) is damaged or destroyed, repair and/or replacement of sign(s) will be at Contractor's expense.

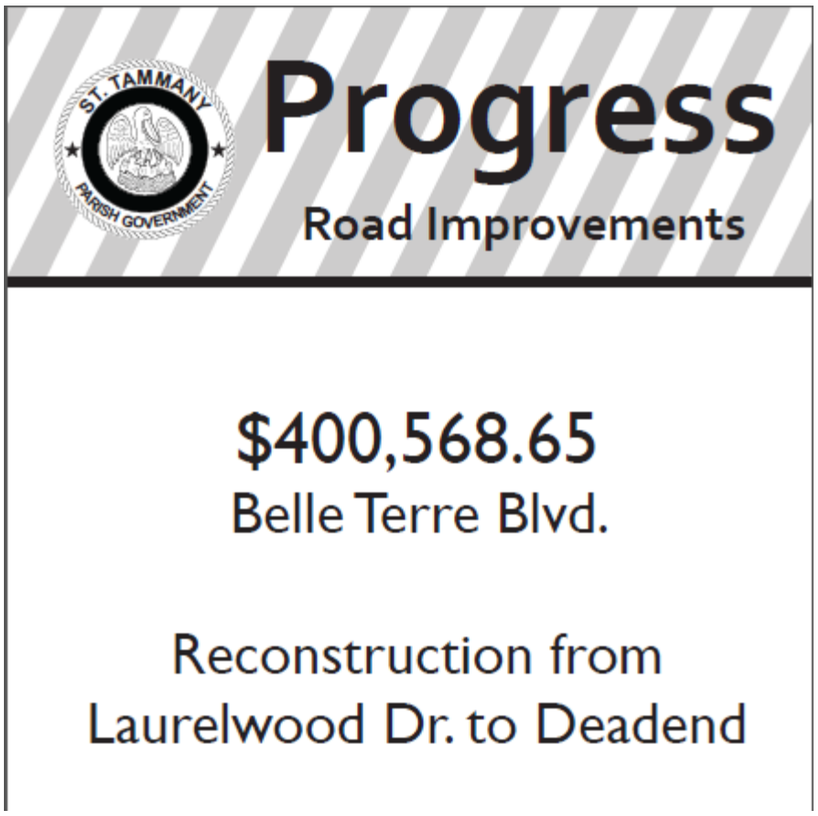
f. Contractor is responsible for the removal of all project signs upon issuance of final acceptance by the St. Tammany Parish Government Project Manager at no direct pay.

g. Cost to be included in "Temporary Signs and Barricades

Blank Template of Parish Project Sign:



Example of a Completed Parish Project Sign:



Section 08

General Conditions for St. Tammany Parish Government

This index is for illustrative purposes only and is not intended to be complete nor exhaustive.

All bidders/contractors are presumed to have read and understood the entire document. Some information contained in these conditions may not be applicable to all projects.

GENERAL CONDITIONS INDEX

01.00 DEFINITIONS OF TERMS

Whenever used in these General Conditions or in other Contract Documents, the following terms shall have the meanings indicated, and these shall be applicable to both the singular and plural thereof.

01.01 A.A.S.H.T.O American Association of State Highway and Transportation Officials. When A.A.S.H.T.O. is referred to in these Specifications it takes the meaning of the specification for materials and methods of testing specified by this association and the specification stated is considered to be a part of the Specifications as if written herein in full.

01.02 A.C.I American Concrete Institute. When A.C.I. is referred to in these Specifications it takes the meaning of the specification for materials and methods of testing specified by this institute and the specification stated is considered to be a part of the Specifications as if written herein in full.

01.03 Addenda Written or graphic instruments issued prior to the opening of bids which clarify, correct, modify or change the bidding or Contract Documents.

01.04 Advertisement The written instrument issued by the Owner at the request of the Owner used to notify the prospective bidder of the nature of the Work. It becomes part of the Contract Documents.

01.05 Agreement The written agreement or contract between the Owner and the Contractor covering the Work to be performed and the price that the Owner will pay. Other documents, including the Proposal, Addenda, Specifications, plans, surety, insurance, etc., are made a part thereof.

01.06 Application for Payment The form furnished by the Owner which is to be used by the Contractor in requesting incremental (progress) payments and which is to include information required by Section 28.01 and an affidavit of the Contractor. The affidavit shall stipulate that progress payments theretofore received from the Owner on account of the Work have been applied by Contractor to discharge in full of all Contractor's obligations reflected in prior applications for payment.

01.07 A.S.T.M. American Society of Testing Materials. When A.S.T.M. is referred to in these Specifications it takes the meaning of the specification for materials and methods of testing specified by this society and the specification stated is considered to be a part of the Specifications as if written herein in full.

01.08 Bid The offer or Proposal of the Bidder submitted on the prescribed form setting forth all the prices for the Work to be performed.

01.09 Bidder Any person, partnership, firm or corporation submitting a Bid for the Work.

01.10 Bonds Bid, performance and payment bonds and other instruments of security, furnished by the Contractor and its surety in accordance with the Contract Documents and Louisiana law.

01.11 Change Order A written order to the Contractor signed by the Owner authorizing an addition, deletion or revision in the Work, or an adjustment in the Contract Price or the Contract Time after execution of the Agreement.

01.12 Contract Documents The Agreement, Addenda, Contractor's Bid and any documentation accompanying or post-bid documentation when attached as an exhibit, the Bonds, these General Conditions, the Advertisement for Bid, Notice to Contractor, all supplementary conditions, the Specifications, the Drawings, together with all Modifications issued after the execution of the Agreement.

01.13 Contract Price The total monies payable to the Contractor under the Contract Documents.

01.14 Contract Time The number of consecutive calendar days stated in the Agreement for the completion of the Work.

01.15 Contractor The person, firm, corporation or provider with whom the Owner has executed the Agreement.

01.16 Defective Work Work which is unsatisfactory, faulty or deficient for any reason whatsoever, or does not conform to the Contract Documents, or does not meet the requirements of any inspection, test or approval referred to in the Contract Documents, or has been damaged prior to the Owner's recommendation or acceptance.

01.17 Drawings The Drawings and plans which show the character and scope of the Work to be performed and which have been prepared or approved by the Owner and are referred to in the Contract Documents.

01.18 Field Order A written order issued by the Owner or his agent which clarifies or interprets the Contract Documents.

01.19 Modification (a) A written amendment of the Contract Documents signed by both parties, (b) A Change Order, (c) A written clarification or interpretation issued by the Owner or his agent. Modification may only be issued after execution of the Agreement.

01.20 Notice of Award The written notice by Owner to the lowest responsible Bidder stating that upon compliance of the conditions enumerated in the Notice of Award, or enumerated in the Bid documents, the Owner will deliver the Contract Documents for signature. The time for the delivery of the Contract Documents can be extended in conformance with Louisiana Law.

01.21 Notice to Contractor Instructions, written or oral given by Owner to Contractor and deemed served if given to the Contractor's superintendent, foreman or mailed to Contractor at his last known place of business.

01.22 Notice to Proceed A written notice given by the Owner fixing the date on which the Contract Time will commence, and on which date the Contractor shall start to perform his obligation under the Contract Documents. Upon mutual consent by both parties, the Notice to Proceed may be extended.

01.23 Owner St. Tammany Parish Government, acting herein through its duly constituted and authorized representative, including but not limited to the Office of the Parish President or its designee, its Chief Administrative Officer, and/or Legal Counsel. St. Tammany Parish Government (hereinafter, the “Parish”) and Owner may be used interchangeably.

01.24 Project The entire construction to be performed as provided in the Contract Documents.

01.25 Project Representative The authorized representative of the Owner who is assigned to the Project or any parts thereof.

01.26 Proposal The Bid submitted by the Bidder to the Owner on the Proposal form setting forth the Work to be done and the price for which the Bidder agrees to perform the Work.

01.27 Shop Drawings All drawings, diagrams, illustrations, brochures, schedules and other data which are prepared by the Contractor, Subcontractor, Manufacturer, Supplier or Distributor and which illustrate the equipment, material or some portion of the Work.

01.28 Specifications The Instructions to Bidders, these General Conditions, the Special Conditions and the Technical Provisions. All of the documents listed in the "Table of Contents."

01.29 Subcontractor An individual, firm or corporation having a direct Contract with the Contractor or with any other Subcontractor for the performance of a part of the Project Work.

01.30 Substantial Completion The date as certified by the Owner or its agent when the construction of the Project or a specified part thereof is sufficiently complete in accordance with the Contract Documents so that the Project or specified part can be utilized for the

purposes for which it was intended; or if there is no such certification, the date when final payment is due in accordance with Section 28.

01.31 Superintendent Contractor's site representative. The person on the site who is in full and complete charge of the Work.

01.32 Time Unless specifically stated otherwise, all time delays shall be calculated in calendar days.

01.33 Work Any and all obligations, duties and responsibilities necessary to the successful completion of the Project assigned to or undertaken by the Contractor under the Contract Documents, usually including the furnishing of all labor, materials, equipment and other incidentals.

01.34 The terms “he/himself” may be used interchangeably with “it/itself.”

02.00 PROPOSAL

02.01 All papers bound with or attached to the Proposal Form are a necessary part thereof and must not be detached.

02.02 For submitting Bids, the only forms allowed shall be the “Louisiana Uniform Public Work Bid Form”, “Louisiana Uniform Public Works Bid Form Unit Price Form” (if necessary), the Bid Bond, and written evidence of authority of person signing the bid. Necessary copies of the Louisiana Uniform Public Work Forms will be furnished for Bidding. Bound sets of the Contract Documents are for Bidder's information and should not be used insubmitting Bids.

02.03 Proposal forms must be printed in ink or typed, unless submitted electronically. Illegibility or ambiguity therein may constitute justification for rejection of the Bid.

02.04 Each Bid must be submitted in a sealed envelope, unless submitted electronically. The outside of the envelope shall show the name and address of the Bidder, the State Contractor’s License Number of the Bidder (if work requires contractor’s license), and the Project name and number for which the Bid is submitted, along with the Bid number.

02.05 The price quoted for the Work shall be stated in words and figures on the Bid Form, and in numbers only on the Unit Price Form. The price in the Proposal shall include all costs necessary for the complete performance of the Work in full conformity with the conditions of the Contract Documents, and shall include all applicable Federal, State, Parish, Municipal or other taxes. The price bid for the items listed on the Unit Price Form will include the cost of all related items not listed, but which are normally required to do the type of Work bid.

02.06 The Bid shall be signed by the Bidder. The information required on the Louisiana Uniform Public Work Bid Form must be provided. Evidence of agency, corporate, or partnership authority is required and shall be provided in conformance with LSA-R.S. 38:2212(B).

02.07 Only the Contractors licensed by the State to do the type of Work involved can submit a Proposal for the Work. The envelope containing the Proposal shall have the Contractor's license number on it. Failure to be properly licensed constitutes authority by the Owner for rejection of Bid.

02.08 Bidders shall not attach any conditions or provisions to the Proposal. Any conditions or provisions so attached may, at the sole option of the Owner, cause rejection of the Bid or Proposal.

02.09 A Bid Guarantee of five percent (5%) of the amount of the total Bid, including Alternates, must accompany the Proposal and, at the option of the Bidder, may be a cashier's check, certified check or a satisfactory Bid Bond. The Bid Guarantee must be attached to the Louisiana Uniform Public Work Bid Form. No Bid will be considered unless it is so guaranteed. Cashier's check or certified check must be made payable to the order of the Owner. Cash deposits will not be accepted. The Owner reserves the right to cash or deposit the cashier's check or certified check. Such guarantees shall be made payable to the Parish

of St. Tammany. In accordance with LSA-R.S. 38:2218(C), if a bid bond is used, it shall be written by a surety or insurance company currently on the U.S. Department of the Treasury Financial Management Service list of approved bonding companies which is published annually in the Federal Register, or by a Louisiana domiciled insurance company with at least an A- rating in the latest printing of the A.M. Best's Key Rating Guide to write individual bonds up to ten percent of policyholders' surplus as shown in the A.M. Best's Key Rating Guide, or by an insurance company in good standing licensed to write bid bonds which is either domiciled in Louisiana or owned by Louisiana residents. It is **not** required to be on any AIA form.

02.10 Bid securities of the three (3) lowest Bidders will be retained by the Owner until the Contract is executed or until final disposition is made of the Bids submitted. Bid securities of all other Bidders will be returned promptly after the canvas of Bids. Bids shall remain binding for forty-five (45) days after the date set for Bid Opening. The Parish shall act within the forty-five (45) days to award the contract to the lowest responsible bidder or reject all bids as permitted by Public Bid Law. However, the Parish and the lowest responsible bidder, by mutual written consent, may agree to extend the deadline for award by one or more extensions of thirty (30) calendar days. In the event the Owner issued the Letter of Award during this period, or any extension thereof, the Bid accepted shall continue to remain binding until the Execution of the Contract.

02.11 A Proposal may be withdrawn at any time prior to the scheduled closing time for receipt of Bids, provided the request is in writing, executed by the Bidder or its duly authorized representative and is filed with the Owner prior to that time. When such a request is received, the Proposal will be returned to the Bidder unopened.

02.12 Written communications, over the signature of the Bidder, to modify Proposals will be accepted and the Proposal corrected in accordance therewith if received by the Owner prior to the scheduled closing time for receipt of Bids. Oral, telephonic or telegraphic Modifications will not be considered.

02.13 No oral interpretation obligating the Owner will be made to any Bidder as to the meaning of the Drawings, Specifications and Contract Documents. Every request for such an interpretation shall be made in writing and addressed and forwarded to the Owner. No inquiry received within seven (7) days prior to the day fixed for opening of the Bids shall be given consideration. Every interpretation made to the Bidder shall be in the form of an addendum to the Specifications. All such Addenda shall become part of the Contract Documents. Failure of Bidder to receive any such interpretation shall not relieve any Bidder from any obligation under this Bid. All Addenda shall be issued in accordance with the Public Bid Law, LSA-R.S. 38:2212(O)(2)(a) and (b).

02.14 The Owner reserves the right to reject any or all Bids for just cause in accordance with the Public Bid Law, LSA-R.S. 38:2214(B). Incomplete, informal or unbalanced Bids may be rejected. Reasonable grounds for belief that any one Bidder is concerned directly or indirectly with more than one Bid will cause rejection of all Bids wherein such Bidder is concerned. If required, a Bidder shall furnish satisfactory evidence of its competence and ability to perform the Work stipulated in its Proposal. Incompetence will constitute cause for rejection. If the Parish determines that the bidder is not responsive or responsible for any reason whatsoever, the bid may be rejected in accordance with State law.

02.15 The Contractor shall indemnify and hold harmless the Owner from any and all suits, costs, penalties or claims for infringement by reason of use or installation of any patented design, device, material or process, or any trademark and copyright in connection with the Work agreed to be performed under this Contract, and shall indemnify and hold harmless the Owner for any costs, expenses and damages which it may be obliged to pay by reason of any such infringement at any time during the prosecution or after completion of the Work.

02.16 Bidders shall familiarize themselves with and shall comply with all applicable Federal and State Laws, municipal ordinances and the rules and regulations of all authorities having jurisdiction over construction of the Project, which may directly or indirectly affect the Work or its prosecution. These laws and/or ordinances will be deemed to be included in the Contract, as though herein written in full.

02.17 Each Bidder shall visit the site of the proposed Work and fully acquaint itself with all surface and subsurface conditions as they may exist so that it may fully understand this

Contract. Bidder shall also thoroughly examine and be familiar with drawings, Specifications and Contract Documents. The failure or omission of any Bidder to receive or examine any form instrument, Drawing or document or to visit the site and acquaint itself with existing conditions, shall in no way relieve any Bidder from any obligation with respect to its Bid and the responsibility in the premises.

02.18 The standard contract form enclosed with the Proposal documents is a prototype. It is enclosed with the Contract Documents for the guidance of the Owner and the Contractor. It has important legal consequences in all respects and consultation with an attorney is encouraged. Contractor shall be presumed to have consulted with its own independent legal counsel.

02.19 When one set of Contract plans show the Work to be performed by two or more prime Contractors, it is the responsibility of each Bidder to become knowledgeable of the Work to be performed by the other where the Work upon which this bid is submitted is shown to come into close proximity or into conflict with the Work of the other. In avoiding conflicts, pressure pipe lines must be installed to avoid conflict with gravity pipe lines and the Bidder of the smaller gravity pipe line in conflict with the larger gravity pipe line must include in his Bid the cost of a conflict box at these locations. The location of and a solution to the conflicts do not have to be specifically noted as such on the plans.

02.20 Bidder shall execute affidavit(s) attesting compliance with LSA-R.S. 38:2212.10, 38:2224, 38:2227, each as amended, and other affidavits as required by law, prior to execution of the contract.

02.21 Sealed Proposals (Bid) shall be received by St. Tammany Parish Government at the office of St. Tammany Parish Government, Department of Procurement, 21454 Koop Drive, Suite 2-F, Mandeville, LA 70471, until the time and date denoted in Notice to Bidders, at which time and place the Proposals (Bids), shall be publicly opened and read aloud to those present. In accordance with LSA-R.S. 38-2212(A)(3)(c)(i), the designer's final estimated cost of construction shall be read aloud upon opening bids. Sealed Proposals (Bids) may also be mailed by certified mail to St. Tammany Parish Government, Department of Procurement, 21454 Koop Drive, Suite 2-F, Mandeville, LA 70471, and must be received before the bid opening. Bids may also be submitted electronically. Information concerning links for electronic bidding is contained in the Notice to Bidders.

02.22 Proposals (Bids) shall be executed on Forms furnished and placed in a sealed envelope, marked plainly and prominently as indicated in the Notice to Bidders, and these General Conditions, and addressed:

St. Tammany Parish Government
Department of Procurement
21454 Koop Drive, Suite 2-F
Mandeville, LA 70471

02.23 Complete sets of Drawings, Specifications, and Contract Documents may be secured at the Office of the Owner. See Notice to Bidders for deposit schedule.

02.24 The successful bidder shall be required to post in each direction a public information sign, 4' x 8' in size, at the location of the project containing information required by the Owner. The Owner shall supply this information.

03.00 AWARD, EXECUTION OF DOCUMENTS, BONDS, ETC.

03.01 The award of the Contract, if it is awarded, will be to the lowest responsible Bidder, in accordance with State Law. No award will be made until the Owner has concluded such investigations as it deems necessary to establish the responsibility, qualifications and financial ability and stability of the Bidder to do the Work in accordance with the Contract Documents to the satisfaction of the Owner within the time prescribed as established by the Department based upon the amount of work to be performed and the conditions of same. The written contract and bond shall be issued in conformance with LSA-R.S. 38:2216. The Owner reserves the right to reject the Bid of any Bidder in accordance with the Public Bid Law, LSA-R.S. 38:2214. If the Contract is awarded, the Owner shall give the successful Bidder written notice of the award within forty-five (45) calendar days after

the opening of the Bids in conformance with LSA-R.S. 38:2215(A), or any extension as authorized thereunder.

03.02 At least three counterparts of the Agreement and of such other Contract Documents as practicable shall be signed by the Owner and the Contractor. The Owner shall identify those portions of the Contract Documents not so signed and such identification shall be binding on both parties. The Owner and the Contractor shall each receive an executed counterpart of the Contract Documents.

03.03 Prior to the execution of the Agreement, the Contractor shall deliver to the Owner the required Bonds.

03.04 Failure of the successful Bidder to execute the Agreement and deliver the required Bonds within twenty (20) days of the Notice of the Award shall be just cause for the Owner to annul the award and declare the Bid and any guarantee thereof forfeited.

03.05 In order to ensure the faithful performance of each and every condition, stipulation and requirement of the Contract and to indemnify and save harmless the Owner from any and all damages, either directly or indirectly arising out of any failure to perform same, the successful Bidder to whom the Contract is awarded shall furnish a surety Bond in an amount of at least equal to one hundred percent (100%) of the Contract Price. The Contract shall not be in force or binding upon the Owner until such satisfactory Bond has been provided to and approved by the Parish. The cost of the Bond shall be paid for by the Contractor unless otherwise stipulated in the Special Provisions.

03.06 No surety Company will be accepted as a bondsman who has no permanent agent or representative in the State upon whom notices referred to in the General Conditions of these Specifications may be served. Services of said notice on said agent or representative in the State shall be equal to service of notice on the President of the Surety Company, or such other officer as may be concerned.

03.07 In conformance with LSA-R.S. 38:2219(A)(1)(a), (b), and (c):

> Any surety bond written for a public works project shall be written by a surety or insurance company currently on the U.S. Department of the Treasury Financial Management Service list of approved bonding companies which is published annually in the Federal Register, or by a Louisiana domiciled insurance company with at least an A- rating in the latest printing of the A.M. Best's Key Rating Guide, to write individual bonds up to ten percent of policyholders' surplus as shown in the A.M. Best's Key Rating Guide or by an insurance company that is either domiciled in Louisiana or owned by Louisiana residents and is licensed to write surety bonds.
>
> For any public works project, no surety or insurance company shall write a bond which is in excess of the amount indicated as approved by the U.S. Department of the Treasury Financial Management Service list or by a Louisiana domiciled insurance company with an A- rating by A.M. Best up to a limit of ten percent of policyholders' surplus as shown by A.M. Best; companies authorized by this Paragraph who are not on the treasury list shall not write a bond when the penalty exceeds fifteen percent of its capital and surplus, such capital and surplus being the amount by which the company's assets exceed its liabilities as reflected by the most recent financial statements filed by the company with the Department of Insurance.
>
> In addition, any surety bond written for a public works project shall be written by a surety or insurance company that is currently licensed to do business in the state of Louisiana. All contractors must comply with any other applicable provisions of LSA-R.S. 38:2219.

03.08 Should the Contractor's Surety, even though approved and accepted by the Owner, subsequently remove its agency or representative from the State or become insolvent, bankrupt, or otherwise fail, the Contractor shall immediately furnish a new Bond in another company approved by the Owner, at no cost to the Owner. The new Bond shall be executed under the same terms and conditions as the original Bond. The new bond shall be submitted within thirty (30) days of such time as the Owner notifies Contractor or from the time Contractor learns or has reason to know that the original surety is no longer financially viable or acceptable to the Parish, whichever occurs first. In the event that Contractor fails

or refuses to timely secure additional surety, then the Owner may secure such surety and thereafter deduct such cost or expense from any sum due or to become due Contractor.

03.09 The Contractor's bondsman shall obligate itself to all the terms and covenants of these Specifications and of contracts covering the Work executed hereunder. The Owner reserves the right to do Extra Work or make changes by altering, adding to deducting from the Work under the conditions and in the manner herein before described without notice to the Contractor's surety and without in any manner affecting the liability of bondsman or releasing it from any of its obligations hereunder.

03.10 The Bond shall also secure for the Owner the faithful performance of the Contract in strict accordance with plans and Specifications. It shall protect the Owner against all lien laws of the State and shall provide for payment of reasonable attorney fees for enforcement of Contract and institution or concursus proceedings, if such proceedings become necessary. Likewise, it shall provide for all additional expenses of the Owner occurring through failure of the Contractor to perform.

03.11 The surety of the Contractor shall be and does hereby declare and acknowledge itself by acceptance to be bound to the Owner as a guarantor, jointly and in solido, with the Contractor, for fulfillment of terms of Section 03.00.

03.12 The performance Bond and Labor and Material Bond forming part of this Contract shall be continued by Contractor and its Surety for a period of one (1) year from date of acceptance of this Contract by Owner to assure prompt removal and replacement of all defective material, equipment, components thereof, workmanship, etc., and to assure payment of any damage to property of Owner or others as a result of such defective materials, equipment, workmanship, etc.

03.13 Contractor shall pay for the cost of recording the Contract and Bond and the cost of canceling same. Contractor shall also secure and pay for all Clear Lien and Privilege Certificates (together with any updates) which will be required before any final payment is made, and that may be required before any payment, at the request of the Owner, its representative, agent, architect, engineer and the like. All recordation and Clear Lien and Privilege Certificate requirements shall be in accordance with those requirements noted herein before in contract Specifications.

04.00 SUBCONTRACTS

04.01 Contractor shall be fully responsible for all acts and omissions of its Subcontractors and of persons and organizations for whose acts any of them may be liable to the same extent that it is responsible for the acts and omissions of persons directly employed by it. Nothing in the Contract Documents shall create any contractual relationship between Owner and any Subcontractor or other person or organization having a direct Contract with Contractor, nor shall it create any obligation on the part of the Owner to pay or to see to the payment of any monies due any Subcontractor.

04.02 Nothing in the Contract Documents shall be construed to control the Contractor in dividing the Work among approved Subcontractors or delineating the Work to be performed by any trade.

04.03 The Contractor agrees to specifically bind every Subcontractor to all of the applicable terms and conditions of the Contract Documents prior to commencing Work. Every Subcontractor, by undertaking to perform any of the Work, shall thereby automatically be deemed bound by such terms and conditions.

04.04 The Contractor shall indemnify and hold harmless the Owner 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 Contractor's failure to bind every Subcontractor and Contractor's surety to all of the applicable terms and conditions of the Contract Documents.

05.00 ASSIGNMENT

05.01 Neither party to this Contract shall assign or sublet its interest in this Contract without prior written consent of the other, nor shall the Contractor assign any monies due or to become due to it under this Contract without previous written consent of the Owner, nor without the consent of the surety unless the surety has waived its right to notice of assignment.

06.00 CORRELATION, INTERPRETATION AND INTENT OF CONTRACT DOCUMENTS.

06.01 It is the intent of the Specifications and Drawings to describe a complete Project to be constructed in accordance with the Contract Documents. The Contract Documents comprise the entire Agreement between Owner and Contractor. Alterations, modifications and amendments shall only be in writing between these parties.

06.02 The Contract Documents are intended to be complimentary and to be read *in pari materii*, and what is called for by one is as binding as if called for by all. If Contractor finds a conflict, error or discrepancy in the Contract Documents, it shall call it to the Owner's attention, in writing, at once and before proceeding with the Work affected thereby; however, it shall be liable to Owner for its failure to discover any conflict, error or discrepancy in the Specifications or Drawings. In resolving such conflicts, errors and discrepancies, the documents shall be given precedence in the following order: Agreement, Modifications, Addenda, Special Conditions, General Conditions, Construction Specifications and Drawings. The general notes on the plans shall be considered special provisions. Figure dimensions on Drawings shall govern over scale dimensions and detail Drawings shall govern over general Drawings. Where sewer connections are shown to fall on a lot line between two lots, the Contractor shall determine this location by measurement not by scale. Any Work that may reasonably be inferred from the Specifications or Drawings as being required to produce the intended result shall be supplied whether or not it is specifically called for. Work, materials or equipment described herein which so applied to this Project are covered by a well-known technical meaning or specification shall be deemed to be governed by such recognized standards unless specifically excluded.

06.03 Unless otherwise provided in the Contract Documents, the Owner will furnish to the Contractor (free of charge not to exceed ten (10) copies) Drawings and Specifications for the execution of Work. The Drawings and Specifications are the property of the Owner and are to be returned to it when the purpose for which they are intended have been served. The Contractor shall keep one copy of all Drawings and Specifications, including revisions, Addenda, details, Shop Drawings, etc. on the Work in good order and available to the Owner or the regulatory agency of the governmental body having jurisdiction in the area of the Work.

07.00 SHOP DRAWINGS, BROCHURES AND SAMPLES

07.01 After checking and verifying all field measurements, Contractor shall submit to Owner for approval, five copies (or at Owner's option, one reproducible copy) of all Shop Drawings, which shall have been checked by and stamped with the approval of Contractor and identified as Owner may require. The data shown on the Shop Drawings will be complete with respect to dimensions, design criteria, materials of construction and the like to enable Owner to review the information as required.

07.02 Contractor shall also submit to Owner, for review with such promptness as to cause no delay in Work, all samples as required by the Contract Documents. All samples will have been checked by and stamped with the approval of Contractor identified clearly as to material, manufacturer, any pertinent catalog numbers and the use for which intended. At the time of each submission, Contractor shall in writing call Owner's attention to any deviations that the Shop Drawings or samples may have from the requirements of the Contract Documents.

07.03 Owner will review with reasonable promptness Shop Drawings and samples, but its review shall be only for conformance with the design concept of the Project and for compliance with the information given in the Contract Documents. The review of a separate item as such will not indicate approval of the assembly in which the item functions. Contractor shall make any corrections required by Owner and shall return the required number of

corrected copies of Shop Drawings and resubmit new samples for review. Contractor shall direct specific attention in writing or on resubmitted Shop Drawings to revisions other than the corrections called for by Owner on previous submissions. Contractor's stamp of approval on any Shop Drawing or sample shall constitute a representation to Owner that Contractor has determined and verified all quantities, dimensions, field construction criteria, materials catalog numbers and similar data and thereafter assumes full responsibility for doing so, and that it has reviewed or coordinated each Shop Drawing or sample with the requirements of the Work and the Contract Documents.

07.04 Where a Shop Drawing or sample submission is required by the Specifications, no related Work shall be commenced until the submission has been reviewed by Owner. A copy of each reviewed shop Drawing and each inspected sample shall be kept in good order by Contractor at the site and shall be available to Owner.

07.05 Owner's review of Shop Drawings or samples shall not relieve Contractor from its responsibility for any deviations from the requirements of the Contract Documents unless Contractor has in writing called Owner's attention to such deviation at the time of submission and Owner has given written approval to the specific deviation, nor shall any review by Owner relieve Contractor from responsibility for errors or omissions in the Shop Drawings. The mere submittal of shop drawings which contain deviations from the requirements of plans, specifications and/or previous submittals in itself does not satisfy this requirement.

08.00 RECORD DRAWINGS

08.01 The Contractor shall keep an accurate record in a manner approved by the Owner of all changes in the Contract Documents during construction. In Work concerning underground utilities, the Contractor shall keep an accurate record in a manner approved by the Owner of all valves, fittings, etc. Before the Work is accepted by the Owner, and said acceptance is recorded, the Contractor shall furnish the Owner a copy of this record.

08.02 Contractor shall keep an accurate drawing measured in the field to the nearest 0.1' of the location of all sewer house connections. The location shown shall be the end of the connection at the property line measured along the main line of pipe from a manhole.

08.03 Contractor shall keep an accurate drawing of the storm water drainage collection system. Inverts to the nearest 0.01' and top of castings shall be shown as well as location of all structures to the nearest 0.1'. Upon completion of the Work, the plan will be given to the Owner.

09.00 PROGRESS OF WORK

09.01 Contractor shall conduct the Work in such a professional manner and with sufficient materials, equipment and labor as is considered necessary to ensure its completion within the time limit specified.

09.02 The Owner shall issue a Notice to Proceed to the Contractor within twenty (20) calendar days from the date of execution of the Contract. Upon mutual consent by both parties, the Notice to Proceed may be extended. The Contractor is to commence Work under the Contract within ten (10) calendar days from the date the Notice to Proceed is issued by the Owner.

09.03 The Contractor, immediately after being awarded the Contract, shall prepare and submit for the Owner's approval an estimated progress schedule for the work to be performed, as well as a construction signing layout for all roads within the project area. The Contractor shall not start work or request partial payment until the work schedule has been submitted to the Owner for approval.

09.04 Revisions to the original schedule will be made based on extension of days granted for inclement weather or change orders issued under the contract. No other revision shall be made which affects the original completion or updated completion date, whichever is applicable.

09.05 Failure of the Contractor to submit an estimated progress schedule or to complete timely and on schedule the Work shown on the progress schedule negates any and all causes or claims by the Contractor for accelerated completion damages. These accelerated damage claims shall be deemed forfeited.

09.06 Meetings will be held as often as necessary to expedite the progress of the job. Meetings will be held during normal working hours at the jobsite and shall be mandatory for the Contractor and all Sub-Contractors working on the project. Meetings may be requestedby the Owner at any time and at the discretion of the Owner.

10.00 OWNER'S RIGHT TO PROCEED WITH PORTIONS OF THE WORK

10.01 Upon failure of the Contractor to comply with any notice given in accordance with the provisions hereof, the Owner shall have the alternative right, instead of assuming charge of the entire Work, to place additional forces, tools, equipment and materials on parts of the Work. The cost incurred by the Owner in carrying on such parts of the Work shall be payable by the Contractor. Such Work shall be deemed to be carried on by the Owner on account of the Contractor. The Owner may retain all amounts of the cost of such Work from any sum due Contractor or those funds that may become due to Contractor under this Agreement.

10.02 Owner may perform additional Work related to the Project by itself or it may let any other direct contract which may contain similar General Conditions. Contractor shall afford the other contractors who are parties to such different contracts (or Owner, if it is performing the additional Work itself) reasonable opportunity for the introduction and storage of materials and equipment and the execution of Work, and shall properly connect and coordinate its Work with the subsequent work.

10.03 If any part of Contractor's Work depends upon proper execution or results upon the Work of any such other contractor (or Owner), Contractor shall inspect and promptly report to Owner in writing any defects or deficiencies in such Work that render it unsuitable for such proper execution and results. Failure to so report shall constitute an acceptance of the other Work as fit and proper for the relationship of its Work except as to defects and deficiencies which may appear in the other Work after the execution of its Work.

10.04 Whatever Work is being done by the Owner, other Contractors or by this Contractor, the parties shall respect the various interests of the other parties at all times. The Owner may, at its sole discretion, establish additional rules and regulations concerning such orderly respect of the rights of various interests.

10.05 Contractor shall do all cutting, fitting and patching of its Work that may be required to integrate its several parts properly and fit to receive or be received by such other Work. Contractor shall not endanger any Work of others by cutting, excavating or otherwise altering Work and will only alter Work with the written consent of Owner and of the other contractors whose Work will be affected.

10.06 If the performance of additional Work by other contractors or Owner is not noted in the Contract Documents, written notice thereof shall be given to Contractor prior to starting any such additional Work. If Contractor believes that the performance of such additional Work by Owner or others may cause additional expense or entitles an extension of the Contract Time, the Contractor may make a claim therefor. The claim must be in writing to the Owner within thirty (30) calendar days of receipt of notice from the Owner of the planned additional Work by others.

11.00 TIME OF COMPLETION

11.01 The Notice to Proceed will stipulate the date on which the Contractor shall begin work. That date shall be the beginning of the Contract Time charges.

11.02 Contractor shall notify the Owner through its duly authorized representative, in advance, of where Contractor’s work shall commence each day. A daily log shall be maintained by Contractor to establish dates, times, persons contacted, and location of work. Specific notice shall be made to the Owner if the Contractor plans to work on Saturday, Sunday, or

a Parish approved holiday. If notice is not received, no consideration will be given for inclement weather and same shall be considered a valid work day.

11.03 The Work covered by the Plans, Specifications and Contract Documents must be completed sufficiently for acceptance within the number of calendar days specified in the Proposal and/or the Contract, commencing from the date specified in the Notice to Proceed. It is hereby understood and mutually agreed, by and between the Contractor and the Owner, that the time of completion is an essential condition of this Contract, and it is further mutually understood and agreed that if the Contractor shall neglect, fail or refuse to complete the Work within the time specified, or any proper extension thereof granted by the Owner, then the Contractor does hereby agree, as partial consideration for the awarding of this Contract, to pay the Owner $500.00 per day as specified in the Contract, not as a penalty, but as liquidated damages for such breach of contract for each and every calendar day that the Contractor shall be in default after the time stipulated in the Contract for completing the Work. It is specifically understood that the Owner shall also be entitled to receive a reasonable attorney fee and all costs in the event that Contractor fails to adhere to this agreement and this contract is referred to counsel for any reason whatsoever. Reasonable attorney fees shall be the prevailing hourly rate of the private sector, and in no event shall the hourly rate be less than $175.00 per hour. All attorney fees shall be paid to the operating budget of the Office of the Parish President.

11.04 Prior to final payment, the Contractor may, in writing to the Owner, certify that the entire Project is substantially complete and request that the Owner or its agent issue a certificate of Substantial Completion. See Section 29.00.

11.05 The Owner may grant an extension(s) of time to the Contractor for unusual circumstances which are beyond the control of the Contractor and could not reasonably be foreseen by the Contractor prior to Bidding. Any such request must be made in writing to the Owner within seven (7) calendar days following the event occasioning the delay. The Owner shall have the exclusive and unilateral authority to determine, grant, and/or deny the validity of any such claim.

11.06 Extensions of time for inclement weather shall be processed as follows:

Commencing on the start date of each job, the Parish Inspector assigned to same shall keep a weekly log, indicating on each day whether inclement weather has prohibited the Contractor from working on any project within the specific job, based upon the following:

1. Should the Contractor prepare to begin work on any day in which inclement weather, or the conditions resulting from the weather, prevent work from beginning at the usual starting time, and the crew is dismissed as a result, the Contractor will not be charged for a working day whether or not conditions change during the day and the rest of the day becomes suitable for work.

2. If weather conditions on the previous day prevent Contractor from performing work scheduled, provided that no other work can be performed on any project within the package. The Parish Inspector shall determine if it is financially reasonable to require the Contractor to deviate from the schedule and relocate to another location.

3. If the Contractor is unable to work at least 60% of the normal work day due to inclement weather, provided that a normal working force is engaged on the job.

Any dispute of weather conditions as related to a specific job shall be settled by records of the National Weather Service.

11.07 Extensions of time for change orders

When a change order is issued, the Owner and Contractor will agree on a reasonable time extension, if any, to implement such change. Consideration shall be given for, but not limited to, the following:

1. If material has to be ordered;
2. Remobilization and or relocation of equipment to perform task; and
3. Reasonable time frame to complete additional work.

Time extensions for change orders shall be reflected on the official document signed by the Owner and Contractor.

11.08 At the end of each month, the Owner or its agent will furnish to the Contractor a monthly statement which reflects the number of approved days added to the contract. The Contractor will be allowed fourteen (14) calendar days in which to file a written protest setting forth in what respect the monthly statement is incorrect; otherwise, the statement shall be considered accepted by the Contractor as correct.

11.09 Apart from extension of time for unavoidable delays, no payment or allowance of any kind shall be made to the Contractor as compensation for damages because of hindrance or delay for any cause in the progress of the Work, whether such delay be avoidable or unavoidable.

12.00 LIQUIDATED DAMAGES

12.01 In case the Work is not completed in every respect within the time that may be extended, it is understood and agreed that per diem deductions of the sum of $500.00 for liquidated damages, as stipulated in the Proposal and/or Contract, shall be made from the total Contract Price for each and every calendar day after and exclusive of the day on which completion was required, and up to the completion of the Work and acceptance thereof by the Owner. It is understood and agreed that time is of the essence to this Contract, and the above sum being specifically herein agreed upon in advance as the measure of damages to the Owner on account of such delay in the completion of the Work. It is further agreed that the expiration of the term herein assigned or as may be extended for performing the Work shall, *ipso facto*, constitute a putting in default, the Contractor hereby waiving any and all notice of default. The Contractor agrees and consents that the Contract Price, reduced by the aggregate of the entire damages so deducted, shall be accepted in full satisfaction of all Work executed under this Contract. It is further understood and agreed that Contractor shall be liable for a reasonable attorney fee and all costs associated with any breach of this agreement, including but not limited to this subsection. In the event that any dispute or breach herein causes referrals to counsel, then Contractor agrees to pay a reasonable attorney fee at the prevailing hourly rate of the private sector. In no event shall the hourly rate be less than $175.00 per hour.

13.00 LABOR, MATERIALS, EQUIPMENT, SUPERVISION, PERMITS AND TAXES

13.01 The Contractor shall provide and pay for all labor, materials, equipment, supervision, subcontracting, transportation, tools, fuel, power, water, sanitary facilities and all incidentals necessary for the completion of the Work in substantial conformance with the Contract Documents.

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

13.03 Unless otherwise specifically provided for in the Specifications, all workmanship, equipment, materials, and articles incorporated in the Work covered by this Contract are to be new and of the best grade of their respective kinds for the purpose intended. Samples of materials furnished under this Contract shall be submitted for approval to the Owner when and as directed.

13.04 Whenever a material or article required is specified or shown on the plans by using the name of a proprietary product or of a particular manufacturer or vendor, any material or article which shall perform adequately the duties imposed by the general design will be considered equal, and satisfactory, providing the material or article so proposed is of equal substance and function and that all technical data concerning the proposed substitution be approved by the Owner prior to the Bidding. The Owner shall have the exclusive and unilateral discretion to determine quality and suitability in accordance with LSA-R.S. 38:2212(T)(2).

13.05 Materials shall be properly and securely stored so as to ensure the preservation of quality and fitness for the Work, and in a manner that leaves the material accessible to inspection. Materials or equipment may not be stored on the site in a manner such that it will interfere with the continued operation of streets and driveways or other contractors working on the site.

13.06 The Contractor, by entering into the Contract for this Work, sets itself forth as an expert in the field of construction and it shall supervise and direct the Work efficiently and with its best skill and attention. It shall be solely responsible for the means, methods, techniques, sequences and procedures of construction.

13.07 Contractor shall keep on the Work, at all times during its progress, a competent resident Superintendent, who shall not be replaced without written Notice to Owner except under extraordinary circumstances. The Superintendent will be Contractor's representative atthe site and shall have authority to act on behalf of Contractor. All communications given to the Superintendent shall be as binding as if given to the Contractor. Owner specifically reserves the right to approve and/or disapprove the retention of a new superintendent, all to not be unreasonably withheld.

13.08 Any foreman or workman employed on this Project who disregards orders or instructions, does not perform his Work in a proper and skillful manner, or is otherwise objectionable, shall, at the written request of the Owner, be removed from the Work and shall be replaced by a suitable foreman or workman.

13.09 The Contractor and/or its assigned representative shall personally ensure that all subcontracts and divisions of the Work are executed in a proper and workmanlike manner, on scheduled time, and with due and proper cooperation.

13.10 Failure of the Contractor to keep the necessary qualified personnel on the Work shall be considered cause for termination of the Contract by the Owner.

13.11 Only equipment in good working order and suitable for the type of Work involved shall be brought onto the job and used by the Contractor. The Contractor is solely responsible for the proper maintenance and use of its equipment and shall hold the Owner harmless from any damages or suits for damages arising out of the improper selection or use of equipment. No piece of equipment necessary for the completion of the Work shall be removed from the job site without approval of the Owner.

13.12 All Federal, State and local taxes due or payable during the time of Contract on materials, equipment, labor or transportation, in connection with this Work, must be included in the amount bid by the Contractor and shall be paid to proper authorities before acceptance. The Contractor shall furnish all necessary permits and certificates and comply with all laws and ordinances applicable to the locality of the Work. The cost of all inspection fees levied by any governmental entity whatsoever shall be paid for by the Contractor.

13.13 In accordance with St. Tammany Police Jury Resolution 86-2672, as amended, the Contractor must provide in a form suitable to the Owner an affidavit stating that all applicable sales taxes for materials used on this project have been paid.

13.14 During the period that this Contract is in force, neither party to the Contract shall solicit for employment or employ an employee of the other.

13.15 All materials or equipment shown on the Drawings or included in these specifications shall be furnished unless written approval of a substitute is obtained from the Designer, or Owner if no separate designer.

13.16 If a potential supplier wishes to submit for prior approval a particular product other than a product specified in the contract documents, he shall do so no later than seven working days prior to the opening of bids. Within three days, exclusive of holidays and weekends, after such submission, the prime design professional shall furnish to both the public entity and the potential supplier written approval or denial of the product submitted. The burden of proof of the equality of the proposed substitute is upon the proposer and only that information formally submitted shall be used by the Designer in making its decision.

13.17 The decision of the Designer/Owner shall be given in good faith and shall be final.

14.00 QUANTITIES OF ESTIMATE, CHANGES IN QUANTITIES, EXTRA WORK

14.01 Whenever the estimated quantities of Work to be done and materials to be furnished under this Contract are shown in any of the documents, including the Proposal, such are given for use in comparing Bids and the right is especially reserved, except as herein otherwise specifically limited, to increase or diminish same not to exceed twenty-five percent (25%) by the Owner to complete the Work contemplated by this Contract. Such increase or diminution shall in no way vitiate this Contract, nor shall such increase or diminution give cause for claims or liability for damages.

14.02 The Owner shall have the right to make alterations in the line, grade, plans, form or dimensions of the Work herein contemplated, provided such alterations do not change the total cost of the Project, based on the originally estimated quantities, and the unit prices bid by more than twenty-five percent (25%) and provided further that such alterations do not change the total cost of any major item, based on the originally estimated quantities and the unit price bid by more than twenty-five (25%). (A major item shall be construed to be any item, the total cost of which is equal to or greater than ten percent (10%) of the total Contract Price, computed on the basis of the Proposal quantity and the Contract unity price). Should it become necessary, for the best interest of the Owner, to make changes in excess of that herein specified, the same shall be covered by supplemental agreement either before or after the commencement of the Work and without notice to the sureties. If such alterations diminish the quantity of Work to be done, such shall not constitute a claim for damages for anticipated profits for the Work dispensed with, but when the reduction in amount is a material part of the Work contemplated, the Contractor shall be entitled to only reasonable compensation as determined by the Owner for overhead and equipment charges which it may have incurred in expectation of the quantity of Work originally estimated, unless specifically otherwise provided herein; if the alterations increase the amount of Work, the increase shall be paid according to the quantity of Work actually done and at the price established for such Work under this Contract except where, in the opinion of the Owner, the Contractor is clearly entitled to extra compensation.

14.03 Without invalidating the Contract, the Owner may order Extra Work or make changes by altering, adding to, or deducting from the Work, the Contract sum being adjusted accordingly. The consent of the surety must first be obtained when necessary or desirable, all at the exclusive discretion of the Owner. All the Work of the kind bid upon shall be paid for at the price stipulated in the Proposal, and no claims for any Extra Work or material shall be allowed unless the Work is ordered in writing by the Owner.

14.04 Extra Work for which there is no price or quantity included in the Contract shall be paid for at a unit price or lump sum to be agreed upon in advance in writing by the Owner and Contractor. Where such price and sum cannot be agreed upon by both parties, or where this method of payment is impracticable, the Owner may, at its exclusive and unilateral discretion, order the Contractor to do such Work on a Force Account Basis.

14.05 In computing the price of Extra Work on a Force Account Basis, the Contractor shall be paid for all foremen and labor actually engaged on the specific Work at the current local rate of wage for each and every hour that said foremen and labor are engaged in such Work, plus ten percent (10%) of the total for superintendence, use of tools, overhead, direct & indirect costs/expenses, pro-rata applicable payroll taxes, pro-rata applicable workman compensation benefits, pro-rata insurance premiums and pro-rata reasonable profit. The Contractor shall furnish satisfactory evidence of the rate or rates of such insurance and tax. The Contractor will not be able to collect any contribution to any retirement plans or programs.

14.06 For all material used, the Contractor shall receive the actual cost of such material delivered at the site of the Work, as shown by original receipted bill, to which shall be added five percent (5%). There will be absolutely no additional surcharges or additional fees attached hereto with respect to this subsection.

14.07 For any equipment used that is owned by the Contractor, the Contractor shall be allowed a rental based upon the latest prevailing rental price, but not to exceed a rental price as determined by the Associated Equipment Distributors (A.E.D. Green Book).

14.08 The Contractor shall also be paid the actual costs of transportation for any equipment which it owns and which it has to transport to the Project for the Extra Work. There will be absolutely no additional surcharges or additional fees attached hereto with respect to this subsection.

14.09 If the Contractor is required to rent equipment for Extra Work, but not required for Contract items, it will be paid the actual cost of rental and transportation of such equipment to which no percent shall be added. The basis upon which rental cost are to be charged shall be agreed upon in writing before the Work is started. Actual rental and transportation costs shall be obtained from receipted invoices and freight bills.

14.10 No compensation for expenses, fees or costs incurred in executing Extra Work, other than herein specifically mentioned herein above, will be allowed.

14.11 A record of Extra Work on Force Account basis shall be submitted to the Owner on the day following the execution of the Work, and no less than three copies of such record shall be made on suitable forms and signed by both the Owner or his representative on the Project and the Contractor. All bids for materials used on extra Work shall be submitted to the Owner by the Contractor upon certified statements to which will be attached original bills covering the costs of such materials.

14.12 Payment for Extra Work of any kind will not be allowed unless the same has been ordered in writing by the Owner.

15.00 STATUS OF THE ENGINEER (NOT APPLICABLE)

16.00 INJURIES TO PERSONS AND PROPERTY

16.01 The Contractor shall be held solely and exclusively responsible for all injuries to persons and for all damages to the property of the Owner or others caused by or resulting from the negligence of itself, its employees or its agents, during the progress of or in connection with the Work, whether within the limits of the Work or elsewhere under the Contract proper or as Extra Work. This requirement will apply continuously and not be limited to normal working hours or days. The Owner's construction review is for the purpose of checking the Work product produced and does not include review of the methods employed by the Contractor or to the Contractor's compliance with safety measures of any nature whatsoever. The Contractor agrees to pay a reasonable attorney fee and other reasonable attendant costs of the Owner in the event it becomes necessary for the Owner to employ an attorney to enforce this section or to protect itself against suit over the Contractor's responsibilities. Attorney fees shall be at the prevailing hourly rate of the private sector. The attorney fee hourly rate shall not be less than $175.00 per hour. All attorney fees collected shall be paid to the operating budget of the Office of the Parish President.

16.02 The Contractor must protect and support all utility infrastructures or other properties which are liable to be damaged during the execution of its Work. It shall take all reasonable and proper precautions to protect persons, animals and vehicles or the public from the injury, and wherever necessary, shall erect and maintain a fence or railing around any excavation, and place a sufficient number of lights about the Work and keep same burning from twilight until sunrise, and shall employ one or more watchmen as an additional security whenever needed. The Contractor understands and agrees that the Owner may request that security be placed on the premises to ensure and secure same. The Owner shall exclusive authority to request placement of such security. Contractor agrees to retain and place security as requested, all at the sole expense of Contractor. Additional security shall not be considered a change order or reason for additional payment by the Owner. The Contractor must, as far as practicable and consistent with good construction, permit access to private and public property and leave fire hydrants, catch basins, streets, etc., free from encumbrances. The Contractor must restore at its own expense all injured or damaged property caused by any negligent act of omission or commission on its part or on the part of its employees or subcontractors, including, but not limited to, sidewalks, curbing, sodding, pipes conduits, sewers, buildings, fences, bridges, retaining walls, tanks, power lines, levees or any other building or property whatsoever to a like condition as existed prior to such damage or injury.

16.03 In case of failure on the part of the Contractor to restore such property or make good such damage, the Owner may upon forty-eight (48) hours' notice proceed to repair or otherwise restore such property as may be deemed necessary, and the cost thereof will be deducted from any monies due or which may become due under its Contract.

16.04 Contractor agrees to protect, defend, indemnify, save, and hold harmless St. Tammany Parish Government, its elected and appointed officials, departments, agencies, boards and commissions, their officers, agents servants, employees, including volunteers, from and against any and all claims, demands, expense and liability arising out of injury or death to any person or the damage, loss or destruction of any property to the extent caused by any negligent act or omission or willful misconduct of Contractor, its agents, servants, employees, and subcontractors, or any and all costs, expense and/or attorney fees incurred by St. Tammany Parish Government as a result of any claim, demands, and/or causes of action that results from the negligent performance or non-performance by Contractor, its agents, servants, employees, and subcontractors of this contract. Contractor agrees to investigate, handle, respond to, provide defense for and defend any such claims, demand, or suit at its sole expense and agrees to bear all other costs and expenses related thereto caused by any negligent act or omission or willful misconduct of Contractor, its agents, servants, employees, and subcontractors.

16.05 As to any and all claims against Owner, its agents, assigns, representatives or employees by any employee of Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts as may be liable, the indemnification obligation under Paragraph 16.04 shall not be limited in any way or by any limitation on the amount or type of damages, compensation or benefits payable by or for Contractor or any Subcontractor under workmen's compensation acts, disability benefit acts or other employee benefit acts.

16.06 No road shall be closed by the Contractor to the public except by written permission of the Owner. If so closed, the Contractor shall maintain traffic over, through and around the Work included in his Contract, with the maximum practical convenience, for the full twenty-four hours of each day of the Contract, whether or not Work has ceased temporarily. The Contractor shall notify the Owner at the earliest possible date after the Contract has been executed and, in any case, before commencement of any construction that might in any way inconvenience or endanger traffic, in order that necessary and suitable arrangements may be determined. Any and all security, maintenance, labor or costs associated with traffic control herein shall be at the sole expense of Contractor. This expense shall be paid directly by the Contractor. This expense shall not be considered as a change order nor shall it allow the Contractor any additional cost reimbursement whatsoever. All traffic deviations herein shall be coordinated with the appropriate law enforcement officials of this Parish.

16.07 The convenience of the general public and residents along the Works shall be provided for in a reasonable, adequate and satisfactory manner. Where existing roads are not available as detours, and unless otherwise provided, all traffic shall be permitted to pass through the Work. In all such cases, the public shall have precedence over Contractor's vehicles insofar as the traveling public's vehicles shall not be unduly delayed for the convenience of the Contractor. In order that all unnecessary delay to the traveling public may be avoided, the Contractor shall provide and station competent flagmen whose sole duties shall consist of directing and controlling the movement of public traffic either through or around the Work. Any and all security, maintenance, labor or costs associated with traffic control herein shall be at the sole expense of Contractor. This expense shall be paid directly by the Contractor. This expense shall not be considered as a change order nor shall it allow the Contractor any additional cost reimbursement whatsoever. All traffic deviations herein shall be coordinated with the appropriate law enforcement officials of this Parish.

16.08 The Contractor shall arrange its Work so that no undue or prolonged blocking of business establishments will occur.

16.09 Material and equipment stored on the right of way or work site shall be so placed and the Work at times shall be so conducted as to ensure minimum danger and obstruction to the traveling public.

16.10 During grading operations when traffic is being permitted to pass through construction, the Contractor shall provide a smooth, even surface that will provide a satisfactory passageway

for use of traffic. The road bed shall be sprinkled with water if necessary to prevent a dust nuisance, provided the dust nuisance is a result of the Work.

16.11 Fire hydrants shall be accessible at all times to the Fire Department. No material or other obstructions shall be placed closer to a fire hydrant than permitted by ordinances, rules or regulations or within fifteen (15) feet of a fire hydrant, in the absence of such ordinance, rules or regulations.

16.12 The Contractor shall not, without the written permission of the Owner, do Work for a resident or property owner abutting the Work at the time that this Work is in progress.

16.13 No Work of any character shall be commenced on railroad right-of-way until the Railroad Company has issued a permit to the Owner and has been duly notified by the Contractor in writing (with a copy forwarded to the Owner) of the date it proposes to begin Work, and until an authorized representative of the Railroad Company is present, unless the Railroad Company waives such requirements. All Work performed by the Contractor within the right-of-way limits of the railroad shall be subject to the inspection and approval of the chief engineer of the Railroad Company or its authorized representative. Any precautions considered necessary by said chief engineer to safeguard the property, equipment, employees and passengers of the Railroad Company shall be taken by the Contractor without extra compensation. The Contractor shall, without extra compensation, take such precautions and erect and maintain such tell-tale or warning devices as the Railroad Company considers necessary to safeguard the operation of its trains. The temporary vertical and horizontal clearance specified by the chief engineer of the Railroad Company in approving these shall be maintained at all times. No steel, brick, pipe or any loose material shall be left on the ground in the immediate vicinity of the railway track. Before any Work is done within Railroad right of way, the Contractor shall provide and pay all costs of any special insurance requirements of the Railroad.

16.14 The Contractor, shall, without extra compensation, provide, erect, paint and maintain all necessary barricades. Also, without extra compensation, the Contractor shall provide suitable and sufficient lights, torches, reflectors or other warning or danger signals and signs, provide a sufficient number of watchmen and flagmen and take all the necessary precautions for the protection of the Work and safety of the Public.

16.15 The Contractor shall erect warning signs beyond the limits of the Project, in advance of any place on the Project where operations interfere with the use of the road by traffic, including all intermediate points where the new Work crosses or coincides with the existing road. All barricades and obstructions shall be kept well painted and suitable warning signs shall be placed thereon. All barricades and obstructions shall be illuminated at night and all lights or devices for this purpose shall be kept burning from sunset to sunrise.

16.16 Whenever traffic is maintained through or over any part of the Project, the Contractor shall clearly mark all traffic hazards. No direct payment will be made for barricades, signs and illumination therefore or for watchmen or flagmen.

16.17 The Contractor will be solely and completely responsible for conditions on the job site, including safety of all persons and property during performance of the Work. This requirement will apply continuously and not be limited to normal working hours. The duty of the Owner to conduct construction review of the Contractor's performance is not intended to include review of the adequacy of the Contractor's safety measures, in, or near the construction site.

17.00 SANITARY PROVISIONS

17.01 The Contractor shall provide and maintain in a neat, sanitary condition such accommodations for the use of its employees as may be necessary to comply with the rules and regulations of the State Health Agency or of the other authorities having jurisdiction and shall permit no public nuisance.

18.00 RIGHTS OF WAY

18.01 The Owner will furnish the Contractor with all necessary rights-of-way for the prosecution of the Work. The rights of way herein referred to shall be taken to mean only permission to use or pass through the locations or space in any street, highway, public or private property in which the Contractor is to prosecute the Work.

18.02 It is possible that all lands and rights of way may not be obtained as herein contemplated before construction begins, in which event the Contractor shall begin its Work upon such land and rights of way as the Owner may have previously acquired. Any delay in furnishing these lands by the Owner can be deemed proper cause for adjustment in the Contract amount and/or in the time of completion.

19.00 PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE

19.01 The Contractor shall not enter upon private property for any purpose without first obtaining permission from the Owner, as well as the private property owner and/or and private property Lessees. The Contractor shall use every precaution necessary for the preservation of all public and private property, monuments, highway signs, telephone lines, other utilities, etc., along and adjacent to the Work; the Contractor shall use every precaution necessary to prevent damage to pipes, conduits, and other underground structures; and shall protect carefully from disturbance or damage all land monuments and property marks until an authorized agent has witnessed or otherwise referenced their location and shall not remove them until directed. The street and highway signs and markers that are to be affected by the Work shall be carefully removed when the Work begins and stored in a manner to keep them clean and dry. The Contractor must obtain all necessary information in regard to existing utilities and shall give notice in writing to the owners or the proper authorities in charge of streets, gas, water, pipes, electric, sewers and other underground structures, including conduits, railways, poles and pole lines, manholes, catch basins, fixtures, appurtenances, and all other property that may be affected by the Contractor's operations, at least forty-eight (48) hours before its operations will affect such property. The Contractor shall not hinder or interfere with any person in the protection of such Work or with the operation of utilities at any time. When property, the operation of railways, or other public utilities are endangered, the Contractor shall at its own expense, maintain flagmen or watchmen and any other necessary precautions to avoid interruption of service or damage to life or property, and it shall promptly repair, restore, or make good any injury or damage caused by its negligent operations in an acceptable manner. The Contractor must also obtain all necessary information in regard to the installation of new cables, conduits, and transformers, and make proper provisions and give proper notifications, in order that same can be installed at the proper time without delay to the Contractor or unnecessary inconvenience to the Owner.

19.02 The Contractor shall not remove, cut or destroy trees, shrubs, plants, or grass that are to remain in the streets or those which are privately owned, without the proper authority. Unless otherwise provided in the Special Provisions or the Proposal, the Contractor shall replace and replant all plants, shrubs, grass and restore the grounds back to its original good condition to the satisfaction of the Owner and/or the property owner. The Contractor shall assume the responsibility of replanting and guarantees that plants, shrubs, grass will be watered, fertilized and cultivated until they are in a growing condition. No direct payment will be made for removing and replanting of trees, shrubs, plants or grass unless such items are set forth in the Proposal.

19.03 When or where direct damage or injury is done to public or private property by or on account of any negligent act, omission, neglect or otherwise of the Contractor, it shall make good such damage or injury in an acceptable manner.

20.00 CONTRACTORS RESPONSIBILITY FOR WORK

20.01 Until final acceptance of the Work by the Owner as evidence by approval of the final estimate, the Work shall be in the custody and under the charge and care of the Contractor and it shall take every necessary precaution against injury or damage to any part thereof by the action of the elements or from the non-execution of the Work; unless otherwise provided for elsewhere in the Specifications or Contract. The Contractor shall rebuild, repair, restore and make good, without extra compensation, all injuries or damages to any portion of the Work occasioned by any of the above causes before its completion and

acceptance, and shall bear the expenses thereof. In case of suspension of the Work from any cause whatever, the Contractor shall be responsible for all materials and shall properly and securely store same, and if necessary, shall provide suitable shelter from damage and shall erect temporary structures where necessary. If in the exclusive discretion of the Owner, any Work or materials shall have been damaged or injured by reason of failure on the part of the Contractor or any of its Subcontractors to so protect the Work, such materials shall be removed and replaced at the sole expense of the Contractor. Such amount shall be deducted from any sum due or to be due Contractor.

20.02 The Contractor shall give all notice and comply with all Federal, State, and local laws, ordinances, and regulations in any manner affecting the conduct of the Work, and all such orders and decrees as exist, or may be enacted by bodies or tribunals having any jurisdiction or authority over the Work, and shall indemnify and hold harmless the Owner against any claim or liability arising from, or based on, the violation of any such law, ordinance, regulation, order or decree, whether by itself, its employees or Subcontractors.

21.00 TESTS AND INSPECTIONS CORRECTION & REMOVAL OF DEFECTIVE WORK

21.01 Contractor warrants and guarantees to Owner that all materials and equipment will be new unless otherwise specified and that all Work will be of good quality and free from faults or defects and in accordance with the requirements of the Contract Documents. All unsatisfactory Work, all faulty or Defective Work and all Work not conforming to the requirements of the Contract Documents at the time of acceptance shall be considered Defective. Prompt and reasonable notice of all defects shall be given to the Contractor.

21.02 If the Contract Documents, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any Work to specifically be inspected, tested or approved by some public body, Contractor shall assume full responsibility therefor, pay all costs in connection therewith and furnish Owner the required certificates of inspection, testing or approval. All other inspections, tests and approval required by the Contract Documents shall be performed by organizations acceptable to Owner and Contractor and the costs thereof shall be borne by the Contractor unless otherwise specified.

21.03 Contractor shall give Owner timely notice of readiness of the Work for all inspections, tests or approvals. If any such Work required to be inspected, tested or approved is covered without written approval of Owner, it must, if requested by Owner, be uncovered for observation, and such uncovering shall be at Contractor's expense unless Contractor has given Owner timely notice of its intention to cover such Work and Owner has not acted with reasonable promptness in response to such notice.

21.04 Neither observations by Owner nor inspections, tests or approvals shall relieve Contractor from its obligations to perform the Work in accordance with the requirements of the Contract Document.

21.05 Owner and its representatives will at reasonable times have access to the Work. Contractor shall provide proper and safe facilities for such access and observation of the Work and also for any inspection or testing thereof by others.

21.06 If any Work is covered contrary to the written request of Owner, it must, be uncovered for Owner’s observation and replaced at Contractor's expense. If any Work has been covered which Owner has not specifically requested to observe prior to its being covered, or if Owner considers it necessary or advisable that covered Work be inspected or tested by others, the Contractor, at Owner's request, shall uncover, expose or otherwise make available for observations, inspections or testing as Owner may require, that portion of the Work in question, furnishing all necessary labor, material and equipment. If it is found that such Work is Defective, Contractor shall bear all the expenses of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction, including compensation for additional professional services, and an appropriate deductive Change Order shall be issued. If, however, such Work is not found to be Defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction.

21.07 If the Work is Defective, or Contractor fails to supply sufficient skilled workmen or suitable materials or equipment, or if the Contractor fails to make prompt payments to Subcontractors or for labor, materials or equipment, Owner may order Contractor to stop the Work, or any portion thereof, until the cause of such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor or any other party.

21.08 Prior to approval of final payment, Contractor shall promptly, without cost to Owner and as specified by Owner, either correct any Defective Work, whether or not fabricated, installed or completed, or if the Work has been rejected by Owner, remove it from the site and replace it with non-defective Work. If Contractor does not correct such Defective Work or remove and replace such rejected Work within a reasonable time, all as specified in a written notice from Owner, Owner may have the deficiency corrected or the rejected Work removed and replaced. All direct or indirect costs of such correction or removal and replacement including compensation for additional professional services shall be paid by Contractor, and an appropriate deductive Change Order shall be issued. Contractor shall also bear the expense of making good all Work of others destroyed or damaged by its correction, removal or replacement of its Defective Work.

21.09 If, after the approval of final payment and prior to the expiration of one year after the date of Substantial Completion or such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the Contract Documents, any Work is found to be Defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions, either correct such Defective Work or if it has been rejected by Owner, remove it from the site and replace it with non-defective Work. If Contractor does not promptly comply with the terms of such instructions, Owner may have the Defective Work corrected or the rejected Work removed and replaced, and all direct and indirect costs of such removal and replacement, including compensation for additional professional services, shall be paid by Contractor. The Contractor agrees to pay a reasonable attorney fee and other reasonable attendant costs of the Owner in the event it becomes necessary for the Owner to employ an attorney to enforce this section or to protect itself against suit over the Contractor's responsibilities. Attorney fees shall be at the prevailing hourly rate of the private sector. The attorney fee hourly rate shall not be less than $175.00 per hour. All attorney fees collected shall be paid to the operating budget of the Office of the Parish President.

21.10 If, instead of requiring correction or removal and replacement of Defective Work, Owner (and prior to approval of final payment) prefers to accept it, the Owner may do so. In such case, if acceptance occurs prior to approval of final payment, a Change Order shall be issued incorporating the necessary revisions in the Contract Documents, including appropriate reduction in the Contract Price, or, if the acceptance occurs after approval of final payment, an appropriate amount shall be paid by Contractor to Owner.

21.11 If Contractor should fail to progress the Work in accordance with the Contract Documents, including any requirements of the Progress Schedule, Owner, after seven (7) days written Notice to Contractor, may, without prejudice to any other remedy Owner may have, make good such deficiencies and the cost thereof including compensation for additional professional services shall be charged against Contractor. In such cases, a Change Order shall be issued incorporating the necessary revisions in the Contract Documents including an appropriate reduction in the Contract Price. If the payments then or thereafter due Contractor are not sufficient to cover such amount, Contractor shall pay the difference to Owner.

21.12 The Owner may appoint representatives to make periodic visits to the site and observe the progress and quality of the executed Work. These representatives shall be governed by the same restrictions placed on the Owner by these Specifications. The governing body of the Federal, State or local government exercising authority in the area of the Work may appoint representatives to observe the progress and quality of the Work. Contractor shall cooperate with and assist these representatives in the performance of their duties.

21.13 The Contractor shall be responsible for the faithful execution of its Contract and the presence or absence of the Owner's or Government's Representative is in no way or manner to be presumed or assumed to relieve in any degree the responsibility or obligation of the Contractor.

21.14 The Contractor shall notify the Owner and the Governmental Agency having jurisdiction as to the exact time at which it is proposed to begin Work so the Owner may provide for inspection of all materials, foundations, excavations, equipment, etc., and all or any part of the Work and to the preparation or manufacture of materials to be used whether within the limits of the Work or at any other place.

21.15 The Owner or its representatives shall have free access to all parts of the Work and to all places where any part of the materials to be used are procured, manufactured or prepared. The Contractor shall furnish the Owner all information relating to the Work and the material therefor, which may be deemed necessary or pertinent, and with such samples of materials as may be required. The Contractor, at its own expense, shall supply such labor and assistance as may be necessary in the handling of materials for proper inspection or for inspection of any Work done by it.

21.16 No verbal instructions given to the Contractor by the Owner, Project Representative or any of their agents shall change or modify the written Contract. Contractors shall make no claims for additional payments or time based upon verbal instructions.

22.00 SUBSURFACE CONDITIONS

22.01 It is understood and agreed that the Contractor is familiar with the subsurface conditions that will be encountered and its price bid for the Work includes all of the costs involved for Work in these conditions and it is furthermore agreed that it has taken into consideration, prior to its Bid and acceptance by Owner, all of the subsurface conditions normal or unusual that might be encountered in the location of the Work.

22.02 Should the Contractor encounter during the progress of the Work subsurface conditions at the site materially differing from those shown on the Drawings or indicated in the Specifications, the attention of the Owner shall be directed to such conditions before the conditions are disturbed. If the Owner finds that the conditions materially differ from those shown on the Drawings or indicated in the Specifications, it shall at once make such changes in the Drawings or Specifications as it may find necessary, and any increase or decrease in cost or extension of time resulting from such changes shall be adjusted in the same manner as provided for changes for Extra Work. The Contractor shall submit breakdowns of all costs in a manner as instructed and approved by the Owner.

23.00 REMOVAL AND DISPOSAL OF STRUCTURES AND OBSTRUCTIONS

23.01 Bidder shall thoroughly examine the site of the Work and shall include in its Bid the cost of removing all structures and obstructions in the way of the Work.

23.02 The Contractor shall remove any existing structures or part of structures, fence, building or other encumbrances or obstructions that interfere in any way with the Work. Compensations for the removal of any structure shall be made only if the item(s) to be removed was/were listed as pay item(s) on the Proposal.

23.03 If called for in the Special Conditions, all privately and publicly owned materials and structures removed shall be salvaged without damage and shall be piled neatly and in an acceptable manner upon the premises if it belongs to an abutting property owner, otherwise at accessible points along the improvements. Materials in structures which is the property of the Owner or property of any public body, private body or individual which is fit for use elsewhere, shall remain property of the original Owner. It shall be carefully removed without damage, in sections which may be readily transported; same shall be stored on or beyond the right of way. The Contractor will be held responsible for the care and preservation for a period of ten (10) days following the day the last or final portion of the materials stored at a particular location are placed thereon. When privately owned materials are stored beyond the right of way, the Contractor will be held responsible for such care and preservation for a period of ten (10) days responsibility period for care and preservation of the materials begins. The Contractor must furnish the Owner with evidence satisfactory that the proper owner of the materials has been duly notified by the Contractor that the said owner must assume responsibility for its materials on the date following the Contractor's ten (10) day responsibility.

24.00 INSURANCE

24.01 Contractor shall secure and maintain at its expense such insurance that will protect it and the Parish from claims for injuries to persons or damages to property which may arise from or in connection with the performance of Services or Work hereunder by the Contractor, his agents, representatives, employees, and/or subcontractors. The cost of such insurance shall be included in Contractor's bid.

24.02 The Contractor shall not commence work until it has obtained all insurance as required for the Parish Project. If the Contractor fails to furnish the Parish with the insurance protection required and begins work without first furnishing Parish with a currently dated certificate of insurance, the Parish has the right to obtain the insurance protection required and deduct the cost of insurance from the first payment due the Contractor. Further deductions are permitted from future payments as are needed to protect the interests of the Parish including, but not limited to, renewals of all policies.

24.03 Payment of Premiums: The insurance companies issuing the policy or policies shall have no recourse against the Parish of St. Tammany for payment of any premiums or for assessments under any form of policy.

24.04 Deductibles: Any and all deductibles in the described insurance policies shall be assumed by and be at the sole risk of the Contractor.

24.05 Authorization of Insurance Company(ies) and Rating: All insurance companies must be authorized to do business in the State of Louisiana and shall have an A.M. Best rating of no less than A-, Category VII.

24.06 Policy coverages and limits must be evidenced by Certificates of Insurance issued by Contractor's carrier to the Parish and shall reflect:

Date of Issue: Certificate must have current date.

Named Insured: The legal name of Contractor under contract with the Parish and its principal place of business shall be shown as the named insured on all Certificates of Liability Insurance.

Name of Certificate Holder: St. Tammany Parish Government, Office of Risk Management, P. O. Box 628, Covington, LA 70434

Project Description: A brief project description, including Project Name, Project Number and/or Contract Number, and Location.

Endorsements and Certificate Reference: All policies must be endorsed to provide, and certificates of insurance must evidence the following:

Waiver of Subrogation: The Contractor's insurers will have no right of recovery or subrogation against the Parish of St. Tammany, it being the intention of the parties that all insurance policy(ies) so affected shall protect both parties and be the primary coverage for any and all losses covered by the below described insurance. *Policy endorsements required for all coverages*.

Additional Insured: The Parish of St. Tammany shall be named as additional named insured with respect to general liability, marine liability, pollution/environmental liability, automobile liability and excess liability coverages. *Policy endorsements required.*

Hold Harmless: Contractor's liability insurers shall evidence their cognizance of the Hold Harmless and Indemnification in favor of St. Tammany Parish Government by referencing same on the face of the Certificate(s) of Insurance.

Cancellation Notice: Producer shall provide thirty (30) days prior written notice to the Parish of policy cancellation or substantive policy change.

24.07 The types of insurance coverage the Contractor is required to obtain and maintain throughout the duration of the Contract, include, but is not limited to:

1. Commercial General Liability insurance with a Combined Single Limit for bodily injury and property damage of at least $1,000,000 per Occurrence/$3,000,000 General Aggregate/Products-Completed Operations Per Project. The insurance shall provide for and the certificate(s) of insurance shall indicate the following coverages:

    a) Premises - operations;
    b) Broad form contractual liability;
    c) Products and completed operations;
    d) Personal Injury;
    e) Broad form property damage;
    f) Explosion and collapse.

2. Marine Liability/Protection and Indemnity insurance is required for any and all vessel and/or marine operations in the minimum limits of $1,000,000 per occurrence/$2,000,000 per project general aggregate. The coverage shall include, but is not limited to, the basic coverages found in the Commercial General Liability insurance and coverage for third party liability.

3. Contractors' Pollution Liability and Environmental Liability insurance in the minimum amount of $1,000,000 per occurrence, $2,000,000 general aggregate and include coverage for full contractual liability and for all such environmental and/or hazardous waste exposures affected by this project.

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

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

5. Workers' Compensation/Employers Liability insurance: worker's compensation insurance coverage and limits as statutorily required; Employers' Liability Coverage shall be not less than $1,000,000 each accident, $1,000,000 each disease, $1,000,000 disease policy aggregate, except when projects include exposures covered under the United States Longshoremen and Harbor Workers Act, Maritime and/or Jones Act and/or Maritime Employers Liability (MEL) limits shall be not less than $1,000,000/$1,000,000/$1,000,000. *Coverage for owners, officers and/or partners shall be included in the policy and a statement of such shall be made by the insuring producer on the face of the certificate.*

6. Owners Protective Liability (OPL) (formerly Owners and Contractors Protective Liability (OCP) Insurance) shall be furnished by the Contractor naming St. Tammany Parish Government as the Named Insured and shall provide coverage in the minimum amount of $1,000,000 combined single limit (CSL) each occurrence, $2,000,000 aggregate. Any project valued in excess of $3,000,000 shall be set by the Office of Risk Management. The policy and all endorsements shall be addressed to St. Tammany Parish Government, Office of Risk Management, P. O. Box 628, Covington, LA 70434.

7. Builder's Risk Insurance shall be required on buildings, sewage treatment plants and drainage pumping stations, and shall be written on an "all-risk" or equivalent policy form in the amount of the full value of the initial Contract sum, plus value of subsequent Contract modifications and cost of materials supplied or installed by others, comprising 100% total value for the entire project including foundations. Deductibles should not exceed $5,000 and Contractor shall be responsible for any and all policy deductibles. This insurance shall cover portions of the work stored off the site, and also portions of the work in transit. In addition, Installation Floater

Insurance, on an "all-risk" form, will be carried on all pumps, motors, machinery and equipment on the site or installed. Both the Builder's Risk Insurance and the Installation Floater Insurance shall include the interests of the Owner, Contractor, Subcontractors, and Sub-subcontractors and shall terminate only when the Project has been accepted. St. Tammany Parish Government, P. O. Box 628, Covington, LA 70434 shall be the first named insured on the Builder's Risk and Installation Floater Insurance.

8. Professional Liability (errors and omissions) insurance in the sum of at least One Million Dollars ($1,000,000) per claim with Two Million Dollars ($2,000,000) annual aggregate.

9. An umbrella policy or excess policy may be required and/or allowed to meet minimum coverage limits, subject to the review and approval by St. Tammany Parish Government, Office of Risk Management.

24.08 All policies of insurance shall meet the requirements of the Parish of St. Tammany prior to the commencing of any work. The Parish of St. Tammany 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 St. Tammany as to form or substance; or if a company issuing any such policy shall be or become unsatisfactory to the Parish of St. Tammany, the Contractor shall promptly obtain a new policy, timely submit same to the Parish of St. Tammany 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.

24.09 Upon failure of Contractor to furnish, deliver and/or maintain such insurance as above provided, the contract, at the election of the Parish of St. Tammany, 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.

24.10 Contractor shall maintain a current copy of all annual insurance policies and provide same to the Parish of St. Tammany as may be reasonably requested.

24.11 It shall be the responsibility of Contractor to require that these insurance requirements are met by all contractors and sub-contractors performing work for and on behalf of Contractor. Contractor shall further ensure the Parish is named as additional insured on all insurance policies provided by said contractor and/or sub-contractor throughout the duration of the project, and that renewal certificates for any policies expiring prior to the Parish's final acceptance of the project shall be furnished to St. Tammany Parish Government, Department of Legal, Office of Risk Management, without prompting.

NOTICE:

These are only an indication of the coverages that are generally required. Additional coverages and/or limits may be required for projects identified as having additional risks or exposures. Please note that some requirements listed may not necessarily apply to your specific services. St. Tammany Parish Government reserves the right to remove, replace, make additions to and/or modify any and all of the insurance requirement language upon review of the final scope of services presented to Department of Legal, Office of Risk Management prior to execution of a contract for services.

For inquiries regarding insurance requirements, please contact:
St. Tammany Parish Government
Legal Department
Office of Risk Management
P. O. Box 628
Covington, LA 70434
Telephone: 985-898-2797
Fax: 985-898-3070
Email: riskman@stpgov.org

24.12 Nothing contained in these insurance requirements is to be construed as limiting the extent of the Contractor's Responsibility for payment of damages resulting from its operations under this Contract.

25.00 OWNER'S RIGHT TO OCCUPANCY

25.01 The Owner shall have the right to use, at any time, any and all portions of the Work that have reached such a stage of completion as to permit such occupancy, provided such occupancy does not hamper the Contractor or prevent its efficient completion of the Contract or be construed as constituting an acceptance of any part of the Work.

25.02 The Owner shall have the right to start the construction of houses, structures or any other building concurrent with the Contractor's Work.

26.00 SURVEY HORIZONTAL AND VERTICAL CONTROL

26.01 The Owner shall provide surveys for construction to establish reference points which in its judgment are necessary to enable Contractor to layout and proceed with its Work. Contractor shall be responsible for surveying and laying out the Work and shall protect and preserve the established reference points and shall make no changes or relocations without the prior written approval of the Owner. Contractor shall report to Owner whenever any reference point is lost or destroyed and the Owner shall decide if the reference point shall be replaced by its or the Contractor's forces.

26.02 The Contractor shall establish lines and grades with its own forces in sufficient number and location for the proper execution of the Work.

26.03 If the Contractor, during the construction, damages the established property corners and/or other markers and thereafter requests the Owner to re-stake same in order to complete the project, this expense will be borne solely by the Contractor.

27.00 TERMINATION OF THE CONTRACT, OWNER'S AND CONTRACTORS RIGHT TO STOP WORK.

27.01 If the Contractor should be adjudged bankrupt (voluntarily or involuntarily) or if it should make a general assignment for the benefit of its creditors, or if a receiver should be appointed on account of its insolvency, or if it should persistently or repeatedly refuse or should fail (except in cases for which extension of time is provided) to supply enough properly skilled workmen or proper materials, or if it should fail to make prompt payment to Subcontractors or for material or labor, or persistently disregard laws, ordinances or the

instructions of the Owner, or otherwise be guilty of a substantial violation of any provision of the Contract, then the Owner, upon the certificate of the Owner that, in its unilateral discretion and judgment, believes sufficient cause exists to justify such action, may, without prejudice to any other right or remedy and after giving the Contractor ten (10) calendar days written notice, terminate the employment of the Contractor and take possession of the premises and of all materials, tools and appliances thereon and finish the Work by whatever method the Owner may deem expedient.

27.02 Failure of the Contractor to start the Work within the time limit specified herein or substantial evidence that the progress being made by the Contractor is sufficient to complete the Work within the specified time shall be grounds for termination of the Contract by the Owner.

27.03 Before the Contract is terminated, the Contractor and its surety will first be notified in writing by the Owner of the conditions which make termination of the Contract imminent. When after ten (10) calendar days' notice is given and if satisfactory effort has not been made by the Contractor or its surety to correct the conditions, the Owner may declare, in its exclusive discretion, that the Contract is terminated and so notify the Contractor and its surety accordingly.

27.04 Upon receipt of notice from the Owner that the Contract has been terminated, the Contractor shall immediately discontinue all operations. The Owner may then proceed with the Work in any lawful manner that it may elect until Work is finally completed.

27.05 The exclusive right is reserved to the Owner to take possession of any machinery, implements, tools or materials of any description that shall be found upon the Work, to account for said equipment and materials, and to use same to complete the Project. When the Work is finally completed, the total cost of same will be computed. If the total cost is less than the Contract Price, the difference will not be paid to the Contractor or its surety.

27.06 In case of termination, all expenses incident to ascertaining and collecting losses under the Bond, including legal services, shall be assessed against the Bond.

27.07 If the Work should be stopped under any order of any court or public authority for period of sixty (60) calendar days, through no act or fault of the Contractor or anyone employed by it, or if the Owner shall fail to pay the Contractor within a reasonable time any sum certified by the Owner, then the Contractor may, upon ten (10) calendar days written notice to the Owner, stop Work or terminate this Contract and recover from the Owner payment for all Work properly and professionally executed in a workmanlike manner. This loss specifically includes actual cost of materials and equipment, together with all wages inclusive of all federal, state, and local tax obligations. This loss specifically includes reimbursement of all insurances on a pro-rata basis from the date of termination to date of policy period. This loss excludes and specifically does not include recovery by the Contractor for lost profit, indirect & direct expenses, overhead, and the like.

28.00 PAYMENTS TO THE CONTRACTOR

28.01 Monthly certificates for partial payment, in a form approved by the Owner, shall be transmitted to the Owner upon receipt from the Contractor and acceptance by the Owner. In accordance with LSA-R.S. 38:2248(A), when the Contract Price is less than five hundred thousand dollars, these certificates shall be equal to ninety percent (90%) of both the Work performed and materials stored at the site; and when the Contract Price is five hundred thousand dollars or more, these certificates shall be equal to ninety-five percent (95%) of both the Work performed and materials stored at the site. Partial payment certificates shall include only Work, materials and equipment that are included in official Work Order and which meet the requirements of plans, Specifications and Contract Documents. These monthly estimates shall show the amount of the original estimate for each item, the amount due on each item, the gross total, the retained percentage, the amount previously paid and the net amount of payment due.

28.02 After final completion and acceptance by the Owner of the entire Work, and when the Contract Price is less than five hundred thousand dollars, the Owner shall issue to the Contractor Certificate of Payment in sum sufficient to increase total payments to ninety percent (90%) of the Contract Price. After final completion and acceptance by the Owner

of the entire Work, and when the Contract Price is five hundred thousand dollars or more, the Owner shall issue to the Contractor Certificate of Payment in sum sufficient to increase total payments to ninety-five percent (95%) of the Contract Price.

28.03 When the Contract Price is less than five hundred thousand dollars, the final payment certificate of the remaining ten percent (10%) of the Contract Price, minus any deduction for deficient or Defective Work or other applicable deductions, will be issued by the Owner forty-five (45) days after filing acceptance in the Mortgage Office of the Parish and a Clear Liens and Privilege Certificate has been secured. When the Contract Price is five hundred thousand dollars or more, the final payment certificate of the remaining five percent (5%) of the Contract Price, minus any deduction for deficient or Defective Work or other applicable deductions, will be issued by the Owner forty-five (45) days after filing acceptance in the Mortgage Office of the Parish and a Clear Liens and Privilege Certificate has been secured. Before issuance of the final payment certificate, the Contractor shall deposit with the Owner a certificate from the Clerk of Court and Ex-Officio Recorder of Mortgages from the Parish in which the Work is performed to the effect that no liens have been registered against Contract Work.

28.04 When, in the opinion of the Contractor, the Work provided for and contemplated by the Contract Documents has been substantially completed, the Contractor shall notify the Owner in writing that the Work is substantially complete and request a final inspection. The Owner shall proceed to perform such final inspection accompanied by the Contractor. Any and all Work found by this inspection to be Defective or otherwise not in accordance with the plans and Specifications shall be corrected to the entire satisfaction of the Owner and at the sole expense of the Contractor. If the Contract is found to be incomplete in any of its details, the Contractor shall at once remedy such defects, and payments shall be withheld and formal acceptance delayed until such Work has been satisfactorily completed.

28.05 If payment is requested on the basis of materials and equipment not incorporated in the Work, but delivered and suitably stored and protected from damage and theft at the site, the Request for Payment shall also be accompanied by such data, satisfactory to the Owner, as will establish Owner's title to the material and equipment and protect its interest therein, including applicable insurance.

28.06 Each subsequent Request for Payment shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied to discharge in full all of Contractor's obligations reflected in prior Request for Payment.

28.07 Each subsequent request for payment shall include an affidavit by Contractor that Contractor, all subcontractors, agents, material suppliers and all other persons supplying material to the project upon which State of Louisiana and/or St. Tammany sales taxes are lawfully due have paid these taxes and that all supplies and materials purchased for this project and for which Contractor has been paid have had all lawfully due State and/or St. Tammany sales taxes paid.

28.08 The Bid Proposal, unless otherwise modified in writing, and the Contract constitute the complete Project. The Contract Prices constitute the total compensation payable to Contractor and the cost of all of the Work and materials, taxes, permits and incidentals must be included into the Bid submitted by the Contractor and included into those items listed on the Proposal.

28.09 Any additional supporting data required by the Owner in order to substantiate Contractor's request for payment shall be furnished by Contractor at no cost to the Owner.

28.10 Owner may withhold from payment to Contractor as may be necessary to protect itself from loss on account of:

(1) Defective and/or inferior work;
(2) Damage to the property of Owner or others caused by Contractor;
(3) Failure by Contractor to make payments properly to sub-contractors or to pay for labor, materials or equipment used on this project;
(4) Failure by Contractor to pay taxes due on materials used on this project;
(5) Damage by Contractor to another Contractor;
(6) Insolvency;
(7) Bankruptcy, voluntary or involuntary;

(8) Revocation of corporate status;
(9) Failure to follow corporate formalities;
(10) Unprofessional activities;
(11) Unworkmanlike performance;
(12) Fraud and/or misrepresentation of any kind.

29.00 ACCEPTANCE AND FINAL PAYMENT(S)

29.01 Upon receipt of written notice from Contractor that the work is substantially complete and usable by Owner or the Pubic in suitable manner, the Owner and the Contractor shall jointly inspect the work.

29.02 If the Owner by inspection determines that the work is not substantially complete in a suitable manner for use by the Owner or the Public, then the Owner shall so notify the Contractor in writing stating such reason. All reasons need not be disclosed unless actually known. The Owner is afforded an opportunity to amend said notices as are reasonably possible.

29.03 If the Owner by its inspection determines that the work is substantially complete, it shall prepare a list of all items not satisfactorily completed and shall notify the Contractor and Owner in writing that the work is substantially complete and subject to satisfactory resolution of those items on the list (punch list). Punch lists may be amended from time to time by Owner in the event that additional deficiencies are discovered. In accordance with LSA-R.S. 38:2248(B), any punch list generated during a construction project shall include the cost estimates for the particular items of work the design professional has developed based on the mobilization, labor, material, and equipment costs of correcting each punch list item. The design professional shall retain his working papers used to determine the punch list items cost estimates should the matter be disputed later. The contract agency shall not withhold from payment more than the value of the punch list. Punch list items completed shall be paid upon the expiration of the forty-five (45) day lien period. The provisions of this Section shall not be subject to waiver.

29.04 Upon determination of substantial completeness with the punch list, the Contract Time is interrupted and the Contractor is given a reasonable time not to exceed thirty (30) consecutive calendar days to effect final completion by correcting or completing all of those items listed on the punch list. If the items on the punch list are not completed in a satisfactory manner within the thirty day period, then the Contract Time will begin to run again and will include for purposes of determining liquidated damages the thirty day period the grace period being withdrawn.

29.05 Upon receipt by Owner of written determination that all work embraced by the contract has been completed in a satisfactory manner, the Owner shall provide a written acceptance to Contractor who shall record Owner's written acceptance with the recorder of Mortgages, St. Tammany Parish. The Contractor shall properly prepare, submit and pay for all costs associated with said Acceptance. The Contractor is also responsible for preparation, re-submission and payment of any and all updated certificates.

29.06 Retainage monies, minus those funds deducted in accordance to the requirements of this agreement including but not limited to Paragraph 28.10, shall be due Contractor not earlier than forty-six (46) calendar days after recordation of certificate of Owner's acceptance provided the following:

(1) Contractor shall prepare, secure, pay for and submit clear lien and privilege certificate, signed and sealed by Clerk of Court or Recorder of Mortgages, Parish of St. Tammany and dated at least forty-six (46) days after recordation of certificate of acceptance;

(2) Ensure that the official representative of the Owner has accepted as per LSA-R.S. 38:2241.1, *et seq*. and that all following sub-sections have been properly satisfied as per law;

(3) Ensure that all signatures are affixed and that there exists the requisite authority for all signatures;

(4) Ensure accurate and proper legal descriptions;

(5) Properly identify all parties and/or signatories;

(6) Properly identify all mailing addresses;

(7) Correctly set for the amount of the contract, together with all change orders;

(8) Set out a brief description of the work performed;

(9) Reference to any previously recorded contract, lien or judgment inscription that may affect the property;

(10) Certification that substantial completion has occurred, together with any applicable date(s);

(11) Certification that no party is in default and/or that the project has been abandoned.

29.07 After securing the clear lien and privilege certificate the Contractor shall prepare its final application for payment and submit to Owner. The Owner shall approve application for payment, or state its objections in writing and forward to Contractor for resolution.

30.00 NOTICE AND SERVICE THEREOF

30.01 Any Notice to Contractor from the Owner relative to any part of this Contract shall be in writing and shall be considered delivered and the service thereof completed when said notice is posted; by certified mail, return receipt requested to the said Contractor at its last given address, or delivered in person to said Contractor or its authorized representative on the Work.

31.00 INTENTION OF THESE GENERAL CONDITIONS

31.01 These General Conditions shall be applicable to all contracts entered into by and between the Owner and Contractors, except as may be altered or amended with the consent of the Owner, and/or provided for in the Special Conditions of each contract. Contractor shall be presumed to have full knowledge of these General Conditions which shall be applicable to all contracts containing these General Conditions, whether Contractor has obtained a copy thereof or not.

32.00 SEVERABILITY

32.01 If any one or more or part of any of the provisions contained herein and/or in the Specifications and Contract for the Work shall for any reason be held invalid, illegal or unenforceable in any respect, such invalidity, illegality or unenforceability shall not affect any other provisions of this Agreement or attachment, but it shall be construed as if such invalid, illegal, or unenforceable provision or part of a provision had never been contained herein.

32.02 CHANGING THESE CONDITIONS: Owner reserves the right to change or modify these General Conditions as it deems best, or as required by law. The General Conditions may also be modified for a particular project by the use of Special Conditions prior to the issuance of the Advertisement for Bid. However, once an advertisement for bid is made for any specific project, any changes to the General Conditions as they affect that specific project must be made in writing and issued via an addendum in accordance with State Law.

33.00 LAW OF THE STATE OF LOUISIANA

33.01 The Contract Documents shall be governed by the Law of the State of Louisiana.

33.02 The Contractor agrees to pay reasonable attorney's fees and other reasonable attendant costs, in the event that it becomes necessary for the Owner to employ an attorney in order

to enforce compliance with or any remedy relating to any covenants, obligations, or conditions imposed upon the Contractor by this Agreement. Attorney fees shall be based upon the prevailing hourly rate of attorney rates in the private sector. In no case shall the hourly rate be less than $175.00 per hour. All attorney fees collected shall be paid the operating budget of the Office of the Parish President.

33.03 The jurisdiction and venue provisions shall apply to all contractors, sureties, and subcontractors. The 22nd Judicial District for the Parish of St. Tammany shall be the court of exclusive jurisdiction and venue for any dispute arising from these General Conditions and/or any contract executed in conjunction with these General Conditions. All parties specifically waive any rights they have or may have for removal of any disputes to Federal Court, or transfers to different State District Court.

33.04 Contractor warrants that it has and/or had received a copy of these General Conditions at all times material hereto; Contractor further agrees that it has read and fully and completely understands each and every condition herein.

33.05 The property description will be more fully set out by an attached exhibit.

33.06 The Contractor warrants that it has the requisite authority to sign and enter this agreement.

33.07 It is specifically understood and agreed that in the event Contractor seeks contribution from the Parish or pursues its legal remedies for any alleged breach of this agreement by the Parish, then the following list of damages SHALL NOT BE RECOVERABLE BY CONTRACTOR. This list includes, but is not limited to:

1. indirect costs and/or expenses;
2. direct costs and/or expenses;
3. time-related costs and/or expenses;
4. award of extra days;
5. costs of salaries or other compensation of Contractor's personnel at Contractor's principal office and branch offices;
6. expenses of Contractor's principal, branch and/or field offices;
7. any part of Contractor's capital expenses, including any interest on Contractor's capital employed for the work;
8. any other charges related to change orders;
9. overhead and general expenses of any kind or the cost of any item not specifically and expressly included in Cost of Work.

33.08 DEFAULT AND WAIVERS

It is understood that time is of the essence. It is specifically understood between the parties that Contractor waives any and all notice to be placed in default by the Owner. This subsection shall supersede and prime any other subsection herein above that is in conflict. The Owner specifically reserves its right and specifically does not waive the requirement to be placed in default by the Contractor as per law.

33.09 St. Tammany Parish Government contracts to be awarded are dependent on the available funding and/or approval by members designated and/or acknowledged by St. Tammany Parish Government. At any time St. Tammany Parish Government reserves the right to cancel the award of a contract if either or both of these factors is deficient.

33.10 It is the Parish's policy to provide a method to protest exclusion from a competition or from the award of a contract, or to challenge an alleged solicitation irregularity. It is always better to seek a resolution within the Parish system before resorting to outside agencies and/or litigation to resolve differences. All protests must be made in writing, and shall be concise and logically presented to facilitate review by the Parish. The written protest shall include:

1. The protester's name, address, and fax and telephone numbers and the solicitation, bid, or contract number;

2. A detailed statement of its legal and factual grounds, including a description of the resulting prejudice to the protester;

3. Copies of relevant documents;

4. All information establishing that the protester is an interested party and that the protest is timely; and

5. A request for a ruling by the agency; and a statement of the form of relief requested.

The protest shall be addressed to Mr. Anthony Smith, Director of Procurement, St. Tammany Parish Government, P.O. Box 628, Covington, LA 70434.

The protest review shall be conducted by the Parish Procurement Department.

Only protests from interested parties will be allowed. Protests based on alleged solicitation improprieties that are apparent before bid opening, or the time set for receipt of initial proposals must be filed with and received by the Procurement Department BEFORE those deadlines.

Any other protest shall be filed no later than ten (10) calendar days after the basis of the protest is known, or should have been known (whichever is earlier).

The Parish will use its best efforts to resolve the protest within thirty (30) days of the date that it is received by the Parish. The written response will be sent to the protestor via mail and, fax, if a fax number has been provided by the protestor. The protester can request additional methods of notification.

Last day to submit questions and/or verification on comparable products will be no later than 2:00 pm CST, seven (7) working days prior to the opening date of the bid/proposal due date. Further any questions or inquires must be submitted via fax to 985-898-5227, or via email to Purchasing@stpgov.org. Any questions or inquires received after the required deadline to submit questions or inquires will not be answered.

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Section 09

Contract Time Extension Specifications

The contractor shall document for each month of the scheduled construction, the occurrence of adverse weather conditions having an impact on controlling items of work. An adverse weather day is a previously scheduled or normally scheduled work day on which rainfall, wet conditions or cold weather will prevent construction operations on the controlling work activity from proceeding for at least five (5) continuous hours of the day or sixty-five (65) percent of the normal work day, whichever is greater, with the normal working force engaged in performing the controlling item of work.

If the contractor submits a written request for additional contract time due to adverse weather conditions, the contractor's request will be considered only after the Department agrees with the days and then only for adverse weather days in excess of allowable number of days per month stated below. Adverse weather days will be documented by the Engineer and agreed upon monthly. Adverse weather days will be prorated for partial months when a work order or final inspection is issued other than the first or last of the month and agreed to by the Department.

If the contractor is being considered for disqualification by the department, an equitable adjustment in contract time may be made at the end of the original contract period, including all days added by approved change orders.

Contract time will be adjusted by comparing the actual number of adverse weather days to the statistical number of adverse weather days over the specific time period per the table below. The resulting number of adverse weather days will be multiplied by 1.45 to convert the calendar days.

Adjustments for adverse weather cannot result in a contract time reduction. Once adjusted, a new adverse weather day accounting will begin using the adverse weather conditions having an impact on the controlling items of work, in excess of the allowable number of days per month stated below. A second and final contract time adjustment will be done at the final acceptance of the project.

An adjustment in the contract time due to adverse weather will not be cause for an adjustment in the contract amount. There will be no direct or indirect cost reimbursement for excess adverse weather days.

The following are anticipated adverse weather days that the contractor shall include in each month of his calendar day construction schedule.

January	10 days	May	5 days	September	4 days
February	9 days	June	6 days	October	3 days
March	8 days	July	6 days	November	7 days
April	7 days	August	5 days	December	7 days

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SECTION 01010 – SUMMARY OF THE WORK AND GENERAL REQUIREMENTS

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. Furnish all plant, tools, equipment, materials, supplies, and manufactured articles, labor, transportation, and services, including fuel, power, water, and essential communications, and performing all work or other operations required for the fulfillment of the Contract in strict accordance with the Contract Documents. Furnish all work, materials, and services not expressly indicated or called for in the Contract Documents which may be necessary for the complete and proper construction of the WORK in good faith as though originally so indicated, at no increase in cost to the OWNER. These actions constitute the WORK of this Contract.

B. **Instructions to the CONTRACTOR:** Throughout these Technical Specifications, Instructions to the CONTRACTOR are generally written in active voice, imperative mood. The subject of imperative sentences is understood to be "the CONTRACTOR." The ENGINEER and OWNER's responsibilities are generally written in passive voice, indicative mood. Phrases such as "as approved," "unless otherwise approved," "upon approval," "as directed," "as verified," "as ordered," and "as determined" refer to actions of the ENGINEER or OWNER unless otherwise stated, and it is understood that the directions, orders, or instructions to which they relate are within the limitations of and authorized by the Contract Documents.

1.2 WORK COVERED BY THE CONTRACT DOCUMENTS

A. The WORK of this Contract generally comprises the modification of two (2) existing vertical turbine type drainage pumps and motors. Specifically, one currently operational pump is to be modified to elevate the motor of the vertical pump above the prescribed flood hazard elevation. A second pump, currently not operational, will be removed, rehabilitated, and modified to elevate its motor above the prescribed flood hazard elevation. A third pump, which is located at the pumping station but is currently not operational, will be removed from the pumping station and delivered to the OWNER.

B. The Work of the contract is located at: *the OWNER's Lakefront Drainage Pumping Station (Lakefront DPS) located at the end of East Howze Beach Road in Slidell, Louisiana. Approximate GPS coordinates for the location of the WORK are 30°12'42" N, 89°47'23" W (as determined using publicly available GPS information).*

C. Major Items of the WORK include, but are not limited to the following:

1. Removal, modification, and re – installation of the existing operational 75 HP vertical turbine type drainage pump to elevate the existing motor above the prescribed flood hazard elevation;

2. Removal, rehabilitation, and re – installation of an existing non - operational 350 HP vertical turbine drainage pump to return the drainage pump to operational service and to elevate the pump motor above the prescribed flood hazard elevation;

3. Removal, rehabilitation, and re – installation of a non – operational 350 HP motor for 54" drainage pump;

4. Removal of and delivery to the OWNER of an existing non – operational 350 HP vertical turbine drainage pump and non – operational drainage pump motor to the OWNER;

5. Relocation of existing power distribution and control gear to an adjacent elevated platform;

6. Provision, installation, and startup of new power distribution and control gear on a adjacent elevated platform;

7. Appurtenant demolition, mechanical, structural, and electrical WORK as prescribed by the Contract Documents.

1.3 CONTRACT METHOD

A. The WORK hereunder will be constructed under a single unit – price contract. Payments will be based upon items identified in Section 01025 - Measurement and Payment.

1.4 EXPLANATION OF ALTERNATES

A. No Bid Alternates will be considered.

1.5 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 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*

1.6 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 is 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 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" mean The International Building Code (IBC) latest edition. Similarly, references to "Mechanical Code", “Plumbing Code" and, “Fire Code" 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)" 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, 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 govern. Bring all conflicts to the attention of the ENGINEER for clarification and directions prior to ordering or providing any materials or furnishing labor. Bid for the most stringent requirements.

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

G. Ensure that all work included in the Contract Documents, regardless if shown or not, complies 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, install chemical, hazardous, and petroleum product piping and storage in underground locations in 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.

1.7 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. Ensure that the conference is 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. 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. Ensure that the CONTRACTOR’s Project Manager, superintendent, and pertinent subcontractors 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, present any issues that may impact its progress with a view to resolve these issues expeditiously.

1.8 PERMITS

A. Abide by the conditions of all permits and obtain proof of satisfaction of conditions from issuers of permits, where so required, prior to acceptance of the WORK by the OWNER.

B. Conditions affecting the CONTRACTOR are found in the following permits.

1. Parish of St. Tammany, Building Permit (Obtained and Paid for by the CONTRACTOR)

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION (NOT USED)

3.1 WORK BY OTHERS

A. Where 2 or more contracts are being performed at one time on the same Site or adjacent land in such manner that work under one contract may interfere with work under another, the OWNER will determine the sequence and order of the Work in either or both contracts. When the Site of one contract is the necessary or convenient means of access for performance of work under another, the OWNER may grant privilege of access or other reasonable privilege to the contractor so desiring, to the extent, amount, and in manner and at time that the OWNER may determine. No OWNER determination of method or time or sequence or order of the work or access privilege will be the basis for a claim for delay or damage except under provisions of the General Conditions for temporary suspensions of the work.

B. Conduct operations so as to cause a minimum of interference with the work of such other contractors, and cooperate fully with such contractors to allow continued safe access to their respective portions of the Site, as required to perform work under their respective contracts.

3.2 INTERFERENCE WITH WORK ON UTILITIES

A. Cooperate fully with all utility forces of the OWNER or forces of other public or private agencies engaged in the relocation, altering, or otherwise rearranging of any facilities which interfere with the progress of the WORK.

B. Schedule the WORK so as to minimize interference with said relocation, altering, or other rearranging of facilities.

3.3 CONTRACTOR'S USE OF THE SITE

A. Limit use of the site to construction operations, including on-Site storage of materials, on-Site fabrication facilities, and field offices.

3.4 WORKING HOURS

A. Limit ordinary working hours of 7:30 AM to 5:30 PM, Monday through Friday. Work outside of normal hours only with the permission of the OWNER and ENGINEER. Tender such requests the ENGINEER a minimum of 48 hours prior to the proposed work outside of normal working hours.

B. Night WORK will generally not be allowed.

C. Understand and conform to the Construction and Schedule Constraints specified within these specifications.

3.5 OWNER'S USE OF THE SITE

A. The OWNER will utilize all or part of the existing site and facilities during the entire period of construction for the conduct of the OWNER's normal operations. Cooperate and coordinate with the OWNER to facilitate the OWNER's operations and to minimize interference with the CONTRACTOR's operations at the same time. In any event, allow the OWNER access to the Site during the entire period of construction.

3.6 BAR CHART SCHEDULING

A. Schedule the WORK in accordance with the Contract Documents.

B. Where submittals are indicated, submit as directed and as per these specifications.

C. The CONTRACTOR is alerted to the Construction and Schedule Constraints of these specifications.

D. Prepare and submit a Project Overview Bar Chart Schedule for WORK. Indicate the major components of the WORK and the sequence relations between the major components and subdivisions of major components. Indicate the relationships and time frames in which the various components of the WORK will be made substantially complete and placed into service in order to meet the Contract Times. Include sufficient detail for the identification of subdivisions of major components according to such

activities as mobilization, site dewatering, excavation, demolition, yard piping installation, placement of structural backfill, final site grading, and other important WORK for each major item within the overall project scope. Indicate planned durations and start dates for each work item subdivision.

E. The ENGINEER's review and comment on the schedules will be limited to conformance to the Contract Documents. Make corrections to the schedules necessary to comply with requirements and adjust the schedules to incorporate any missing information requested by the ENGINEER.

F. Upon approval of a change order or upon receipt of authorization to proceed with additional WORK, depict the pertinent changes in the next submittal of the Project Overview Bar Chart Schedule.

G. Furnish monthly Project Overview Bar Chart Schedules and written narrative reports in the form indicated within these Technical Specifications. Submit this information along with Construction Photographs as required by these Specifications with the CONTRACTOR's regular Progress Payment Requests.

H. Present the Project Overview Bar Chart Schedule as a summary of the current construction schedule for major project components (original and as updated and adjusted throughout the entire construction period). Represent the major project components as time bars and subdivide the major project components into various types of WORK including dewatering, excavation, demolition, yard piping, placement of structural backfill, and final site grading.

I. Plot each major component and subdivision accurately on a time scale consistent with the early start and finish activity information contained in the latest update of the schedule. In addition, list a percent completion for each major component and subdivision. Amend the Project Overview Bar Chart Schedule as necessary to include any additional detail required by the ENGINEER. Include any additional information requested by the ENGINEER at any time during construction.

J. Prepare regular written narrative reports of the status of the project for submission to the ENGINEER with the CONTRACTOR's Progress Payment Requests. Include at a minimum the following items:

1. The status of major project components (percent complete and amount of time ahead or behind schedule) and an explanation of how the project will be brought back on schedule if delays have occurred.

2. The progress made on critical activities indicated on the construction schedule.

3. Explanations for any lack of WORK on critical activities planned to be performed during the last month.

4. Explanations for any schedule changes, including changes to the logic or to activity durations.

5. A list of the critical activities scheduled for the next 2 months.

6. The status of major material and equipment procurements.

7. The value of materials and equipment properly stored at the Site but not yet incorporated into the WORK.

8. Any delays encountered during the reporting period.

9. An assessment of inclement weather delays and impacts to the progress of the WORK.

10. Include any other information pertinent to the status of the project.

11. Include additional status information requested by the ENGINEER.

K. Include lost days on the construction schedule due to inclement weather. Inclement weather delays will be determined in accordance with the requirements of Section 09 – Contract Time Extension Specifications.

3.7 SCHEDULE OF VALUES

A. Prepare and submit a Schedule of Values to the ENGINEER within prior to the first application for payment. Because the ultimate requirement is to develop a detailed Schedule of Values sufficient to determine appropriate monthly progress payment amounts through cost loading of the CPM Schedule activities, provide sufficient detailed breakdown to meet this requirement. The ENGINEER will 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, add the additional items so identified by the ENGINEER.

B. **The minimum detail of breakdown of the major WORK components is indicated below. Provide greater detail where directed by the ENGINEER.**

1. **Mobilization (Ref. No. 1):** No breakdown will be required for this item.

2. **Temporary Signs and Barricades (Ref. No. 2):** Break this item into temporary traffic controls and project signs.

3. **Construction Layout and Elevation Certificate (Ref. No. 3):** No breakdown will be required for this item.

4. **Remove and Deliver Existing 54" Pump Motors to Repair Facility (Ref. No. 4):** Break this item down into removal of each motor and delivery of each of the two motors to the repair facility.

5. **Dismantle Existing 54" Pump Motors at Repair Facility (Ref. No. 5):** No breakdown will be required for this item.

6. **Repair of 54" Pump Motor (Ref. No. 6):** No breakdown will be required for this item.

7. **Remove and Deliver 54" Pumps to Repair Facility (Ref. No. 7):** Break this item into removal of the 54" pumps and delivery of the pumps to the shop where modifications will be done.

8. **Dismantle 54" Pumps at Repair Facility (Ref. No. 8):** No breakdown will be required for this item.

9. **Rebuild, Modify, Test, and Reinstall 54" Pump (Ref. No. 9):** Break this item into design and engineering services for pump modification, materials for the modifications, fabrication of components, assembly, delivery of the modified pump to the site, installation of the modified pump, and startup of the modified pump.

10. **Remove and Deliver 54" Pumps to Repair Facility (Ref. No. 10):** Break this item into removal of the 20" pump and delivery of the pump to the shop where modifications will be done.

11. **Modify, Test, and Reinstall 20" Pump (Ref. No. 11):** Break this item into design and engineering services for pump modification, materials for the modifications, fabrication of components, assembly, delivery of the modified pump to the site, installation of the modified pump, and startup of the modified pump.

12. **Modify Structural Steel Platform for Electrical Panels (Ref. No. 12):** Break this item into fabrication, galvanizing, and execution of the structural modifications.

13. **Electrical and Controls Installation (Ref. No. 13):** Break this item down into control panel fabrication, installation and relocation of components, materials for electrical work, raceway work, conductors, interconnections, and electrical tests.

14. **Deliver Unrepaired Pump to OWNER (Ref. No. 14):** No breakdown will be required for this item.

15. **Deliver Unrepaired Pump Motor to OWNER (Ref. No. 15):** No breakdown will be required for this item.

16. **Furnish and Install New 350 HP Electric Motor (Ref. No. 17):** Break this item into purchase of motor, delivery of the new motor to the site, installation of the new motor, and startup of the new motor.

C. The ENGINEER will review the value allocations and extent of detail to determine any necessary adjustments to the values and to determine if sufficient detail has been proposed to allow acceptable cost loading of the CPM Schedule activities. Make any adjustments deemed necessary to the value allocation or level of detail by the CONTRACTOR and submit a revised detailed Schedule of Values prior to the first application for payment.

3.8 CONSTRUCTION AND SCHEDULE CONSTRAINTS

A. Schedule, sequence, and perform the WORK in a manner which minimizes disruption to the public and which minimizes disruptions in the operation and maintenance of existing facilities.

B. Incorporate the construction and schedule constraints of this Section in preparing the construction schedules required under these specifications.

C. Coordinate and plan the construction activities to integrate each schedule constraint into performance of the overall work.

D. The listing of schedule constraints below does not mean that all constraints or special conditions have been identified. The list does not substitute for the CONTRACTOR's coordination and planning for completion of the WORK within the Contract Times.

E. The constraints herein do not relieve the CONTRACTOR of his responsibilities to notify the OWNER and ENGINEER of proposed work outside of normal working hours.

F. **The following constraints affect the construction schedule.**

1. The existing drainage pump station is equipped with three (3) drainage pumps. The two (2) existing 54” pumps are non-functioning. The third pump is an existing 20” pump which is operational.

2. In order to maintain continuity of service, remove the 54” pumps, send the 54” pump motors to the motor repair shop, modify, reinstall, and start up the 54” drainage pump under the control of the new control panel while the existing 20” pump remains operational under the control of the existing control panel.

3. Following the successful start-up of the 54” pump, the 20” pump may be removed, modified, electrical equipment relocated, and the 20” pump started up under the control of the relocated control panel.

4. The project will be considered substantially complete when both modified pumps are under control of the new control panel.

5. Remove all 54” motors and deliver all to an approved motor repair shop prior to purchase of any new motors for drainage pumps. Disassemble and assess each motor as indicated in the Technical Specifications. If, during the condition assessment of the motors it becomes apparent that a motor may be repaired, the OWNER will re-use a repaired motor in lieu of a new motor. No payment will be made for new motors without the approval of the motor condition assessment reports required by the drawings and Technical Specifications. If it becomes apparent that no motors are suitable for repair, the motor components will become property of the CONTRACTOR and the CONTRACTOR will be directed by the OWNER and ENGINEER to proceed with the purchase of a new motor at the price indicated in the Bid Form.

3.9 CONSTRUCTION SEQUENCING

A. Schedule and sequence all construction activities to ensure continuous operation of the existing treatment facilities. Develop all construction sequencing so that the work will not adversely impact treatment. Assume full responsibility for the development of the construction sequencing. In implementing the construction sequencing, maintain the existing facilities in service until new facilities are constructed and are operational to supplement the existing capacity. When new facilities are operational, the existing facilities may be taken out of service. Use the following general guidelines in planning the sequence of construction.

1. During all rehabilitation, modification, and demolition work, maintain safe working conditions for personnel at all times. The foregoing includes at least proper trench excavation, the provision of temporary equipment guards, supports, warning signs, walkways, covers over openings, handrailing, and protection of electrical equipment and power supply.

2. Construct all temporary facilities accordance with applicable codes and regulations to operate safely and properly.

3. Tag valves to be temporarily shut off during the work as such. Lock valves shut with an approved lock out device and padlock in accordance with the OWNER's procedures or as directed.

4. Similarly shut down electrical and mechanical equipment.

3.10 PROTECTION OF EXISTING UTILITIES AND IMPROVEMENTS

A. Protect all existing utilities and improvements not designated for removal and 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. Do not undertake any WORK that would affect any oil, gas, sewer, or water pipeline; any telephone, telegraph, or electric transmission line; any fence; or any other structure, nor enter upon the rights-of-way involved until notified that the OWNER has secured authority therefor from the proper party.

C. After authority has been obtained, give said party due notice of its intention to begin work, if required by said party.

D. Remove, shore, support, or otherwise protect such pipeline, transmission line, ditch, fence, or structure, or replace the same.

E. Do not destroy, remove, or otherwise disturb any existing survey markers or other existing street or roadway markers without proper authorization. Do not begin pavement breaking or excavation until all survey or other permanent marker points that will be disturbed by the construction operations have been properly referenced. Accurately restore survey markers or points disturbed by the CONTRACTOR after street or roadway resurfacing has been completed. Use qualified licensed land surveyors for restoration of survey markers or points.

F. Pavement:

1. **General:** Replace all paved areas including asphaltic concrete berms cut or damaged during construction with similar materials of equal thickness to match the existing adjacent undisturbed areas, except where specific resurfacing requirements have been called for in the Contract Documents or in the requirements of the agency issuing the permit. Match existing sections for all components of existing sections, including sub-base, base, and pavement. Comply with temporary and permanent pavement requirements of the affected pavement owner. Neatly saw cut pavements which are subject to partial removal in straight lines.

2. **Temporary Resurfacing:** Wherever required by the public authorities having jurisdiction, place temporary surfacing promptly after backfilling and maintain such surfacing for the period of time fixed by said authorities before proceeding with the final restoration of improvements.

3. **Permanent Resurfacing:** In order to obtain a satisfactory junction with adjacent surfaces, t saw cut back and trim the edge so as to provide a clean, sound, vertical joint before permanent replacement of an excavated or damaged portion of pavement. Trim back damaged edges of pavement along excavations and elsewhere by full depth saw cutting in straight lines. Construct all pavement restoration and other facilities restoration to finish grades compatible with adjacent undisturbed pavement.

4. **Restoration of Sidewalks or Private Driveways:** Wherever sidewalks or private roads are removed for purposes of construction, place suitable temporary sidewalks or roadways promptly after backfilling and maintain them in satisfactory condition for the period of time fixed by the authorities having jurisdiction over the affected portions. If no such period of time is so fixed, maintain said temporary sidewalks or roadways until the final restoration thereof has been made.

G. **Underground Utilities:**

1. **General:** Protect underground Utilities and other improvements which may be impaired during construction operations, regardless of whether or not the Utilities are indicated on the Drawings. Take all possible precautions for the protection of unforeseen Utility lines to provide for uninterrupted service and to provide such special protection as may be necessary.

2. Conduct exploratory excavations as necessary to determine the exact locations and depths of Utilities which may interfere with its work. Perform such exploratory excavations as soon as practicable after Notice to Proceed and, in any event, a sufficient time in advance of construction to avoid possible delays to the CONTRACTOR's progress. When such exploratory excavations show the Utility location as shown on the Drawings to be in error, notify the ENGINEER.

3. Perform the number of exploratory excavations which is sufficient to determine the alignment and grade of the Utility.

4. **Utilities to be Moved:** In case it becomes be necessary to move the property of any public utility or franchise holder, such utility company or franchise holder will, upon request of the CONTRACTOR, be notified by the OWNER to move such property within a specified reasonable time. When utility lines that are to be removed are encountered within the area of operations, notify the ENGINEER a sufficient time in advance for the necessary measures to be taken to prevent interruption of service.

5. **Utilities to be Removed:** Where the proper completion of the WORK requires the temporary or permanent removal and/or relocation of an existing Utility or other improvement which is indicated, remove and, without unnecessary delay, temporarily replace or relocate such Utility or improvement in a manner satisfactory to the ENGINEER and the owner of the facility. In all cases of such temporary removal or relocation, accomplish restoration to the former location in a manner that will restore or replace the Utility or improvement as nearly as possible to its former locations and to as good or better condition than found prior to removal.

6. **OWNER's Right of Access:** The right is reserved to the OWNER and to the owners of public utilities and franchises to enter at any time upon any public street, alley, right-of-way, or easement for the purpose of making changes in their property made necessary by the WORK of this Contract.

7. **Underground Utilities Indicated:** Protect existing Utility lines that are indicated or the locations of which are made known to the CONTRACTOR prior to excavation and that are to be retained, and all Utility lines that are constructed during excavation operations from damage during excavation and backfilling. If such utilities are damaged, immediately repair or replace the facility unless otherwise repaired by the owner of the damaged Utility. If the owner of the damaged facility performs its own repairs, reimburse said owner for the costs of repair.

8. **Underground Utilities Not Indicated:** In the event that the CONTRACTOR damages existing Utility lines that are not indicated or the locations of which are not made known to the CONTRACTOR prior to excavation, immediately make a verbal report of such damage to the ENGINEER and make a written report thereof promptly thereafter. The ENGINEER will immediately notify the owner of the damaged Utility. If the ENGINEER is not immediately available, notify the Utility owner of the damage. If directed by the ENGINEER, make repairs by the CONTRACTOR under the provisions for changes and extra work contained in the General Conditions.

9. Costs of locating and repairing damage not due to failure of the CONTRACTOR to exercise reasonable care, and removing or relocating such Utility facilities not indicated in the Contract Documents with reasonable accuracy, and for equipment on the project which was actually working on that portion of the WORK which was interrupted or idled by removal or relocation of such Utility facilities, and which was necessarily idled during such work will be paid for as extra work in accordance with the General Conditions.

10. **Approval of Repairs:** All repairs to a damaged Utility or improvement are subject to inspection and approval by an authorized representative of the Utility or improvement owner before being concealed by backfill or other work.

11. **Maintaining in Service:** Unless indicated otherwise, continuously maintain in service all oil and gasoline pipelines, power, and telephone or the communication cable ducts, gas and water mains, irrigation lines, sewer lines, storm drain lines, poles, and overhead power and communication wires and cables encountered along the line of the WORK during all the operations under the Contract, unless other arrangements satisfactory to the ENGINEER are made with the owner of said pipelines, duct, main, irrigation line, sewer, storm drain, pole, or wire or cable. Assume responsibility for and repair all damage due to construction operations, and the provisions of this Section will not be abated even in the event such damage occurs after backfilling or is not discovered until after completion of the backfilling.

H. **Trees, Shrubs, Lawn Areas and Landscaping:**

1. **General:** Except where trees or shrubs are indicated to be removed, exercise all necessary precautions so as not to damage or destroy any trees or shrubs, including those lying within street rights-of-way and project limits. Do not trim or remove any trees unless such trees have been approved for trimming or removal by the jurisdictional agency or OWNER. Trim or replace existing trees and shrubs which are damaged during construction using a certified tree company under permit from the jurisdictional agency and/or the OWNER. Accomplish trimming and replacement in accordance with the following paragraphs.

2. **Trimming:** Preserve symmetry of the tree; no stubs or splits or torn branches left; make clean cuts close to the trunk or large branch. Do not use spikes for climbing live trees. Coat cuts over 1-1/2 inches in diameter with a tree paint product that is waterproof, adhesive, and elastic, and free from kerosenes, coal tar, creosote, or other material injurious to the life of the tree.

3. **Replacement:** Immediately notify the jurisdictional agency and/or the OWNER if any tree or shrub is damaged by the CONTRACTOR's operations. If, in the opinion of said agency or the OWNER, the damage is such that replacement is necessary, replace the tree or shrub at no additional cost to the OWNER. Provide and plant a tree or shrub of a like size and variety as the one damaged, or, if of a smaller size, or pay to the owner of said tree a compensatory payment acceptable to the tree or shrub owner, subject to the approval of the jurisdictional agency or OWNER. Furnish and plant a tree or shrub not less than 1-inch diameter nor less than 6 feet in height. Plant replacement trees and shrubs in accordance with the recommendations of the nursery furnishing the plants. Unless otherwise indicated, water and maintain the replacement trees and shrubs for 6 months after planting.

4. Repair or replace landscaped areas damaged during construction to match the pre-construction condition to the satisfaction of the land owner and the OWNER.

I. **Notifcation:** Prior to any excavation in the vicinity of any existing underground facilities, including all water, sewer, storm drain, gas, petroleum products, or other pipelines; all buried electric power, communications, or television cables; all traffic signal and street lighting facilities; and all roadway and state highway rights-of-way, notify the respective authorities representing the owners or agencies responsible for such facilities not less than 3 days nor more than 7 days prior to excavation so that a representative of said owners or agencies can be present during such work if they so desire. Comply with the Louisiana Underground Utilities and Facilities Damage Prevention Law. Provide notice to Louisiana One Call (811) in accordance with the Louisiana Underground Utilities and Facilities Damage Prevention Law

3.11 ROADWAY CLOSURE REQUESTS

A. Modifications to existing facilities, the construction of new facilities, and the connection of new to existing facilities may require the temporary closure of existing roadways and driveways. In such cases, coordinate the WORK with the ENGINEER as described below. Submit a detailed closure request and time schedule for all construction activities which will make it necessary to completely or partially close a roadway, driveway, or walkway to the public.

B. Submit the closure request to the ENGINEER a minimum of two (2) weeks in advance of the time that such closure is required. Coordinate the closure request with the construction schedule and the restrictions and conditions of these specifications. Within the closure request, describe the CONTRACTOR’s temporary traffic control plan, the length of time to complete the operation, and the manpower, plant, and equipment to ensure that WORK requiring the closure is completed within the scheduled time for the closure. Assume and pay for all costs for preparing, implementing, maintaining, and removing the closure plan as part of the WORK.

C. Do not enact a roadway, driveway, or sidewalk closure until written approval has been granted by the ENGINEER in each case. Should the CONTRACTOR enact a closure without approval of the ENGINEER, the ENGINEER will direct the CONTRACTOR to take whatever measures are necessary to re – open the affected roadway, driveway, or sidewalk closure at the CONTRACTOR's expense. Should the CONTRACTOR refuse, the OWNER may take required measures and such costs will be withheld from future progress payments to the CONTRACTOR.

D. The ENGINEER will coordinate the CONTRACTOR's planned closure with the OWNER's personnel. The ENGINEER has the authority to modify any proposed closure plans should the closure unnecessarily adversely impact the public.

E. Notify the ENGINEER in writing at least one week in advance of the required closure if the schedule for performing the work has changed or if revisions to the closure plan are required. Provide written confirmation of the closure date and time 2 working days prior to the actual closure.

3.12 OUTAGE REQUESTS

A. Modifications to existing facilities, the construction of new facilities, and the connection of new to existing facilities may require the temporary outage or bypass of existing treatment processes or facilities. In such cases, coordinate WORK with the ENGINEER as described below. Submit a detailed outage plan and time schedule for all construction activities which will make it necessary to remove a tank, pipeline, channel, electrical circuit, equipment, structure, road, or other facilities from service.

B. Submit the outage plans to the ENGINEER for acceptance a minimum of 2 weeks in advance of the time that such outages are required. Coordinate the outage plans with the construction schedule and meet the restrictions and conditions of this Section. Describe the CONTRACTOR's method for preventing bypassing of other treatment units; the length of time required to complete the operation; any necessary temporary power, controls, instrumentation, or alarms required to maintain control, monitoring, and alarms for the treatment plant processes; and the manpower, plant, and equipment which the CONTRACTOR will provide in order to ensure proper operation of associated treatment units. Assume responsibility for and pay for costs for preparing and implementing the outage plans s as part of the WORK.

C. Do not begin an alteration affecting existing facilities until specific written authorization has been granted by the ENGINEER in each case.

D. The ENGINEER will coordinate the CONTRACTOR's planned procedure with the treatment facility personnel. The ENGINEER has the authority to modify any proposed shutdown procedures if such procedures would adversely impact the plant operations.

E. Notify the ENGINEER in writing at least one week in advance of the required outage if the schedule for performing the work has changed or if revisions to the outage plan are required. Provide written confirmation of the shutdown date and time 2 working days prior to the actual shutdown.

3.13 TEMPORARY CONNECTIONS

A. Plan the making of connections to existing facilities or other operations that interfere with the operation of the existing equipment thoroughly in advance. Ensure that any and all required equipment, materials, and labor are on hand at the time of undertaking the connections. Complete work as quickly as possible and with as little delay as possible, and proceed continuously (24 hours a day and seven days a week) if necessary to complete modifications and/or connections in the minimum time.

B. Include the cost of any temporary facilities and night, weekend, or holiday work and overtime payments required during process interruptions in the price of the WORK.

C. Locate temporary facilities and piping to minimize interference with construction facilities and OWNER's operation and maintenance of the wastewater treatment plant. Unless otherwise indicated, provide temporary pipelines of the same size as its connection to the existing or permanent facility at the downstream end of the pipeline. Use piping materials suitable for the material being conveyed and as required in the Contract Specifications.

D. When temporary electrical power, controls, instrumentation, or alarms are required for routine continuous operations of existing or new equipment, provide the necessary equipment and appurtenances. Prior to installing said equipment and appurtenances,

furnish a submittal on the proposed components and installation for ENGINEER's review and approval.

E. Submit a plan showing the size and location of the temporary facilities and piping to the ENGINEER at the same time as the outage plan required under this Section. Assume responsibility for and pay for all costs for design, provision, operation, and removal of temporary facilities and piping as a part of the WORK.

3.14 PROJECT SIGN

A. Provide one project identification sign, complete, in accordance with the Contract Documents.

B. Construct the sign of 1/2-inch pressure treated plywood with 4-inch by 4-inch supports and 2-inch by 4-inch pressure treated cross bracing

C. Provide sign content and legend be as indicated. Use relationships of letter size and logo size as indicated.

D. Locate the project sign on the site at such a location so as to be highly visible and not obstruct pedestrian or vehicular traffic

E. Set the sign 4 feet above the ground, measured from grade to the lower edge of the plywood sheet.

F. Remove the project sign upon preparation of the Notice of Completion.

3.15 CONSTRUCTION NOISE

A. Maintain and operate equipment in such manner as to minimize noise generation to the extent practicable. Equip all engines used on the project with properly functioning mufflers.

3.16 SITE CONDITIONS SURVEYS

A. Furnish all labor, materials, and equipment to perform color audio-video recording and photography of the project site surfaces as specified herein. Furnish to the Owner continuous color and audio-video documentation and color photographs of the project site. The Owner will reject the audio-video documentation and/or color photographs because of poor quality, unintelligible audio or uncontrolled pan or zoom. Re – video any documentation rejected at no additional cost to the Owner. Submit (1) copy to the Owner for format and content approval prior to the start of any work.

B. Prior to mobilization, conduct a detailed survey that includes preconstruction photographs and video of the jobsite, surrounding areas, and access/haul routes. Use master video format with accompanying audio on NTSC high definition video equipment with a minimum resolution of 720p (1280 x 720 progressive), supplied on a common media device (such as DVD, USB drives, external hard drives) in a common media format (such as MP4). Provide rovide video recordings made with a dedicated digital video camera specifically made for video recordings. Video recordings made with cell phones, tablets, webcams, wearable cameras, and drones are not acceptable.

C. **Qualifications:** Use audio-video taping firm or individual knowledgeable in construction practices and experienced in the implementation of established inspection procedures.

D. **Execution of Video:**

1. Video at a minimum the following areas:

a. All areas to be entered by vehicles or equipment, including construction areas for both internal and executed improvements.

b. Paved and unpaved areas which will be entered by vehicles or equipment.

c. Areas surrounding construction operations including exterior/ interior of homes within a 200’ radius of construction.

2. Assume responsible for the timely execution of the preconstruction audio-video documentation and color photographs, its vantage points, and quality. Cooperate with the photographer’s work and provide reasonable auxiliary services as

requested, including access and use of temporary facilities including temporary lighting.

3. The OWNER and ENGINEER will review submitted media. Should the media not provide adequate coverage to fully illustrate the physical condition of the work area or not be in compliance with the specifications, re – survey all project areas prior to the initiation of construction at the project sites, at no additional cost to the Owner.

4. Provide a cumulative index correlating the various segments of video coverage to the corresponding media. Provide an index which clearly identifies each segment in the video by location, engineering stationing corresponding to the stationing on the contract documents, video counter number, viewing side, point starting from, traveling direction, and ending point. Written documentation must coincide with the information on the video, so as to make easy retrieval of locations sought for at a later date.

5. Provide video with bright, sharp, clear pictures with accurate colors and that is free from distortion, tearing, rolls, or any other form of picture imperfection. Provide audio portion of the recording with precise and concise explanatory notes by the camera operator with proper volume, clarity, and freedom from distortion.

6. To preclude the possibility of tampering or editing, provide video displaying continuous digital information including the following:

a. Video number;

b. Name of CONTRACTOR;

c. Date and Time;

d. Project Information and Location;

e. General Location and Name of Street

f. Weather Conditions

7. Include in the recording coverage of all surface and other site features located in areas to be affected by the Work. Include at a minium, roadways, driveways, sidewalks, curbs, culverts, headwalls, retaining walls, buildings, above-ground utilities, parks, lawns, landscaping, trees, tree canopies, shrubbery, and fences. In addition, if properties are near the site, include views from behind the curb, the sidewalk and grass areas, driveways, and fronts of residences. Provide side and rear views of the exterior of the residence, along with the interior of all structures adjacent to the construction. Run interior videos along the corners of each room or the subject structure. Clearly show and document existing damage prior to the commencement of work. Supply the Engineer with the signatures of any resident not allowing the internal/ external survey of existing residential structures on an appropriate form.

8. Identify houses and structures visually and verbally by house number in such a manner that structures of the proposed system (i.e., manholes on a sewer system) can be located by reference.

9. Provide continuous coverage (i.e., do not turn the camera off once recording has begun) to the greatest extent possible.

10. Do not exceed a rate of travel for video recording of 44 feet per minute. Halt forward motion of the camera when viewing objects or structures outside the limits of the street or easement being documented. Provide a distance from the camera lens to the ground of not less than 12 feet. If not accessible by motorized vehicle, determine the distance from ground to shoulder height of the camera operator.

11. Pan and zoom in and out at a reasonable rate so as to control sufficiently the clarity of objects being viewed.

12. Furnish all auxiliary lighting as required to produce a quality recording.

13. Do not perform video recording if the weather is not acceptable, such as rain, fog, mist, or elongated shadows that distort perception and tend to prevent clear resolution.

14. Retain the original unedited media and photographs for seven (7) years after the date of the final acceptance.

15. Provide a monthly video of the construction area and related temporary traffic signage. In the monthly video, include a walk through the project area, showing all construction and related temporary traffic signage. Deliver (2) copies of the monthly progress video as described herein.

E. **Execution of Photographs:**

1. Prior to beginning the work, and upon the completion of work, take photographs along both private property lines at fifty (50) foot intervals within the project limits. Take two views at each fifty (50) foot interval. In one view, show up-station along the roadway, in the other view show the property line side view at the station perpendicular to the roadway travel edge.

2. In addition, during the progress of work, take twelve (12) photos every month consisting of various features, as directed by the ENGINEER.

3. Take 4”x6” or 8”x10” Hard copy photographs with a digital format camera, which is capable of imprinting in the lower righthand corner of the image, the date of the photograph. Submit photographs as 4”x6” or 8”x10” glossy color prints of commercial quality and which are clear, sharp and that encompass depth of field. Submit photographs in protective sleeves and number and index photos to a master list to be furnished with the prints. Furnish the master index list neatly bound and provide within at minimum, the date and time of the photograph, the station location of the photograph, the direction of view, and the image number. Furnish two (2) copies of digital photographs with each set of photographs as JPEG images on CD ROM or USB drive devices.

4. Take photographs with a digital format camera, which imprints in the lower righthand corner of the image; the date of the photograph and picture or frame number. Provide digital photographs of commercial quality and which are clear, sharp and encompass depth of field. Include the master list on the USB drive with the photographs, and contain at a minimum, the date and time of the photograph, the station/ location of the photograph, the direction of view, and the image number. Furnish two (2) copies to the owner as JPEG images on CD ROM or USB drive devices.

3.17 APPLICATIONS FOR PAYMENT

A. Submit applications for Payment to the ENGINEER at the times stipulated in the General Conditions.

B. Submit applications which contain both an application and continuation pages, along with all substantiating documentation detailed herein or as deemed necessary by the ENGINEER. Type the application and continuation sheets in the format specified herein and created on 8-1/2” x 11” paper.

C. Submit Applications for Payment typed on American Institute of Architects (AIA) Form G-702. Submit continuation sheets on American Institute of Architects (AIA) Form G-703.

D. Populate the application form (AIA G-702) in accordance with the form instructions and as prescribed below:

1) Include required information, including Change Orders executed prior to the date of the application;

2) Include summary of dollar amounts to agree with totals depicted within continuation sheets;

3) Execute certification by a Corporate Principal.

4) Where directed by the OWNER, ensure that applications are notarized by a Notary Public Registered in the State of Louisiana.

E. Populate the continuation sheets (AIA G-703) in accordance with the form instructions and as prescribed below:

1) If the project is to be conducted under a Lump Sum Contract, include list of all scheduled items of the WORK per the Schedule of Values with each

as a single line item. Include list of all payment items included in Section 01025 – Measurement and Payment with each as a single line item.

2) Fill in dollar amount in each column for each line item on the continuation page.

3) List each Change Order executed prior to date of submission at the end of the continuation pages.

4) Submit copies of paid invoices for stored materials, along with photos of stored materials in the amount and quality deemed acceptable by the ENGINEER.

F. Prior to submittal of the completed Application for Payment, submit to the ENGINEER an electronic copy of a "draft" Application for Payment, including all substantiating documentation for review. Create the draft application in Adobe Acrobat Portable Document Format (.PDF). Undertake all revisions as required by the ENGINEER prior to submitting the completed application for payment.

G. When the ENGINEER finds the application for payment correct, he will instruct the CONTRACTOR to submit the completed application for approval and transmittal to the OWNER. Submit the number of applications for payment as determined at the pre – construction conference.

H. The ENGINEER will not collate or assemble Applications for Payment. Assembly of the Application for Payment are the sole responsibility of the CONTRACTOR.

I. Submit construction progress photographs documenting progress of the WORK with applications for payment. Submit updated schedules and progress narratives as specified within these specifications with applications for payment.

3.18 CHANGE ORDER PROCEDURES

A. Implement and abide by the procedures for Change Orders as specified herein and the General Conditions.

B. Provide full written data as required or requested for the evaluation of changes by the OWNER and ENGINEER;

C. Maintain detailed records of work done on a time – and – material or force account basis.

D. Provide full documentation to the ENGINEER upon request.

E. Designate in writing the member of the CONTRACTOR's organization who is authorized to accept changes in the WORK and who is responsible of informing others in the CONTRACTOR's employ of the authorization for changes in the WORK.

F. The OWNER will designate in writing the person who is authorized to execute change orders.

G. The OWNER or ENGINEER may initiate changes to the WORK by submitting a Proposal Request to the CONTRACTOR. Such a request is to be for information. Do not construe such a request as an authorization to execute the WORK. This request will include, but not necessarily be limited to, the following items:

1) Detailed description of the proposed change, products, and location of the proposed change to the WORK;

2) Supplementary or revised drawings and/or specifications;

3) Projected time for making the change, and a specific statement as to whether or not overtime work is or is not authorized;

4) A specific period of time for which the requested price is to remain valid.

H. The CONTRACTOR may initiate a request for changes to the WORK by submitting a written notice to the ENGINEER containing at a minimum the following items:

1) A description of the proposed changes;

2) Statement of the reason for making the changes

3) Statement of the effect on the Contract Price and Contract Time;

4) Statement of the effect on the work of separate CONTRACTORs;

5) Documentation supporting any change in the Contract Sum or Contract Time, as appropriate.

I. Support each quotation for a lump-sum proposal, and for each unit price which has not previously been established, with sufficient substantiating data to allow Engineer to evaluate the quotation.

J. On request of the ENGINEER or OWNER, provide additional data to support time and cost computations, such as the following:

1) Labor Required;

2) Equipment Required;

3) Products required (recommended source of purchase and unit cost, quantities required);

4) Taxes, insurance, and bonds;

5) Credit for WORK deleted from the Contract;

6) Overhead and Profit;

7) Justification for any changes in the Contract Time.

K. Support each claim for additional costs, and for work done on a time-and-material/force account basis, with documentation as required for a lump-sum proposal, plus additional information, such as the following:

1) Name of the OWNER's authorized agent who ordered the work, and date of the order;

2) Dates and time work was performed, and by whom;

3) Time record, summary of hours worked, and hourly rates paid;

4) Receipts and invoices for equipment used listing dates and times of use;

5) Receipts and invoices for products used, including quantities;

6) Receipts and invoices for subcontracts.

L. The ENGINEER will prepare each Change Order.

M. Use the OWNER's standard change order form, which will be provided to the CONTRACTOR.

N. The Change Order will describe changes in the Work, both additions and deletions, with attachments of revised Contract Documents to define details of the change.

O. The Change Order will provide an accounting of adjustment in the Contract Sum and Contract Times.

P. The content of Lump Sum/Fixed Price Change Orders will be based on, either:

1) ENGINEER's Proposal Request and CONTRACTOR's responsive proposal as mutually agreed upon between OWNER and CONTRACTOR;

2) CONTRACTOR's Proposal for change to the WORK, as recommended by the ENGINEER.

Q. OWNER and ENGINEER will sign and date the Change Order as authorization for the CONTRACTOR to proceed with the changes.

R. CONTRACTOR may sign and date the Change Order to indicate agreement with the terms therein.

S. The content of Unit Price Change Orders will be based on, either:

1) ENGINEER'S definition of scope of the required Changes in the WORK;

2) CONTRACTOR's proposal for a Changes in the WORK, as recommended by the ENGINEER;

3) Survey of completed work.

T. The amounts of the unit prices will be either:

1) Those stated in the Agreement;

2) Those mutually agreed upon between OWNER and CONTRACTOR.

U. When quantities of the items affected by the Change Order can be determined prior to the start of the work, employ the following procedure:

1) OWNER and ENGINEER will sign and date the Change Order as authorization for the CONTRACTOR to proceed with the changes;

2) CONTRACTOR may sign and date the Change Order to indicate agreement with the terms therein.

V. When quantities of the items affected by the Change Order cannot be determined prior to the start of the work, employ the following procedure:

1) The ENGINEER or OWNER will issue a construction change authorization directing CONTRACTOR to proceed with the change on the basis of unit prices, and will cite the applicable unit prices.

2) At the completion of the change, the ENGINEER will determine the cost of such work based upon the unit prices and quantities of work performed. Submit documentation sufficient in the opinion of the ENGINEER to establish the change in Contract Sum and Contract Time.

3) The ENGINEER will sign and date the Change Order to establish the change in Contract Sum and Contract Time.

4) OWNER and CONTRACTOR will sign and date the Change Order to indicate their agreement with the terms included therein.

W. Periodically revise Schedule of Values and application for payment forms to record each change as a separate item of WORK, and to reflect the adjusted Contract Price.

X. Periodically revise the Construction Schedule to reflect Change Orders as specified herein.

Y. Upon completion of WORK under a Change Order, enter pertinent changes into the Record Documents.

3.19 CONSTRUCTION PROGRESS PHOTOGRAPHS

A. Furnish construction progress photographs showing the progress of the WORK. Use a competent photographer to take photos via digital format of a resolution sufficient for documentation of the work and acceptable to the Engineer. Provide a log with the date of photographing, the project title, short description of what is in the photograph, and the direction the camera is facing.

B. Starting when the WORK begins and for as long as the WORK is in progress, not less than twelve (12) photographs at intervals no longer than two (2) weeks apart, consisting of different angles or views at different locations of progress on the site. Furnish digital photographs to the ENGINEER within one (1) week. Digital photographs become property of the OWNER upon submittal by the CONTRACTOR.

C. Submit construction progress photographs with applications for payment.

D. Upon completion of the WORK but before final payment, make an additional twenty (20) photographs of the WORK as directed by the ENGINEER. For the purposes of documenting the completed work, deliver digital photographs and logs to the ENGINEER for transmittal to the OWNER.

3.20 CONTRACTOR SUBMITTALS, SAMPLING, AND TESTING:

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, 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, ensure that the calculations 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. Submit all submittal documents with the CONTRACTOR's standard submittal transmittal form. Sign all submittals as an indication that they have been reviewed for completeness and organization.

1. **Organization**: Use a single submittal transmittal form 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, match terminology and equipment names and numbers used in submittals to those used in the Contract Documents.

3. Assign each submittal a unique number. Number submittals sequentially, and clearly note the submittal numbers on the transmittal. Assign original submittals a numeric submittal number followed by a letter of the alphabet to distinguish between the original submittal and each resubmittal. For example, if submittal 25-A requires a resubmittal, the first resubmittal will bear the designation "25-B" and the second resubmittal will bear the designation "25-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," make the corrections on the submittal, but formal revision and resubmission will not be required. If a submittal is returned marked "REVISE AND RESUBMIT," revise it and 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 RESUBMIT," and 10 drawings are required to be resubmitted. If a submittal is returned marked "REJECTED," 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, prepare a new submittal and submit the required number of copies to the ENGINEER for review. In the latter case, 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." Do not take corrections indicated on requirements of the Contract Documents as changes to the contract requirements. Re -submittal of rejected portions of a previous submittal will not be allowed. Identify and flag every change

from a submittal to a resubmittal or from a resubmittal to a subsequent resubmittal on the resubmittal.

7. Carefully review submittals of the CONTRACTOR prior to submission to the ENGINEER. Sign and date each submittal by the CONTRACTOR as being correct and in strict conformance with the Contract Documents. In the case of Shop Drawings, date and sign each sheet. Note any deviations from the Contract Documents 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 are the total responsibility of the CONTRACTOR.

8. Corrections 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.") Furnish a Certificate of Analysis 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. Furnish a Certificate of Compliance with each lot of material delivered to the work.

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

1. **Equipment Summary**: Provide a table which lists the equipment name, equipment number, and project area in which the equipment is installed.

2. **Operational Procedures**: Include manufacturer – recommended procedures on the followin 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**: 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. Include recommended frequency of preventive maintenance procedures. Cover lubrication schedules, including lubricant SAE grade, type, and temperature ranges.

4. **Parts List**: Furnish a complete parts list, including a generic description and manufacturer's identification number for each part. Include addresses and telephone numbers of the nearest supplier and parts warehouse. Accompany the parts list with cross-sectional or exploded view drawing. Include part numbers on the drawings with arrows to the corresponding part.

5. **Wiring Diagrams**: 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**: Place equipment warranties, affidavits, certifications, calibrations, laboratory test results, etc. required by the Technical Specifications in this category.

E. **Record Drawings:** Maintain one set of Drawings at the Site for the preparation of record drawings. On these, 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. Give special attention 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. Supplement said record drawings 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. Include revisions made by addenda and change orders, and maintain the record drawings up-to-date during the progress of the WORK. Use red ink for alterations and notes. Identify relevant Change Orders with notations by number and date. Disorganized or incomplete record drawings will not be accepted. Revise them and resubmit within 10 Days. Maintain record drawings as 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.

3.21 SANITARY, HEALTH, AND SAFETY PROVISIONS

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

B. Provide and maintain in a neat, sanitary condition, restrooms and other such accommodations for use of employees and ENGINEER or OWNER personnel. Comply with requirements of the State and local governments for such facilities.

C. **Sanitary and Other Organic Wastes**: Establish a regular daily collection of all sanitary and organic wastes. Dispose of 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 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:** Provide fixed or portable chemical toilets wherever needed for the use of CONTRACTOR's employees. Do not rely on the OWNER’s facilities or facilities of adjacent businesses. Comply with the requirements of Subpart D, Section 1926.51 of the OSHA Standards for Construction for such facilities.

3.22 NAVIGABLE WATERS AND WETLANDS

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

B. Do not infringe upon navigable clearances on waterways. Do not impair and existing navigable depths except as allowed by permits issued by the responsible agency.

C. 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, immediately remove or recover such items. Give immediate notice of such obstruction to proper authorities and, if required, mark or buoy such obstruction until it is removed.

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

F. Conduct all operations in connection with the work in accordance with permits, rules and regulations of the U. S. Army Corps of Engineers and the U. S. Coast Guard. Deviate therefrom only by special permission or special permit under 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 will not relieve the CONTRACTOR of responsibility under the contract.

3.23 BARRICADES AND WARNING SIGNS

A. Provide, erect and maintain necessary barricades, suitable lights, danger signals, signs and other traffic control devices, including flaggers, and take all necessary precautions for protection of the work and safety of the public. Protect highways closed to traffic by effective barricades. Provide suitable warning signs to direct traffic.

3.24 USE OF EXPLOSIVES

A. Do not use explosives without written approval. When explosives are used, do not endanger life or property. If allowed, use explosives in compliance with all laws and ordinances. Assume responsibility for and pay for all damage resulting from the use of explosives as a part of the WORK.

B. Securely store explosives in compliance with all laws and ordinances. Clearly mark such storage places. When no local laws or ordinances apply, provide satisfactory storage not closer than 1,000 feet from any road, building or place of human occupancy.

C. 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. Give such notices sufficiently in advance to enable them to protect their property from damage.

3.25 ARCHEOLOGICAL AND HISTORICAL FINDINGS

A. If cultural artifacts or archaeological or historical sites are discovered, discontinue operations. 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, 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.

3.26 TEMPORARY UTILITIES

A. Provide all temporary utilities necessary for the proper execution of the WORK in the most efficient manner practical. Bear the he cost of provision of these temporary utilities include all costs associated therewith in the price of the WORK.

B. 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, provide the remaining portion with matching and compatible materials and equipment and comply with recommendations of utility company.

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

D. **Temporary Power Distribution**: 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. Properly install and maintain wiring for temporary electric light and power and maintained and securely fasten such wiring in place. Conform to the requirements of Subpart K of the OSHA Safety and Health Standards for Construction for such temporary electrical facilities.

E. **Construction Lighting:** Suitably light WORK conducted at night or under conditions of deficient daylight to ensure proper WORK and to afford adequate facilities for inspection and safe working conditions.

F. **Temporary Lighting**: 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:** Provide an adequate supply of water of a quality suitable for all domestic and construction purposes. Do 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, 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. Pay all permit and water charges.

3.27 SITE ACCESS AND STORAGE

A. Make a thorough 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. Construct and maintain any haul roads required for its construction operations.

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

C. Wherever necessary, to maintain vehicular crossings, provide suitable temporary bridges or steel plates over unfilled excavations, except in such cases as the where the written consent of the responsible individuals or authorities to omit such temporary bridges or steel plates has been obtained. Where such consent is obtained, provide copies to the ENGINEER prior to excavation. Maintain such bridges or plates in service until access is provided across the backfilled excavation. Comply with the requirements of the authority having jurisdiction in each case for temporary bridges or steel plates for street and highway crossing. Adopt designs furnished by said authority for such bridges or steel plates or submit designs to said authority for approval, as may be required.

D. Nothing herein entitles the CONTRACTOR to the exclusive use of any public street, alleyway, or parking area during the performance of the WORK hereunder. Conduct operations to not interfere unnecessarily with the authorized work of utility companies or other agencies in such streets, alleyways, or parking areas.

E. Do not close any street, alleyway, highway, or roadway to the public without first obtaining permission of the ENGINEER and proper governmental authority. Where excavation is being performed in primary streets or highways, maintain one lane in each direction open to traffic at all times unless otherwise indicated. Provide toe boards to retain excavated material if required by the ENGINEER or the agency having jurisdiction over the street or highway. Keep fire hydrants on or adjacent to the WORK accessible to fire-fighting equipment at all times. Make temporary provisions by the CONTRACTOR to assure the use of sidewalks and the proper functioning of all gutters, storm drain inlets, and other drainage facilities.

F. 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, return this area to its original condition, including grading and landscaping.

G. Make all arrangements for any necessary off-Site storage or shop areas necessary for the proper execution of the WORK.

H. Construct and use a separate storage area for hazardous materials used in constructing the WORK.

3.28 QUALITY CONTROL

A. Establish and maintain an effective quality control process which consist of plans, procedures, and organization necessary to provide materials, equipment, workmanship,

fabrication, construction and operations which comply with the contract requirements. Cover construction operations both onsite and offsite, and keyed to the proposed construction sequence.

3.29 PROTECTION OF THE WORK

A. Assume responsibility and pay for the protection of the site, and all WORK, materials, equipment and existing facilities thereon, against theft, vandals, and other unauthorized persons as a part of the WORK.

B. Make no claim against OWNER by reason of any act of an employee or trespasser. Make good all damage to OWNER's property resulting from his failure to provide security measures as specified.

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

D. Maintain the security of any limited access areas as required by the Owner.

E. Maintain charge and care of the WORK until final acceptance. Take precautions against damages to the WORK by action of the elements or from other cause, and satisfactorily repair any damaged work as a part of the WORK. In case of suspension of the WORK for any reason, assume responsibility for all materials and properly store them if necessary. 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.

3.30 PROJECT CLOSEOUT

A. 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. Establish dates for equipment testing, acceptance periods, and on-site instructional periods (as required under the Contract). Establish such dates 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.

- END OF SECTION –

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SECTION 01025 - MEASUREMENT AND PAYMENT

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. Payment for the various items on the Bid Form, as further specified herein, will constitute 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).

B. No separate payment will be made for any item that is not specifically set forth in the Bid Schedule. Include all costs for the WORK within the prices named in the Bid Schedule for the various appurtenant items of work.

1.2 ACCURACY

A. 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.

B. 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 MOBILIZATION (Ref. No. 1)

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

B. **Payment:** Payment for mobilization will be made at the lump sum price on the Bid Form, or portions thereof, in accordance with the table below. The price listed in the Bid Form will constitute full compensation for all labor, materials, equipment and other services necessary for the completion of mobilization, all in accordance with the requirements of 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

1.4 TEMPORARY SIGNS AND BARRICADES (Ref. No. 2)

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

B. **Payment:** Payment for mobilization will be made at the lump sum price on the Bid Form, or portions thereof, in accordance with the table below. The price listed in the Bid Form will constitute full compensation for all labor, materials, equipment, and other services necessary for the provision of temporary signs and barricades, inclusive of labor, materials, equipment and other services for traffic control and the provision, installation, and removal of the project sign, and all other items necessary for the provision of temporary signs and barricades all in accordance with the requirements of the Contract Documents.

Percent of Total Contract Amount Earned	Allowable Percent of Lump Sum Price for Temporary Signs and Barricades
1st Application for Payment	15
10	25
25	75
50	100

1.5 CONSTRUCTION LAYOUT AND ELEVATION CERTIFICATE (REF. NO. 3)

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

B. **Payment:** Payment for this item will be made at the lump sum price on the Bid Form, or portions thereof, in accordance with the table below. The price listed in the Bid Form will constitute full compensation for all labor, materials, equipment and other services necessary for the completion of construction layout, inclusive of the elevation certificate, all in accordance with the requirements of the Contract Documents.

Percent of Total Contract Amount Earned	Allowable Percent of Lump Sum Price for Temporary Signs and Barricades
1st Application for Payment	15
10	25
25	75
50	95 (Final 5% will be paid upon receipt of required elevation certificate)

1.6 REMOVE AND DELIVER EXISTING 54" PUMP MOTORS TO REPAIR FACILITY Ref. No. 4)

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

B. **Payment:** Payment will be made at, on in portions thereof in proportion to the percentage of work acceptably completed, the lump sum bid price named in the Bid Form. The price listed in the Bid Form will constitute full compensation for all labor, materials, equipment, and services necessary for the removal and delivery of both existing 54" pump motors to an approved motor repair facility in accordance with the Contract Documents.

1.7 DISMANTLE EXISTING 54" PUMP MOTORS AT REPAIR FACILITY (Ref. No. 5)

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

B. **Payment:** Payment will be made at, on in portions thereof in proportion to the percentage of work acceptably completed, the lump sum bid price named in the Bid Form. The price listed in the Bid Form will constitute full compensation for all labor, materials, equipment, and services necessary for the dismantling of the existing 54" pump motors at an approved motor repair facility in accordance with the Contract Documents.

1.8 REPAIR OF 54" PUMP MOTOR (Ref. No. 6)

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

B. **Payment:** Payment will be made at, on in portions thereof in proportion to the percentage of work acceptably completed, the lump sum bid price named in the Bid Form. The price listed in the Bid Form will constitute full compensation for all labor, materials, equipment, and services necessary for the repair of one of the two existing motors at the motor repair facility, all in compliance with the requirements of the

Contract Documents.

1.9 REMOVE AND DELIVER 54" PUMPS TO REPAIR FACILITY (Ref. No. 7)

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

B. **Payment:** Payment will be made at, on in portions thereof in proportion to the percentage of work acceptably completed, the lump sum bid price named in the Bid Form. The price listed in the Bid Form will constitute full compensation for all labor, materials, equipment, and services necessary for the removal and delivery of the existing 54" pumps to an approved repair shop in accordance with the Contract Documents.

1.10 DISMANTLE 54" PUMPS AT REPAIR FACILTY (Ref. No. 8)

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

B. **Payment:** Payment will be made at, on in portions thereof in proportion to the percentage of work acceptably completed, the lump sum bid price named in the Bid Form. The price listed in the Bid Form will constitute full compensation for all labor, materials, equipment, and services necessary for the dismantling of the existing 54" pumps at the approved repair shop in accordance with the requirements of the Contract Documents.

1.11 REBUILD, MODIFY, TEST AND INSTALL 54" DRAINAGE PUMP (Ref. No. 9)

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

B. **Payment:** Payment will be made at, on in portions thereof in proportion to the percentage of work acceptably completed, the lump sum bid price named in the Bid Form. The price listed in the Bid Form will constitute full compensation for all labor, materials, equipment, and services necessary for the modification, testing, and reinstallation of an existing 54" pump in accordance with the Contract Documents, including design and engineering services, materials, modifications, rehabilitation and fabrication of components, assembly of the modified pump, delivery of the modified pump to the site, installation of the modified pump, and startup of the modified pump, all in accordance with the requirements of the Contract Documents.

1.12 REMOVE AND DELIVER 20" PUMP TO REPAIR FACILITY (Ref. No. 10)

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

B. **Payment:** Payment will be made at, on in portions thereof in proportion to the percentage of work acceptably completed, the lump sum bid price named in the Bid Form. The price listed in the Bid Form will constitute full compensation for all labor, materials, equipment, and services necessary for the removal and delivery of the existing 20" pump to an approved repair shop in accordance with the requirements of the Contract Documents.

1.13 MODIFY, TEST, AND REINSTALL 20" PUMP (Ref. No. 11)

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

B. **Payment:** Payment will be made at, on in portions thereof in proportion to the percentage of work acceptably completed, the lump sum bid price named in the Bid Form. The price listed in the Bid Form will constitute full compensation for all labor, materials, equipment, and services necessary for the modification, testing, and reinstallation of an existing 20" pump in accordance with the Contract Documents, including design and engineering services, materials, modifications, fabrications of components, assembly of the modified pump, delivery of the modified pump to the site, installation of the modified pump, and startup of the modified pump, all in accordance with the requirements of the Contract Documents.

1.14 MODIFY STRUCTURAL STEEL PLATFORM FOR ELECTRICAL PANELS (Ref. No. 13)

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

B. **Payment:** Payment will be made at, on in portions thereof in proportion to the percentage of work acceptably completed, the lump sum bid price named in the Bid Form. The price listed in the Bid Form will constitute full compensation for all labor,

materials, equipment, and services necessary for the modification of the elevated electrical control panel structure for the installation of the electrical equipment and control panel racks in accordance with the Contract Documents including fabrication of components, installation, and all other work necessary to prepare the existing structure for installation of control and electrical panels all in accordance with the requirements of the Contract Documents.

1.15 ELECTRICAL WORK (Ref. No. 12)

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

B. **Payment:** Payment will be made at, on in portions thereof in proportion to the percentage of work acceptably completed, the lump sum bid price named in the Bid Form. The price listed in the Bid Form will constitute full compensation for all labor, materials, equipment, and services necessary for the installation of electrical and control components in accordance with the Contract Documents, including control panel fabrication, installation, raceway work, conductors, interconnections, and all electrical tests.

1.16 DELIVER UNREPARIED 54" PUMP TO OWNER (Ref. No. 13)

A. **Measurement:** No Measurement will be made for this lump sum item. No payment will be made for this item until condition assessments of the existing motors have been made.

B. **Payment:** Payment will be made at, on in portions thereof in proportion to the percentage of work acceptably completed, the lump sum bid price named in the Bid Form. The price listed in the Bid Form will constitute full compensation for all labor, materials, equipment, and services necessary for the procurement and installation of a new 350 HP motor in accordance with the Contract Documents.

1.17 DELIVER UNREPAIRED 54" PUMP MOTOR TO OWNER (Ref. No. 14)

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

B. **Payment:** Payment will be made at, on in portions thereof in proportion to the percentage of work acceptably completed, the lump sum bid price named in the Bid Form. The price listed in the Bid Form will constitute full compensation for all labor, materials, equipment, and services necessary for the packaging and delivery of the unrepaired 54" pump components to the OWNER, all in accordance with the requirements of the Contract Documents.

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION (NOT USED)

- END OF SECTION -

SECTION 01727 – MOBILIZATION

PART 1 -- GENERAL

1.1 GENERAL

A. Mobilize as required for the proper performance and completion of the WORK and in accordance with the Contract Documents.

B. Include at least the following items as part of the WORK of this section:

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 02003 – AGGREGATES

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. Provide aggregates as specified herein and elsewhere required by the Contract Documents.

1.2 CONTRACTOR SUBMITTALS, SAMPLING, AND TESTING

A. Provide submittals, samples for testing, and testing of materials in accordance with Section 01010 – General Requirements.

B. **Submittal:** Submit the sources of all aggregates to be incorporated into the WORK and reports indicating the gradation of the material to be incorporated into the WORK for review by the ENGINEER.

C. **Sampling:** The ENGINEER will sample material if in the opinion of the ENGINEER that the material is questionable for inclusion in the WORK.

1.3 REFERENCE STANDARDS

. American Association of State Highway and Transportation Officials (AASHTO)

AASHTO PP 65-11	*Standard Practice for Determining the Reactivity of Concrete Aggregates and Selecting Appropriate Measures for Preventing Deleterious Expansion in New Concrete Construction*
AASHTO T 19	*Standard Method of Test for Bulk Density (Unit Weight) and Voids in Aggregate*
AASHTO T 21	*Standard Method of Test for Organic Impurities in Fine Aggregates for Concrete*
AASHTO T 71	*Standard Method of Test for Effect of Organic Impurities in Fine Aggregate on Strength of Mortar*
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 96	*Standard Method of Test for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine*
AASHTO T 104	*Standard Method of Test for Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate*
AASHTO T 278	*Standard Method of Test for Surface Frictional Properties Using the British Pendulum Tester*
AASHTO T 279	*Standard Standard Method of Test for Accelerated Polishing of Aggregates Using the British Wheel*
AASHTO T 327	*Standard Method of Test for Resistance of Coarse Aggregate to Degradation by Abrasion in the Micro-Deval Apparatus*
AASHTO TP 57-99	*Standard Method of Test for The Qualitative Detection of Harmful Clays of the Smectite Group in Aggregates Using Methylene Blue*

B. ASTM International (ASTM)

ASTM C289	*Standard Test Method for Potential Alkali-Silica Reactivity of Aggregates*

ASTM C586	*Standard Test Method for Potential Alkali Reactivity of Carbonate Rocks as Concrete Aggregates*
ASTM C1260	*Standard Test Method for Potential Alkali Reactivity of Aggregates*
ASTM D2321	*Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications*
ASTM D4791	*Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate*

C. Louisiana Department of Transportation and Development (DOTD)

LDOTD AML	*Louisiana DOTD Approved Materials List*
TR 111	*Abrasion of Lightweight Coarse Aggregate*
TR 112	*Amount of Material Finer than No. 200 Sieve in Aggregate*
TR 113	*Sieve Analysis of Fine and Coarse Aggregates*
TR 119	*Determination of Deleterious Materials*
TR 120	*Sand Equivalent Value of Soils and Fine Aggregate*
TR 121	*Fine Aggregate Angularity - FAA (Uncompacted Void Content of Fine Aggregate)*
TR 122	*Determination of pH Value for Aggregates*
TR 306	*Determination of Percentage of Crushed Particles for Coarse Aggregates*
TR 309	*Mechanical Analysis of Extracted Aggregate*
TR 322	*Determining the Effect of Moisture on Asphaltic Concrete Paving Mixture*
TR 413	*Organic Material in Soil*
TR 423	*Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes*
TR 428	*Determining the Atterberg Limits of Soils*
TR 430	*Determination of pH Value of Water or Soil*

1.4 QUALITY CONTROL

A. Locate, select, deliver, and place material conforming to specification requirements and requirements shown on the drawings. Control processes, perform tests, and make adjustments as necessary to result in a uniform product meeting all the requirements of the drawings and specifications.

B. The following test methods will be utilized for the testing, classification and acceptance of aggregates:

Material Property	**Test Procedure**
Deleterious Materials	*DOTD TR 119*
Flat and Elongated Particles	*ASTM D4791*
Magnesium Sulfate Soundness	*AASHTO T 104*

Los Angeles Abrasion	*AASHTO T 96*
Alkali – Silica Reactivity (Chemical Method)	*ASTM C289*
Alkali Reactivity (Mortar – Bar Method)	*ASTM C1260*
Reactivity of Concrete Aggregates	*AASHTO PP65-11*
Alkali Reactivity of Carbonate Rocks (Rock – Cylinder Method)	*ASTM C586*
Organic Impurities	*AASHTO T 21*
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*
pH of Soil and Water	*DOTD TR 430*
pH of Aggregates	*DOTD TR 122*
Atterberg Limits	*DOTD TR 428*
Organic Content	*DOTD TR 413*
Percent Crushed	*DOTD TR 306*
Mechanical Analysis of Extracted Aggregate	*DOTD TR 309*
Sand Equivalent	*DOTD TR 120*
Fine Aggregate Angularity	*DOTD TR 121*
Micro – Deval	*AASHTO T 327*
Moisture Sensitivity	*DOTD TR 322*
Mortar Strength	*AASHTO T 71*
Methylene Blue	*AASHTO TP 57-99*

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle aggregates as recommended by the supplier of the aggregates and as specified herein. Prevent unwanted mixing or segregation of aggregate stockpiles.

PART 2 -- PRODUCTS

2.1 GENERAL REQUIREMENTS FOR AGGREGATES

A. Use aggregates that are environmentally acceptable for the intended use from a source acceptable to the ENGINEER. For an aggregate source to be approved, comply with the general requirements within this subsection and requirements for specific aggregate applications contained within this section and other specifications sections.

B. **Deleterious Materials:** Conform to the following deleterious materials table for source approval and/or project acceptance:

Property	Per Cent Maximum
Wood	0.05
Clay Lumps	0.5
Clay Lumps and Friable Particles	3.0
Coal and Lignite	1.0
Flat and Elongated Particles (5:1)	15.0
Flat and Elongated Particles (3:1)	25.0
Glassy Particles	10.0
Iron Ore	2.0
Total of Wood, Clay Lumps, Friable Particles, Iron Ore, Lignite and Other Foreign Matter	5.0

C. **Magnesium Sulfate Soundness:** For source approval coarse natural aggregates and recycled portland cement concrete (RPCC), the maximum soundness loss is 15 percent when subjected to 5 cycles of the magnesium sulfate soundness test.

D. **Los Angeles Abrasion:** For coarse natural aggregates and RPCC source approval, maximum Los Angeles abrasion loss is 40.0 percent.

E. **Friction Ratings:** Where specified herein or in other specifications sections, use aggrgates which comply with the requirements for friction ratings as defined in the table below and as indicated on the *LDOTD AML (*formerly 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 less than 30

2.2 AGGREGATES FOR PORTLAND CEMENT CONCRETE

A. **General:** Use aggregates from the Approved Materials List in Portland cement concrete and mortar.

B. **Fine Aggregate for Portland Cement Concrete and Mortar:** Use natural silica sand. For fine aggregate used in all Portland cement concrete except Types B and D gradations, conform to the following gradations:

Gradation for Fine Aggregate for Portland Cement Concrete	
U.S. Sieve Size	**Percent Passing by Weight**
3/8 Inch	100
No. 4	95-100
No 16	45-90
No. 50	7-30
No. 100	0-7
No. 200	0 – 3
Gradation for Mortar Sand	
U.S. Sieve Size	**Percent Passing by Weight**
No. 4	100
No. 8	95-10
No. 100	0-25
No. 200	0-10

C. ***Uncrushed Coarse Aggregate***: For uncrushed coarse aggregate used in all Portland cement concrete except Types B and D gradations, use material which complies with the following:

Gradation for Uncrushed Coarse Aggregate for Portland Cement Concrete			
U.S. Sieve Size	**Size 57M**	**Size 89M**	**Size 67**
2 – ½ Inch	--	--	--
2 Inch	--	--	--
1 – ½ Inch	100	--	--
1 Inch	90-100	--	100
¾ Inch	--	100	90-100
½ Inch	25-60	90-100	--
3/8 Inch	--	--	20-55
No. 4	0-10	15-60	0-10
No. 8	0-5	0-30	0-5
No. 16	--	0-5	--
No. 200	0-1	0-1	0-1

D. Crushed Coarse Aggregate: For crushed coarse aggregate used in all portland cement concrete, except Types B and D gradations, comply with the uncrushed coarse aggregate gradations for uncrushed coarse aggregate, except that when the material finer than the No. 200 sieve consists of the dust fraction from crushing, essentially free of clay, this percentage is limited be 0-2 percent. When the total material passing the No. 200 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.

E. Portland Cement Concrete Aggregates – Combined Gradations: For the combined aggregates for the proposed Portland cement concrete combined gradation mix, the percent retained based on the dry weight of the total aggregates must meet the requirements below for the type of concrete specified in in the Master Proportion Table for Portland Cement Concrete. Sample and test each type of aggregate stockpile to be used in the proposed mixture individually. Mathematically determine the percent of total combined aggregates retained using the proportions of the combined aggregate blend. Base all gradation calculations on percent of dry weight.

U.S. Sieve Size	**Percent Retained of Total Combined Aggregates**	
	Gradation Type	
	Type B	**Type D**
2 – ½ Inch	0	0
2 Inch	0	0-20
1 – ½ Inch	0-20	0-20
1 Inch	0-20	5-20
¾ Inch	5-20	5-20
½ Inch	5-20	5-20
3/8 Inch	5-20	5-20
No. 4	5-20	5-20
No. 8	5-20	5-20
No. 16	5-20	5-20
No. 30	5-20	5-20
No. 50	0-20	0-20
No. 100	0-20	0-20
No. 200	0-5	0-5
Note. For the sieves in the shaded areas, the sum of any two (2) adjacent sieves must be a minimum of 12 percent of the total combined aggregates.		

2.3 PUMPED RIVER SAND

A. Comply with the General Requirements for Aggregates. Use a Mississippi River pumped sand. Use a pumped river sand which is classified as AASHTO A-4 or better when classified in accordance with *DOTD TR 423.* Use a material having a maximum plasticity index of 6. Use material free of trash, weeds, lumps, humus, or any other deleterious material per the General Requirements for Aggregates. Provide material with a group index number not to exceed 6.

PART 3 -- EXECUTION

3.1 GENERAL

A. Execution requirements for aggregates are contained within the specific specifications sections for the WORK into which the aggregates are being incorporated.

- END OF SECTION -

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SECTION 02200 - EARTHWORK

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. Perform earthwork indicated and required for construction of the WORK, complete and in place, in accordance with the Contract Documents.

1.2 REFERENCE STANDARDS

A. **ASTM International (ASTM)**

ASTM D1140	*Standard Test Methods for Amount of Material in Soils Finer Than the No. 200 (75-um) Sieve*
ASTM D2487	*Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)*
ASTM D2974	*Standard Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils*
ASTM D3787	*Standard Test Method for Bursting Strength of Textiles Constant-Rate-of-Traverse (CRT) Ball Burst Test*
ASTM D4491	*Standard Test Methods for Water Permeability of Geotextiles by Permittivity*
ASTM D4253	*Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table*
ASTM D4254	*Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density*
ASTM D4632	*Standard Test Method for Grab Breaking Load and Elongation of Geotextiles*
ASTM D4751	*Standard Test Methods for Determining Apparent Opening Size of a Geotextile*
ASTM D4533	*Standard Test Method for Trapezoid Tearing Strength of Geotextiles*
ASTM D4833	*Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products*
ASTM G154	*Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials*

B. **Louisiana Department of Transportation and Development (LDOTD)**

LDOTD AML	*Approved Materials List*
TR 401	*The Determination of In-Place Density*
TR 407	*Mechanical Analysis of Soils*
TR 411	*Dry Preparation of Disturbed Samples for Test*
TR 413	*Organic Material in Soil*
TR 415	*Field Moisture-Density Relationships*
TR 418	*Moisture - Density Relationships*
TR 423	*Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes*

TR 428 *Determining the Atterberg Limits of Soils*

TR 430 *Determination of pH Value of Water or Soil*

1.3 CONTRACTOR SUBMITTALS, SAMPLING, AND TESTING

A. Provide submittals, samples for testing, and testing of materials in accordance with Section 01010 – General Requirements and Section 01030 – Submittals, Sampling and Testing Plan.

1.4 QUALITY ASSURANCE

A. Locate, select, deliver, and place material conforming to specification requirements and requirements shown on the drawings. Control all processes, perform testing and make adjustments as necessary to result in a uniform product meeting all the requirements of the drawings and specifications.

B. Excavation, pile driving, shoring installation and removal and sheet pile installations may cause vibrations that may affect existing residences or underground utilities in the vicinity of WORK. Control particle velocities during the installation of and removal of shoring.

C. **Soil Usage and Classification**: Soils will be classified and tested in accordance with *DOTD TR 423, TR 428, TR 413, TR 407,* and *TR 430.*

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products for earthwork as recommended by the supplier of the materials and as specified herein. Prevent unwanted mixing or segregation of material stockpiles.

PART 2 -- PRODUCTS

2.1 SOIL USAGE

A. Do not blend soils which do not meet Liquid Limit or Plasticity Index 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 USABLE SOILS

A. Furnish natural soils that have a maximum plasticity index (PI) of 25 and a maximum organic content of 5 percent when classified. Soils with a silt content of 50 percent or greater and also a PI of 10 or less when classified will not be allowed.

2.3 SELECTED SOILS

A. Furnish natural soils with a maximum plasticity index (PI) of 20, maximum liquid limit of 35, and a maximum organic content of 5 percent. Soils with a silt content of 50 percent or greater and a PI of 10 or less will not be allowed.

2.4 PLASTIC SOIL BLANKET

A. Use of soils having a minimum PI of 11, maximum PI of 35, a maximum silt content of 65 percent, and a pH not less than 5.5 or greater than 8.5, and a minimum organic content of 3 percent. The CONTRACTOR will be allowed to blend organic materials to achieve the minimum 3 percent organic content. Provide material, when in place, that supports a satisfactory stand of grass upon visual inspection. The minimum thickness of the soil blanket will be 12 inches. Obtain inspection and acceptance of areas requiring a plastic soil blanket prior to placement of the plastic soil blanket. After materials are placed and spread, remove all lumps, stones, roots and other foreign matter from the area. Spread soil blanket material and rolled in a manner that leaves a uniform surface. Any remaining ridges or grooves, including cleat tracks from the dozer, will be parallel to the roadway during the period of time between placement and seeding.

2.5 NON – PLASTIC EMBANKMENT

A. Construct non – plastic embankments of aggregate material as specified in Section 02003 – Aggregates.

2.6 BACKFILL FOR DRAINAGE AND UTILITY PIPING AND DUCT BANKS

A. Use pumped river sand for backfill of all drainage and utility piping and duct banks. Top all backfill with a minimum of 3" of topsoil.

2.7 TOPSOIL

A. When available, use existing surface soil that has been stripped and stockpiled. When additional topsoil is required beyond the available topsoil from the stripping operation, provide topsoil material delivered and amended as recommended by soil tests. Obtain and pay for soil tests prior to delivery of topsoil to the site to determine the quantities and type of soil amendments required to meet local growing conditions for the seed species provided. Test delivered topsoil, existing soil in smooth graded areas, and stockpiled topsoil for particle size, pH, organic content, textural class, chemical composition and soluble salts. Provide topsoil which is free from slag, cinders, stones, lumps of soil, sticks, roots, trash or other material over 1 ½ inches diameter. Use topsoil which is free from viable plants and plant parts. Use material which be free from debris, noxious weeds, toxic substances, or other materials harmful to plant growth. Use topsoil with a a minimum PI of 4, a maximum PI of 12, a pH of 5.5-8.0, a minimum organic content of 2 percent. Provide material that is capable of supporting adequate vegetation.

B. Deliver soil amendments to be blended with the topsoil to the site either in the original, unopened containers bearing the manufacturer's chemical analysis, or in bulk. Provide a chemical analysis 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, provide such amendments at no additional cost to the OWNER.

2.8 MATERIALS FOR SHEETING, SHORING, AND BRACING

A. Where wood is used for sheeting, shoring and sheeting, use green, rough cut hardwood (i.e. oak or hickory). Use lumber with a minimum thickness of 2 inches for all planking, sheeting and foundation lumber. Assume responsibility for the design and installation of all wood sheeting unless wood shoring is indicated on the plans.

B. Where steel sheet piling is used for sheeting, shoring and bracing, use steel sheet piling of a continuous interlock design. Use sheet piling m in good condition and of a water tight interlocking connection, which will retard the infiltration of ground water. Provide cofferdams when constructing wet wells at pump station sites. Assume responsibility for and pay all costs for the for the design and installation of all cofferdams as a part of the WORK.

C. Where trench boxes and shields are used for sheeting, shoring and bracing, use boxes in in good, sound condition which comply with all applicable OSHA requirements. Install, use, and remove of trench shields or accordance with the manufacturer's recommendations and in such a manner as to prevent damage to adjacent embankments, utilities, pavements, or other improvements. Assume responsibility and pay all costs for the design and installation of all trench boxes or shields as a part of the WORK. Depict the use of such implements within the CONTRACTOR's sheeting, shoring and bracing plan.

2.9 SHEET PILES

A. **Permanent Sheeting:** Where required in the Contract Documents, place permanent sheeting of the design indicated on the drawings. Use new sheeting and provide receive protective coatings as specified herein.

B. **Temporary Sheeting:** Where the drawings require temporary sheeting to facilitate the sequence of construction and/or maintain existing facilities in operation, the drawings will indicate the required design criteria for sheeting. Assume full responsibility for the design and details of the sheeting. Submit details of temporary sheeting design and details to the ENGINEER. Use new or used sheeting. Protective coatings are not required for temporary sheeting. Remove temporary sheeting when no longer required, however, when impractical to remove or when indicated to remain in the drawings, leave the temporary sheeting in place.

C. **Sheeting, Shoring, and Bracing:** Where neither permanent nor temporary sheeting is shown on the Drawings, but is required for the CONTRACTOR to meet its obligations for

excavation safety. Assume full and complete responsibility for the design and details of the sheeting. Use new or used sheeting with or without protective coatings. Remove unless otherwise approved by the ENGINEER.

PART 3 -- EXECUTION

3.1 GENERAL

A. Except when specifically provided to the contrary, excavation includes the removal of materials, including obstructions that would interfere with the proper execution and completion of the WORK. Conform to the lines and grades indicated or ordered. Unless otherwise indicated, the strip the entire site of vegetation and debris and grub the entire site. Remove such material from the Site prior to performing any excavation or placing any fill.

3.2 SHEETING, SHORING, AND BRACING

A. Furnish, place, and maintain supports and shoring that may be required for the sides of all excavations regardless of type. Assume full responsibility for the stability and safety of all excavations, regardless of type.

B. Slope or otherwise support excavations in a safe manner in accordance with applicable State safety requirements and the requirements of *OSHA Safety and Health Standards for Construction (29CFR1926*). In accordance with *OSHA Safety and Health Standards for Construction,* excavations less than five (5) feet in depth will not require protective systems if a competent person under the employ of the CONTRACTOR has examined the excavation and found no danger of a potential cave in.

C. Confine limits of all excavations to the right – of – way. Do not allow the limit of any excavation, shoring implement, excavation slopes, or excavation steps to encroach upon private property without a written agreement with the property owner.

D. 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. Remove and exclude water, including storm water, groundwater, irrigation water, and wastewater, from excavations. Use dewatering wells, well-points, sump pumps, or other means 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. Remove and exclude water from excavations 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, excavate to the depth indicated, and install backfill to the grade indicated.

B. **Not Indicated:** When ordered to over-excavate areas deeper and/or wider than required by the Contract Documents, over-excavate to the dimensions ordered and backfill to the indicated grade.

C. **Neither Indicated nor Ordered:** Backfill any over-excavation carried below the grade ordered or indicated to the required grade with granular material or non – plastic embankment as part of the WORK.

3.5 DISPOSAL OF EXCESS MATERIAL

A. Unless otherwise indicated, take possession of and dispose of excess material. Assume full responsibility for the removal and disposal of excess excavated material. Dispose of material of 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 DRAINAGE AND UTILITY PIPELINE EXCAVATION

A. **General:** Unless otherwise indicated or ordered, install pipelines and utilities within open-cut trenches with minimum widths as indicated.

B. **Trench Bottom**: Except where pipe bedding is required, excavate the bottom of the trench uniformly to the grade of the bottom of the pipe. Make excavations for pipe bells and welding as required. Where pipe bedding is required, the bottom of the trench uniformly to the grade of the bottom of the pipe bedding.

C. **Open Trench**: The maximum amount of open trench permitted in any one location is 500-feet or the length necessary to accommodate the amount of pipe installed in a single Day, whichever is greater. Fully backfill trenches at the end of each day or, in lieu thereof, cover trenches by heavy steel plates adequately braced and capable of supporting vehicular traffic in those locations where it is impractical to backfill at the end of each Day. These requirements for backfilling or use of steel plate will be waived in cases where the trench is located further than 100-feet from any traveled roadway or occupied structure. In such cases, however, provide and maintain barricades and warning lights meeting appropriate safety requirements.

D. Where pipelines are to be installed in embankments, fills, or structure backfills, construct the fill to a level at least one-foot above the top of the pipe before the trench is excavated. Upon completion of the embankment or structural backfill, excavate a trench conforming to the appropriate detail and install the pipe.

E. Where moveable trench shield is used during excavation operations, excavate the trench width slightly wider than the shield so that the shield is free to be lifted and then moved horizontally without binding against the trench sidewalls and causing sloughing or caving of the trench walls.

F. If a moveable trench shield is used during excavation, pipe installation, and backfill operations, move the shield by lifting the shield free of the trench bottom or backfill and then moving the shield horizontally. Do not drag trench shields along the trench causing damage or displacement to the trench sidewalls, the pipe, or the bedding and backfill.

3.7 DRAINAGE AND UTILITY PIPELINE AND DUCT BANK BACKFILL AND COMPACTION

A. Prior to backfilling, remove and reinstall or replace pipes found to be damaged or out of alignment or grade as directed by the ENGINEER.

B. Backfill all pipelines and duct banks with pumped river sand. Place and compact backfill as specified below.

C. **Placement and Compaction:**

1. If the top of pipe is even with or below the top of the trench, bring up backfill material up evenly on both sides of pipe for its full length to an elevation of 12 inches (300 mm) above the top of pipe or to subgrade if less than 12 inches (300 mm) or to natural ground elevation, whichever is greater.

2. When the top of the pipe is above the top of the trench, bring up backfill material evenly on both sides of pipe for its full length to 12 inches (300 mm) above the top of pipe or to subgrade if less than 12 inches (300 mm). Use backfill material in the trench and above the top of the trench for a distance on each side of the pipe equal to the horizontal outside diameter for corrugated metal or plastic pipe and 18 inches (450 mm) for concrete pipe, and to 12 inches (300 mm) above the top of pipe or to subgrade if less than 12 inches (300 mm).

3. Unless otherwise authorized by the ENGINEER where headroom is limited, construct embankment to a minimum of 24 inches (600 mm) over the pipe before heavy construction equipment is allowed to cross the installation. Where practical, construct installations with less than 24 inches (600 mm) of cover over the top of the pipe after heavy hauling is completed over the pipe location. After completion of hauling operations, remove excess cover material. Remove and reinstall, or replace pipe damaged by hauling and backfilling operations at no additional cost to the OWNER as directed by the ENGINEER.

D. **Backfill Methods**: Compaction of backfill for drainage pipe as indicated below. Compaction by flooding will not be allowed unless authorized by the ENGINEER.

1. Place backfill; at or near optimum moisture content determined in accordance with *DOTD TR 415* or *TR 418*. Thoroughly compact material under the haunches of the pipe and then compact material in layers not exceeding 12 inches compacted thickness. Compact each layer by approved methods to at least 95 percent of

maximum dry density prior to placement of a subsequent layer. Cover exposed slopes at the pipe ends by at least 12 inches (300 mm) compacted thickness of plastic soil blanket.

3.8 TOPSOIL

A. Scarify areas to receive topsoil as directed. Spread topsoil uniformly over the areas to a depth of 3 inches and roll to a uniform surface with a cultipacker or other suitable equipment.

- END OF SECTION -

SECTION 02201 - SITE PREPARATION

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. Provide all WORK necessary for CONTRACTOR's initial move onto the Site; inspection of the Site, clearing, grubbing and stripping; and development of construction site access.

1.2 REFERENCE STANDARDS

A. Commercial Standards:

AAN	American Association of Nurserymen

B. Louisiana Department of Transportation and Development

Quality Assurance Specifications for Embankment and Base Course

1.3 CONTRACTOR SUBMITTALS, SAMPLING, AND TESTING

A. Provide submittals, samples for testing, and testing of materials in accordance with Section 01010 – General Requirements and Section 01030 – Submittals, Sampling and Testing Plan.

1.4 QUALITY CONTROL

A. NOT USED

1.5 DELIVERY, STORAGE, AND HANDLING

A. NOT USED

PART 2 -- PRODUCTS

2.1 BACKFILL

A. Use material in accordance with Section 02200 – Earthwork.

PART 3 -- EXECUTION

3.1 SITE INSPECTION

A. Prior to moving onto the Site, inspect the Site conditions and review maps of the existing site, existing utilities, and facilities or other items delineating the OWNER's property and right-of-way lines.

3.2 PRIMARY CONSTRUCTION SITE ACCESS

A. 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.

3.3 CLEARING AND GRUBBING

A. Clear, grub, and remove vegetation and debris within the limits of the right-of-way and easement areas, except such items that are designated to remain. Cut trees, logs, brush, stumps and debris; excavate and remove stumps, roots, submerged logs, snags, and other vegetative or objectionable material; dispose removed material in an accordance with State, Federal, and local regulations and clean the area.

B. Adhere to the quality assurance requirements specified in the latest edition of the LDOTD publication titled Application of Quality Assurance Specifications for Embankment and Base Course.

C. Implement and maintain temporary erosion control measures in accordance with Section 02204 – Temporary Erosion Control prior to clearing and grubbing.

D. Preserve the items to remain as designated by the engineer. Do not store equipment, materials, and supplies in proximity of items designated to remain. Remove trees and other items without damaging items marked to remain. Repair damage to bark, trunks, limbs, or roots of vegetation marked to remain using horticultural and tree surgery practices published by the American Association of Nurserymen (AAN) under the supervision of a licensed landscape arborist at no cost to the department. Do not fell trees outside of the right-of-way. Assume full responsibility for damage outside the right- of-way caused by the contractor's operations.

E. Clear and grub to the limits of the right-of-way, or to the construction limits, whichever is greater, unless otherwise designated on the plans.

F. When fencing or utility relocation is required, clear and grub an area 10 foot wide, adjacent to and inside the right-of-way line. Mow when required by theengineer.

G. Some loose limbs and roots approximately 2 inch x 2 foot and smaller may be allowed to remain; however, excessive amounts will not be allowed.

H. Do not use explosives.

I. Stump holes and other holes left from clearing and grubbing by blading the area and backfilling with existing materials or select soil as specified in Section 02200 – Earthwork and compact to a condition similar to surrounding soils.

J. **Burning:** If burning is allowed, submit a plan for burning operations to the engineer for review and comment. Do not jeopardize anything designated to remain on the right-of-way, the surrounding forest cover, or other adjacent property when burning. Burn in accordance with all laws and ordinances, including, but not limited to, the current regulations of the Louisiana Department of Environmental Quality and all state, local, and federal requirements. Materials and materials and debris which cannot be burned and materials which are not burned from the right-of-way and disposed of in a legal, permitted facility in accordance with State, Federal, and Local laws.

K. **Merchantable Timber:** Merchantable timber in the area to be cleared, not removed from the right of-way prior to the beginning date stipulated in the Notice to Proceed, becomes the property of the contractor.

L. Remove hanging branches and unsound or unsightly branches on trees or shrubs designated to remain as directed. Trim branches of trees extending over the roadbed to a height of 20 foot above the grade in accordance with accepted horticultural and tree surgery practices published by *AAN*

- END OF SECTION -

SECTION 02202 – DEMOLITION AND REMOVAL OF STRUCTURES AND OBSTRUCTIONS

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. Demolish and remove facilities as indicated. Remove and/or relocate structures and obstructions as indicated, all in accordance with the Contract Documents.

B. 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 will 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 are to be demolished and reconstructed, but auxiliary utilities are not necessarily shown.

C. While demolition and reconstruction are being performed, provide adequate access for the continued operation and maintenance of equipment and other facilities to remain. 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. 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. Provide submittals, samples for testing, and testing of materials in accordance with Section 01010 – General Requirements and Section 01030 – Submittals, Sampling and Testing Plan.

PART 2 -- PRODUCTS **- NOT USED**

PART 3 -- EXECUTION

3.1 **GENERAL**

A. Coordinate demolition and reconstruction WORK with the OWNER and ENGINEER. Unless otherwise indicated, assume full responsibility for the sequence of activities. Perform demolition and relocation WORK in accordance with applicable safety rules and regulations.

B. 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. 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, then obtain approval from the ENGINEER prior to commencing.

D. 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. Inform 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, then 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, carefully survey the existing facilities and examine the Specifications and Drawings to determine the extent of reconstruction and coordination with the WORK. Protect and maintain existing facilities not subject to reconstruction. Repair existing facilities damaged by demolition and removal to the previous condition or replace with new facilities approved by the OWNER and ENGINEER.

B. Afford persons and equipment safe passages around areas of demolition.

C. Do not overload existing or temporary structural elements. Provide shoring, bracing, or adding new supports as may be required for adequate structural support as a result of WORK performed under this Section. Remove temporary protection when the WORK is complete or when so authorized by the ENGINEER.

D. 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, 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:** Remove equipment supports, including concrete pads, baseplates, mounting bolts, and support hangers, where indicated. Repair damage to the existing structure as indicated.

B. **Exposed Piping:** Remove exposed piping including vents, drains, and valves. Where exposed piping penetrates existing floors and walls, remove the piping, including wall thimbles, to a minimum depth of 2-inches. Repair openings in the structure as indicated.

C. **Electrical Control Panels:** Remove electrical control panels, junction boxes, motor control centers, and local switches and push buttons.

D. **Connections:** Remove connections to embedded electrical conduits a minimum of 2-inches inside the finished surface of the existing structure. Remove wiring and repair the resulting openings as indicated.

E. **Pipe**: Remove and store pipe that is to be re-laid so that there will be no loss or undue damage before relaying. Replace sections lost from storage or unduly damaged at no additional cost to the OWNER.

3.4 REMOVING ENVIRONMENTALLY SENSITIVE MATERIALS

A. When removal or remediation of any environmentally sensitive or contaminated sites is required during construction, conduct operations in compliance with applicable laws and regulations. If failure to follow applicable laws and regulations subsequently causes or increases harm or damage to the environment, pay all resulting fines and clean-up costs.

B. When information is available, the plans will indicate which structures contain friable or non-friable asbestos. When a structure is identified on the plans or discovered on the project to contain asbestos and will be demolished or renovated, dispose of all asbestos containing material in accordance with applicable laws and regulations. Use a certified asbestos abatement contractor for proper removal and disposal. Follow all applicable requirements for proper handling of asbestos material for the continued removal of the asbestos containing material. Notify the Department of Environmental Quality (DEQ), Air Quality Division through the use of the proper notification form, DEQ AAC2, at least 10 calendar days prior to initiation of demolition or renovation of structure(s). Maintain and furnish to the ENGINEER, all records pertaining to the disposal of the asbestos containing material, either as non-friable or friable asbestos, within 21 calendar days of the material being removed from the site for disposal.

C. Asbestos containing materials in structures that are removed or relocated without disturbing asbestos will not be abated. Provide a Certificate of Release to the ENGINEER.

D. **Non Friable Asbestos:** When a structure contains non-friable asbestos, carefully remove the asbestos without excessive breakage or crushing before demolition or renovation of the structure. Dispose of the non-friable asbestos material at an approved industrial landfill.

E. **Friable Asbestos:** When a structure contains friable asbestos, request that DEQ provide a confirmation letter with an Asbestos Disposal Verification Form (ADVF). Complete the ADVF within 90 calendar days from the date of issue. Only use contractors or subcontractors certified by DEQ as Asbestos Abatement Entities remove friable asbestos from structures. Remove the asbestos before structure demolition or renovation. Perform friable asbestos removal, handling, and disposal in accordance with the latest requirements for asbestos abatement of the DEQ Air Quality Division. 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.

F. **Contaminated Soils:** Excavate soil in areas of underground fuel tanks or other areas contaminated with petroleum products or other identified toxic materials at levels above the regulatory limits and is nonprotective of groundwater as shown on the plans or as directed. Determination requirements for groundwater protection through the use of the Synthetic Precipitation Leachate Procedure (SPLP) or as directed by the ENGINEER. Remove the overburden above the contaminated soil to the dimensions shown on the plans or as directed. Also, excavate the contaminated soil at the locations shown on the plans or as directed. Excavate contaminated soil determined to be protective of groundwater, through the use of the SPLP place in the roadbed when the soil is determined to be “suitable soil” by the engineer, and when the volume of soil is within quantities specified on the plans. No additional cover of the contaminated soil, other than the specified paved surfaces courses, will be required in the roadbed. Place all remaining contaminated soil determined to be protective of groundwater, but not used in the roadbed, in other embankment areas within the limits of the project. Cover contaminated soil placed in other embankment areas with 2 feet of compacted soil. Maintain final grade in accordance with the plans. Load the contaminated soil determined not to be protective of groundwater into approved hauling vehicles and dispose of in a site approved by the DEQ. Furnish the engineer, within 21 calendar days, Chain of Custody verification records for the contaminated soil. The ENGINEER will verify that all contaminated soil has been removed. While the excavation is open, 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.

G. **Contaminated Fluids:** Remove and dispose of contaminated fluid, in underground fuel tanks, in areas of underground fuel tanks, or other areas as shown on the plans or as directed. The Department will determine the quantity of contaminated fluid to be removed. Pump the contaminated fluid into approved hauling vehicles. Remove contaminated fluid from underground fuel tanks before tank removal. Dispose or recycle of contaminated fluid in a site approved by the Department of Environmental Quality. Furnish the engineer, within 21 calendar days, Chain of Custody verification records for the contaminated fluid. The Department will verify the removal of the contaminated fluid. Removal and disposal of contaminated fluids will be in accordance with all local, state, and federal laws and regulations.

H. **Paint Containing Lead or Other Hazardous Materials:** Remove steel members of structures protected by paint containing lead or other hazardous materials as shown on the plans or as discovered in the field and prepare for transport in accordance with applicable laws and regulations. Prior to removal, transport, treatment, or disposal of any steel members, submit the following to the engineer: 1. Plan of removal or treatment of steel members. 2. Plan for transport of steel members and any hazardous materials. 3. Name and address of the licensed recycling center. Deliver such steel members to a licensed recycling center capable of processing steel members coated with paint identified as hazardous by the Resource Conservation and Recovery Act (RCRA). The DOTD or the Owner will be the Generator and obtain the generator number. The contractor will be responsible for obtaining an approved disposal site, arranging for transporting the material and/all testing required. The manifest for transportation will have the DOTD Generator number on it and should be signed by the contractor, DOTD Inspector, and the Disposal Operator with copies to each upon completion. Unless

otherwise directed or shown on the plans, the contractor will be allowed to retain any steel member once the lead paint has been removed and disposed of prior to steel leaving the jobsite in accordance with procedure above at no cost to the Department. Transport all steel members or hazardous material in accordance with all federal, state, and local laws. Provide Certificates of Disposal, Chain of Custody forms, or other applicable documents within 21 calendar days following each shipment

I. **Treated Timber:** Remove creosoted and other treated timber or lumber shown on the plans or discovered in the field; and prepare for transport by methods approved by the Department. Dispose of all materials that are not designated to be salvaged by the Department or salvaged by the contractor in an appropriate landfill. Provide Certificates of Disposal, Chain of Custody forms, or other applicable documents within 21 calendar days following each shipment.

J. **Universal Wastes:** Universal Universal wastes are hazardous wastes defined in LAC Title 33, Part V, Chapter 38, Section 3813 to include batteries, pesticides, thermostats, lamps and antifreeze. Remove universal wastes, prepare for transport, and dispose of as specified in LAC Title 33, Part V, Chapter 38 and herein. Inform all employees who handle universal wastes of the proper handling and emergency procedures appropriate to the type of waste.

K. **Other Regulated Materials:** Items for removal under this subsection are defined as any material not considered in the above subsections and may be disposed of as a solid waste in the appropriate solid waste landfill. Such materials may include asphalt shingles, noninfectious medical waste, etc. not covered in other items

- END OF SECTION -

SECTION 02204 - TEMPORARY ENVIRONMENTAL CONTROLS

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. Comply with federal, state, and local laws and regulations controlling pollution of the environment, including air, water, and noise.

B. Prevent pollution of waters and wetlands with fuels, oils, asphalts, chemicals, wastewater, chlorinated or chloraminated water, 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 DUST ABATEMENT

A. Prevent operations from producing dust in amounts damaging to property, cultivated vegetation, and domestic animals. Prevent operations from producing dust causing a nuisance to persons living in or occupying buildings in the vicinity of the Site. Assume complete responsibility for any damage resulting from dust originating from its operations. Continue dust abatement measures until relieved of further responsibility by the ENGINEER.

B. **Storage Piles**: 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**: Water active construction areas and unpaved roads as needed and as directed by ENGINEER.

D. **Inactive Areas of Site**: 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**: 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**: Prevent construction materials, including sand, soils, from accumulating on public and private roads.

1. When there is visible track-out onto a paved public road, 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.

2. 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**: Reduce vehicle speeds as required for control of dust if watering of unpaved roads is not sufficient to control dust.

1.4 SEDIMENTATION ABATEMENT FOR WORK DISTURBING LESS THAN ONE ACRE

A. For work disturbing one acre or less, no formal Storm Water Pollution Prevention Plan is required. Collect, store, haul, and dispose of spoil, silt, and waste materials in compliance with federal, state, and local rules and regulations and the Contract Documents.

B. For work disturbing one acre or less, Storm Water Control Measures (SCMs) must be in place. There will be no Notice of Intent (NOI) required. Complete inspection reports and submit copies to ENGINEER.

C. Install and maintain erosion and sediment control measures, such as swales, grade stabilization structures, berms, dikes, waterways, filter fabric fences, and sediment basins.

D. Install and maintain filter fabric barrier systems, if used, in such a manner that surface runoff will percolate through the system in sheet flow fashion and allow sediment to be retained and accumulated.

E. 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. Do not allow sediment to flush into a stream, drainage structure, or drainage way.

F. Maintain erosion and sediment control measures until final acceptance or until directed by the ENGINEER to remove it.

1.5 RUBBISH CONTROL

A. Keep the Site and adjacent areas in a neat and clean condition and free from any accumulation of rubbish. Dispose of rubbish and waste materials of any nature and establish regular intervals of collection and disposal of such materials and waste. Keep haul roads free from dirt, rubbish, and unnecessary obstructions resulting from its operations. Dispose of rubbish and surplus materials 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.

1.6 CHEMICALS

A. When chemicals are used for the WORK or furnished for facility operation, whether defoliant, soil sterilant, herbicide, pesticide, disinfectant, polymer, reactant, or of other classification, use or provide chemicals which show approval of either the U.S. Environmental Protection Agency or the U.S. Department of Agriculture. Use such chemicals and dispose of residues thereof in strict accordance with the printed instructions of the manufacturer.

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION (NOT USED)

- END OF SECTION –

SECTION 02713 – TEMPORARY TRAFFIC CONTROLS

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. Assume the full and sole responsibility for the design, development, and implementation of a temporary traffic control device plan for all phases and portions of the WORK. The traffic control device plan will provide for safe and expeditious movement of traffic and pedestrians through the area of construction.

B. Furnish, install, maintain, and remove temporary construction barricades, lights, signals, pavement markings and signs, and flaggers as indicated in his plan or as directed by the ENGINEER.

C. Furnish and install appropriate signs for special conditions as required or as directed.

D. Requirements for proper signs, barricades, barriers, channelizing devices, or other safety precautions promulgated by the CONTRACTOR's insurers will not be negated by these specifications.

E. Assign one or more authorized Traffic Control Supervisors (TCS) to provide traffic control management for the execution of the WORK. If more than one TCS is assigned, provide a weekly schedule identifying who will be in charge of providing traffic control management on a daily basis. If the CONTRACTOR utilizes a subcontractor to provide traffic control management, ensure that the subcontractor's TCS meet all requirements set forth herein.

1.2 REFERENCE STANDARDS

A. American Traffic Safety Services Association (ATSSA)

ATSSA	Quality Guidelines for Temporary Traffic Control Devices and Features

B. ASTM International (ASTM):

ASTM B209	Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate
ASTM D4956	Standard Specification for Retroreflective Sheeting for Traffic Control

C. Federal Highway Administration (FHWA):

MUTCD	Manual for Uniform Traffic Control Devices

D. Louisiana Department of Transportation and Development (LDOTD):

AML	Approved Materials List
TTC-00 (C)	Temporary Traffic Control General Notes
TTC-00 (D)	Layout for Placement of Road Work Next "XX" Miles and End Road Work Signs
TTC-01	Layout for Work Less than 15 Feet from the Traveled Way
TTC-02	Layout for Work Less than 15 Feet from the Traveled Way
TTC-03	Layout for Lane Closures on Two Lane Roads with Two Way Traffic Less Than 1600 Feet from Intersection
TTC-04	Layout for Lane Closures on Two Lane Roads with Two Way Traffic Greater Than 1600 Feet from Intersection
TTC-05	Layout for On - Site Diversion with Two Lane Traffic
TTC-06	Layout for Lane Closure on Four – Lane Undivided Highways
TTC-07	Layout for Lane Closure of Two Adjacent Lanes on Four – Lane Undivided Highways

TTC-08	Layout for Median Crossover on Divided Highways
TTC-09	Layout for One Lane Closure on Divided Highways
TTC-10	Layout for Lane and Sidewalk Closures in Urban Areas with Speed Limit Less than or Equal to 40 Miles per Hour
TTC-11	Layout for Lane Closure Using Temporary Barrier Rail on Divided Highways
TTC-12	Layout for Lane Closures Through Ramp Entrance and Exit Tapers
TTC-13	Layout for Lane Closure of Two Lanes on a Multi – Lane Highway
TTC-14	Layout for "Louisiana Left" on Interstate or Other Divided Highways
TTC-15	Layout for Short Duration Closure of Divided Highways
TTC-16	Layout for Temporary Road Closures
TTC-17	Layout for Moving Operations on Interstate or Other Multi – Lane Roadways
TTC-18	Layout for Moving Operations on Two – Way Two – Lane Roadways
TTC-19	Layout for Traffic Signal Installation and Maintenance at an Intersection

E. National Cooperative Highway Research Program (NCHRP)

NCHRP 350	Recommended Procedures for the Safety Performance Evaluation of Highway Features

1.3 CONTRACTOR SUBMITTALS, SAMPLING, AND TESTING

A. Provide submittals, samples for testing, and testing of materials in accordance with Section 01010 – General Requirements.

B. Submit a traffic control device plan for when work encroaches upon any public roadway, with particular attention to lane closures for deliveries and erection of the WORK. In the plan, provide product information on traffic devices to be utilized in sufficient detail for the ENGINEER to determine compliance with the requirements of these specifications.

1.4 QUALITY CONTROL

A. See Part 3 – Execution for Quality Control Requirements.

1.5 SAMPLING AND TESTING

A. 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.

PART 2 -- PRODUCTS

2.1 GENERAL

A. Use Category I, II, and III portable work zone traffic control devices that are crashworthy as determined by evaluations through NCHRP 350 for Test Level 3.

1. Category 1 Devices: Category I devices are low mass, single piece traffic cones, tubular markers, single piece drums and flexible delineators and are, by definition, considered crashworthy devices meeting NCHRP 350 Criteria for Test Level III. Drum and light combinations with Type A or C warning lights and fastener hardware consisting of vandal-resistant ½ inch diameter cadmium plated steel bolts and nuts used with 1 1/2 inch diameter by ¾ cup washers are included as Category I devices. In lieu of testing for crashworthiness, acceptance of Category I devices for compliance with NCHRP 350 will be allowed based upon self – certification by the supplier. Certify that the product is crashworthy in accordance with the evaluation

criteria of NCHRP 350. Certification may be a one – page affidavit signed by the supplier, with supporting documentation kept on file to be furnished if requested.

2. Category 2 Devices: Category II devices include other low mass traffic control devices such as portable barricades, either with or without lights and/or signs, portable sign stands, portable vertical panel assemblies, and drums with lights not meeting the drum and light combination requirements for Category I. Individual crash testing is required for Category II devices. FHWA letters of approval wo;; serve as verification that these devices comply with the crash testing requirements of NCHRP Report 350, Test Level III. Provide to the ENGINEER a listing of all the Category II Devices to be used, including a reference to the FHWA Work Zone letter number for each device. Certify that each device has been crash tested and meets the NCHRP 350 requirements.

3. Category 3 Devices: NOT USED

2.2 BARRICADE WARNING LIGHTS

A. Provide Type A, B, and C barricade warning lights in compliance with the MUTCD. Use only approved products listed on the Louisiana Department of Transportation and Development Approved Materials List.

2.3 DRUMS, CONES, AND TUBULAR MARKERS

A. **Drums and Super Cones:** Use approved products listed on the LDOTD AML. Use devices with a design complying with LDOTD TTC-00 (C). Use reflective sheeting for drums and super cones that is a minimum of six inches wide and wich meets the requirements of ASTM D4956, Type III, and the Supplementary Requirement S2 for reboundable sheeting as specified in ASTM D4956. Use sheeting which is an approved material listed on the LDOTD AML.

B. **Traffic Cones:** Use traffic cones of a design comply with LDOTD TTC-00 (C). Use reflective sheeting for cone collars which is minimum of six inches wide and which meets the requirements of ASTM D4956, Type IV. Use sheeting for plastic traffic cones which is an approved material listed on the LDOTD AML. Use cones that are a minimum of 36 inches in height.

C. **Tubular Markers**: Use markers that comply with LDOTD TTC-00 (C). Use reflective sheeting for tubular markers meeting the requirements of ASTM D4956, Type III. Use sheeting for tubular markers which is an approved material listed on the LDOTD AML. Use tubular markers that are a minimum of 28 inches in height.

2.4 TEMPORARY SIGNS, VERTICAL PANELS & BARRICADES

A. **General:** Provide signs which comply with the MUTCD, the LDOTD Temporary Traffic Control Standards, and the CONTRACTOR's traffic control device plan. The design of temporary barricades and vertical panels must comply with LDOTD TTC – 00 (C). Only Type III barricades will be allowed. Use vertical panels complying with LDOTD TTC – 00 (C).

B. **Substrate:** Use either wood or rigid thermoplastic for barricade panels. Use aluminum, wood, or plastic for portable signs. Use be aluminum, wood, rigid thermoplastic, or aluminum clad low density polyethylene plastic for post mounted signs.

1. **Aluminum:** Use 0.080-inch thick sheeting complying with ASTM B209, Alloy 6061-T6 or Alloy 5052-H38.

2. **Wood:** Use plywood sheeting of exterior type grades High Density Overlay or Medium Density Overlay. Use panels that areminimum of 5/8-inch thick and which comply with the latest American Plywood Association specifications and which are identified with the APA edge mark or back stamp to verify inspection and testing. Prior to application of the reflective sheeting, sand the surface with steel wool or fine sandpaper and wiped thoroughly clean. Allow the panels to dry for eight (8) hours prior to the application of sheeting. Seal the cut edges of plywood panels with aluminum pigmented polyurethane sealer.

3. **Plastic:** When used, plastic substrate for barricade panels and signs must comply with the following:

a. **Fiber Reinforced Vinyl (PVC):** Use a substrate of a nominal composite thickness of 0.04 inches and bonded to an approved retroreflective material by the manufacturer.

b. **Rigid Thermoplastic**: Use rigid thermoplastic substrate consisting of either High Density Polyethylene (HDPE) or High Density Polycarbonate (HDPC). Use either hollow core HDPE or HDPC with a minimum thickness of 0.625-inch thick blow molded substrate. Use either 0.4000inch thick thin wall, fluted substrate or 0.625-inch thick blow molded substrate. Use substrate sufficiently rigid to maintain a flat face and which is capable of attachment to the sign mounting in such a manner as not to crush or otherwise deform the substrate. Reflectorized sheeting applied to rigid thermoplastic with its manufacturer's approval for use on the substrate.

c. **Aluminum Clad Low Density Polyethylene (AL/LDPE) Plastic:** Use aluminum clad low density polyethylene plastic which is a minimum of 0.080- inch thick. Use sufficiently rigid substrate to maintain a flat face and which is capable of attachment to the sign mounting in such a manner as not to crush or otherwise deform the substrate. Reflectorized sheeting applied to aluminum clad low density polyethylene must have its manufacturer's approval for use on the substrate.

C. **Reflective Sheeting:** Use an approved material listed on the LDOTD AML, and whic complies with the requirements of ASTM D4956, Type III. On the main line of freeways and expressways, fabricate the initial advance warning sign using sheeting complying with the requirements of ASTM D4956, Type X (Fluorescent Orange).

PART 3 -- EXECUTION

3.1 GENERAL

A. Ensure temporary signs, barricades, and related devices are in place when the WORK is in progress or when work is suspended. During such times that temporary signs, barricades, and related devices are not in place, maintain appropriate existing regulatory signs. Do not begin until signs, barricades, and other devices have been erected.

B. When signs to be furnished and erected by the CONTRACTOR are in place, ensure the CONTRACTOR's Traffic Control Supervisor (TCS) covers any standard signs that are in conflict with the temporary signs.

C. Coordinate with the ENGINEER in covering OWNER's signs or signs owned by other entities so that all appropriate signs remain in place.

D. Maintain temporary signts, supplemented by other signs as required, throughout the execution of the WORK. When previously used signs are to be utilized on the project, the ENGINEER will review and approve these signs prior to installation. The ENGINEER will require any sign with reduced reflectivity or excessive fading to be removed from the work zone. In the case of a dispute over a rejected used sign, the ENGINEER may at his discretion require measurements to be taken or review reflectivity or color data obtained by the CONTRACTOR to determine if the sign meets minimum standards for new materials. Replace signs that do not meet the minimum standards for new materials.

E. Signs, barricades, and related devices furnished and placed by the CONTRACTOR remain property of the CONTRACTOR.

F. When a work area has been established on one side of the roadway only, do not allow conflicted operations or parking on the opposite shoulder within 500 feet of the work area.

G. Do not park vehicles or unattended equipment, or store of materials within the clear zone. If the clear zone is not defined on the plans, the ENGINEER will inform the CONTRACTOR of the clear zone.

H. Consider sight distance and vertical curvature when placing traffic control devices.

I. **Advanced Warning Area and Flashing Arrow Board:** When specified, provide advance warning arrow panels for temporary traffic control. Use one of the specified types complying with the MUTCD. If none is specified, Provide Type C panels. Use flashing arrow boards that are 4 feet by 8 feet.

3.2 MINIMUM REQUIREMENTS FOR TRAFFIC CONTROL SETUP

A. General: Minimum traffic control devices shown on reference standards are the minimum. Assume the full responsibility to ensure that appropriate devices are employed and maintained during the duration of construction.

B. Minimum Traffic Control Device Layout for various construction situations are to be as indicated in the table below. These minimum requirements are the minimum required, assume the full and sole responsibility to supplement the minimum arrangements as required. The use of these minimum layouts does not relieve the CONTRACTOR from the responsibility of submitting a traffic control device plan sealed by a licensed professional engineer.

Minimum Requirement	Reference Layout
Layout for Placement of Road Work Next "XX" Miles and End Road Work Signs	LDOTD TTC – 00 (D)
Layout for Work Less than 15 Feet from the Traveled Way	LDOTD TTC – 01
Layout for Work Less than 15 Feet from the Traveled Way	LDOTD TTC – 02
Layout for Lane Closures on Two Lane Roads with Two Way Traffic Less Than 1600 Feet from Intersection	LDOTD TTC – 03
Layout for Lane Closures on Two Lane Roads with Two Way Traffic Greater Than 1600 Feet from Intersection	LDOTD TTC – 04
Layout for On - Site Diversion with Two Lane Traffic	LDOTD TTC – 05
Layout for Lane Closure on Four – Lane Undivided Highways	LDOTD TTC – 06
Layout for Lane Closure of Two Adjacent Lanes on Four – Lane Undivided Highways	LDOTD TTC – 07
Layout for Median Crossover on Divided Highways	LDOTD TTC – 08
Layout for One Lane Closure on Divided Highways	LDOTD TTC – 09
Layout for Lane and Sidewalk Closures in Urban Areas with Speed Limit Less than or Equal to 40 Miles per Hour	LDOTD TTC – 10
Layout for Lane Closure Using Temporary Barrier Rail on Divided Highways	LDOTD TTC – 11
Layout for Lane Closures Through Ramp Entrance and Exit Tapers	LDOTD TTC – 12
Layout for Lane Closure of Two Lanes on a Multi – Lane Highway	LDOTD TTC – 13
Layout for "Louisiana Left" on Interstate or Other Divided Highways	LDOTD TTC – 14
Layout for Short Duration Closure of Divided Highways	LDOTD TTC – 15
Layout for Temporary Road Closures	LDOTD TTC – 16
Layout for Moving Operations on Interstate or Other Multi – Lane Roadways	LDOTD TTC – 17

Layout for Moving Operations on Two – Way Two – Lane Roadways	LDOTD TTC – 18
Layout for Traffic Signal Installation and Maintenance at an Intersection	LDOTD TTC – 19

3.3 DROP – OFFS

A. Provide minimum temporary traffic control devices for Drop – offs as indicated on LDOTD TTC-00 (C)

3.4 CHANNELIZING DEVICES

A. Tubular markers, drums, super cones, vertical panels, and traffic cones may be utilized as channelizing devices. During nighttime operations, 36 – inch traffic cones will not be allowed.

B. Match retroreflective material pattern used on super cones with that used on drums.

C. Tangent Areas:

1. Standard Spacing: Use spacing as indicated on LDOTD TTC – 00 (C).

2. Daylight Operations: Space drums and super cones at standard spacing. Space all other devices at ½ of standard spacing.

3. Nighttime Operations: Space drums and super cones at standard spacing onyl.

D. Taper Areas:

1. Standard Spacing: Space devices as indicated on LDOTD TTC – 00 (C).

2. Daylight Operations: Space drums and super cones at standard spacing. Space all other devices at ½ of standard spacing.

3. Nighttime Operations: Use only drums at standard spacing.

E. Use Type C Steady Burn Lights on all channelizing devices in the taper and on the first two devices in the tangent at night.

F. Typical channelizing device lateral placement (do not include when it is used as a divider for opposing directions of traffic) is to be two feet off the lane line of the closed lane or two feet off the shoulder.

G. Devices may be adjusted laterally to accommodate ongoing work in the immediate vicinity but must be returned to the closed lane after to work activity has moved.

H. Use the same channelizing devices throughout the entire tangent area.

I. Use the same channelizing devices throughout the entire taper area.

3.5 TYPE III BARRICADES

A. Only Type III Barricades may be utilized.

B. When used for overnight closures, supplement all barricades that are placed in a closed lane or that extend across a highway with two Type B High Intensity lights.

C. When signs and lights are mounted to a barricade, they must meet NCHRP Report 350 and MASH requirements.

D. A truck with a truck – mounted attenuator may be substituted for a barricade when workers are present.

E. Place barricades, at a minimum:

1. At the beginning of a closed lane or shoulder and at 1,000 foot intervals where no active work is ongoing and the lane must remain closed. Place a minimum of two (2) barricades if the lane or shoulder closure is less than 2,000 feet (Place one

barricade at the beginning of the lane closure after the buffer space and place the other in middle of the lane closure);

2. Before each or group of unfilled holes or holes filled with temporary material;

3. Before uncured concrete;

4. In the closed lane on each side of every intersection and crossover (do not block sight distance);

5. In front of piles of material (dirt, aggregate, broken concrete), culverts, and equipment which is near the work zone.

3.6 SIGNS

A. Supplement the first sign or pair of signs that gives a warning about a lane closure during nighttime operations with One Type B high intensity light.

B. Use caution not to damage existing signs which remain in place. Replace any such signs damaged at the cost of the CONTRACTOR.

C. Cover signs with a strong, lightweight material when not applicable. Burlap will not be acceptable for covering signs.

D. When portable sign frames are used, move the portable sign frames to an area inaccessible to traffic and not visible to drives.

E. Left side mounted signs will not be required for roadways with a center left turn lane and for undivided roadways.

F. Vinyl roll up signs may be used if work zone is in place for 12 hours or less, there are no more than 2 lanes in each direction, and if signs meet all size, color, retroreflectivity, and NHCRP 230 Report or MASH requirements.

G. One foot portable sign stands may be used if work zone is in place for 12 hours or less, the pre – construction posted speed limit is less than 45 miles per hour, and there are no more than 2 lanes in each direction.

H. Ensure that all signs are visible to the drivers. Ensure that no obstructions such as on – street parking or other traffic control devices block the sign.

I. On divided highways, place signs on the right and the left.

J. Sign Posts:

1. Mount signs measuring 10 square feet or less on 1 rigid post.

2. Mount signs measuring over 10 square feet on two (2) rigid posts.

3. Mount igns measuring over 20 square feet on at least three (3) rigid posts.

4. Observe and comply with allowable lap splices for U – channel posts be as indicated on LDOTD TTC -00 (C).

K. Observe sign height and offset from roadway as indicated on LDOTD TTC – 00 (C).

3.7 FLAGGING

A. Use qualified flaggers. Assume full and sole responsibility for training or assuring that all flaggers are qualified to perform flagging duties.

B. A qualified flagger is one that has completed courses such as those offered by ATSSA, Association of General Contractors, or other courses as approved by the LDOTD Work Zone Task Force.

C. Use a minimum 18-inch octagonal shape sign on minimum 6-foot stop/slow paddle and wear ANSI Class 2 Lime Green Vest during daytime operations and ANSI Class 3 Lime Green Ensemble during night operations.

D. In all flagging operations, the flagger must be visible from the flagger advance warning sign.

3.8 FLASHING ARROW BOARDS

A. Flashing arrow boards should be placed on the shoulder. When there is no shoulder or median area, place the arrow board within the closed lane behind the channelizing devices and as close to the beginning of the taper as practical.

B. Delineate flashing arrow boards with retroreflective devices.

C. Do not encroach the arrow board upon the traveled way. When flashing arrow boards are not in use, shield the arrow board by a guard rail or barriers or remove the arrow board.

D. Only use arrow boards for lane reduction tapers and do not use arrow boards for lane shifts.

3.9 DUTIES OF THE TRAFFIC CONTROL SUPERVISOR (TCS)

A. The CONTRACTOR's TCS's responsibility is traffic control management, and the TCS must be available to the ENGINEER to address traffic control issues as required. The following is a listing the primary responsibilities of the CONTRACTOR's TCS:

1. Personally provide traffic control management and supervision services at the site of the WORK. The TCS may have other duties, but be readily available at all times to provide TCS duties as required. Ensure that a minimum of one TCT is present on site during all times when equipment or vehicles related to the WORK of this project are operated on any public roadway.

2. Assume responsibility for observing and evaluating both the day and night time performance of all traffic control devices installed on the project, in accordance with the traffic control plan to ensure that the devices are performing effectively as planned for both safety and traffic operations. Do this upon the initial installation of traffic control devices and when any modifications and/or changes are made, in addition to regular inspection requirements as specified herein.

3. Assume the responsibility for the training of flagging personnel. Ensure that all flagging is in compliance with the MUTCD, Part VI and the Louisiana Work Zone Traffic Control Details.

4. Coordinate all traffic control operations for the duration of the contract, including those of subcontractors, utility companies, and suppliers, to ensure that all traffic control is in place and fully operational prior to the commencement of any work. The ENGINEER recognizes that the TCS does not have direct control over the traffic control operations of utility companies. The coordination required by the TCS when dealing with utility companies is specifically for the purpose of coordinating concurrent utility traffic control with any other construction traffic control to avoid conflicts.

5. Coordinate, in writing, all project activities with the appropriate law enforcement, fire control agencies, and other appropriate public entities as determined at the pre – construction conference. Invite the above agencies to the pre – construction conference.

6. Prepare and submit statements concerning road closures, delays, and other project activities to the OWNER or ENGINEER when directed by the ENGINEER.

7. Assume responsibility for notifying the ENGINEER or all vehicular accidents and/or incidents related to the project traffic control. Document the time and date of the notification in the traffic control diary. Monitor and document queues that occur.

8. Attend the pre – construction conference and all project meetings.

9. Assume the responsibility for the maintenance, cleanliness, and removal of traffic control plan during working and non – working hours.

B. **Traffic Control Diary:** Maintain a project traffic control diary in a bound book. Obtain sufficient number of the diaries from the Louisiana Association of General Contractors (LAGC). Keep the traffic control diary on a daily basis and sign each daily entry. Make entries in ink, and there ensure there are no erasures or white – outs. Strike out erroneous entries and replace with the correct text. Photographs and videotapes may be used to supplement written text. Make the diary available at all times to the ENGINEER and submit a copy to the ENGINEER on a monthly basis. Failure to submit the diary will

result in requests for payments being withheld until the past due copies of the diary are submitted. The traffic control diary will become property of the ENGINEER at the completion of the WORK.

C. **Traffic Control Plan Revisions:** Where revisions are made to the traffic control plan, regardless of whether or not the changes were promulgated by the CONTRACTOR, OWNER, or ENGINEER, submit a revised traffic control device plan by the CONTRACTOR.

D. **Inspection of Traffic Control:** Assume responsibilityle for the inspection of all traffic control devices every calendar day that traffic control devices are in use. This inspection may be delegated to the TCT. The “Quality Guidelines for Work Zone Traffic Control Devices” must be used to evaluate the condition of the traffic control devices to determine if acceptable for use. Provide for the immediate repair, cleaning, or replacement of any traffic control devices not functioning as required to ensure the safety or motorists, pedestrians, and construction personnel and/or not meeting the ATSSA standard. Conduct inspection of traffic control devices by the TCS at the beginning and end of each workday, and as directed by the ENGINER during the workday. Inspect the traffic control devices on weekends, holidays, or other non – work days at least once per day. Inspect traffic control devices at least once per week during nighttime periods and the same night after any modifications or changes have been made in the traffic control devices.

E. **Traffic Control Officer:** In some cases, and with the agreement of the ENGINEER, a Traffic Control Officer (TCO) may be utilized onsite where equipment is in or near to a roadway to assist in alerting or directing traffic near the work area. If required by the OWNER, responsibility of payment for the TCO will be the responsibility of the OWNER. If required by the CONTRACTOR’s traffic control plan, responsibility of payment for the TCO is the responsibility of the CONTRACTOR.

3.10 FAILURE TO COMPLY WITH TRAFFIC CONTROL PLAN

A. The ENGINEER may suspend all or part of the CONTRACTOR’s operation(s) for failure to comply with the reviewed traffic control plan or for failure to correct unsafe traffic conditions within a reasonable period of time after such notification is gien to the CONTRACTOR in writing.

B. In the event that the CONTRACTOR does not take appropriate action to bring the deficient traffic control into compliance with the traffic control plan or to correct unsafe traffic conditions, the OWNER and ENGINEER may employ others to correct the unsafe traffic conditions. Such costs will be deducted from payments due the CONTRACTOR.

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SECTION 02740 – CONSTRUCTION LAYOUT AND SURVEYING

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. 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.

B. This work also includes but is not limited to, the layout of all items of work, and providing assistance in the coordination of utility relocation activities to ensure that the placement of relocated facilities will not conflict with required construction.

1.2 REFERENCE STANDARDS

A. NOT USED

1.3 CONTRACTOR SUBMITTALS, SAMPLING, AND TESTING

A. Provide submittals, samples for testing, and testing of materials in accordance with Section 01010 – General Requirements.

B. Submit the name and licensure information of the surveyor used for elevation control and the FEMA elevation certificate specified within Part 3.

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION

3.1 GENERAL

A. Establish all lines and grades and stake out all work, including sufficient vertical and horizontal points for all necessary operations.

B. Understand the boundaries delineating the OWNER's rights of way or property and other property. Where dimensions are given from property lines along with stationing and offset or coordinates, verify for agreement and report any discrepancies to the ENGINEE.

C. Retain and pay for the services of a licensed professional land surveyor registered in the State of Louisiana to establish one benchmark on or near the project for vertical control.

D. 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.

E. Assume full responsibility for the accuracy of the initial layout and all subsequent alignment and elevations and, 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.

3.2 FLOOD ELEVATION CERTIFICATE

A. Obtain and pay for a FEMA flood elevation certificate indicating the final elevation of the pump motors exceeds the base flood elevation for the area. Retain and pay for a professional land surveyor to provide all field and office work necessary for the preparation of this certificate.

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SECTION 03315 – GROUT

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. Provide grout, complete and in place, in accordance with the Contract Documents

B. The following types of grout are specified in this Section:

1. Non-Shrink Grout - Class I (cement based)
2. Non-Shrink Epoxy Grout

1.2 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

1.3 CONTRACTOR SUBMITTALS, SAMPLING, AND TESTING

A. Provide submittals, samples for testing, and testing of materials in accordance with Section 01010 – General Requirements.

B. Submit product data and mix designs for all grout used in the WORK.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Store grouts in accordance with manufacturer's recommendations.

PART 2 -- PRODUCTS

2.1 APPLICATION

A. Unless indicated otherwise, provide grouts 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 in which the average working or operating temperature will be over 100 degrees F or in high fire risk areas.	Non-Shrink - Class I
Anchor bolts and reinforcing steel required to be set in grout that is not in high temperature or high fire risk areas.	Epoxy Anchor Grout
Storage tanks and other non-motorized equipment and machinery under 30 horsepower	Non-Shrink - Class I
Any application not listed above, where grout is called for on the Drawings or required	Non-Shrink Class I, unless noted otherwise

2.2 NON-SHRINK GROUTS (cement based)

A. **General:**

1. Use 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 may not be used.

2. Ensure that the manufacturer’s instructions are printed on each bag or other container in which the materials are packaged. Use the specific formulation for each class of non-shrink grout indicated herein as recommended by the manufacturer for the particular application.

3. Do not use grout that contains chlorides or additives that may contribute to corrosion.

4. Use grout formulated to be used at any consistency from fluid to plastic.

5. Use cement-based non-shrink grout having 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. Use grout certified for use in a marine environment for grout to be used in a marine environment.

e. Use grout which is certified for use in freeze/thaw environments.

B. **Class I Non-Shrink Grout:**

1. Use non-shrink grout a minimum 28 Day compressive strength of 5000 psi when mixed at a fluid consistency.

2. Use grout meeting the requirements of ASTM C 1107, Grade B or C, when mixed to fluid, flowable, and plastic consistencies.

3. Use grout with a maximum early age height change of 4.0 percent expansion, and with no shrinkage (0.0 percent) in accordance with ASTM C 827 – Test Method for Early Volume Change of Cementitious Mixtures. Use grout which does not bleed or segregate at maximum allowed water.

4. Use grout having 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. **Manufacturers, or Equal: 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. Use a high precision, fluid, extended working time, grout. Use grout with a minimum 28-Day compressive strength of 7500 psi, when mixed at a fluid consistency.

2. Use grout with a maximum early age height change of 4.0 percent expansion, and no shrinkage (0.0 percent) in accordance with ASTM C 827.

3. Use grout having no shrinkage (0.0 percent) and a maximum of 0.3 percent expansion in the hardened state when tested in accordance with ASTM C1090.

4. Use grout having 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. Use grout meeting the requirements of ASTM C 1107, Grade B or C when tested using the amount of water needed to achieve fluid consistency per ASTM C939.

6. Use grout that will not bleed or segregate at maximum allowed water content when tested.

7. Provide certification that its non-shrink property is not based on gas production or gypsum expansion.

8. **Manufacturers, or Equal: Masterflow 928** by **MBT-Chemrex; Five Star Fluid Grout 100** by **Five Star Products; Crystex** by **L&M Construction Chemicals;** or equal.

2.3 NON-SHRINK EPOXY GROUT

A. Use a flowable, non-shrink, 100 percent solids system. Use a grout system having 3 components: resin, hardener, and specially blended aggregate, each premeasured and prepackaged. Use a resin component which does not contain any non-reactive diluents. Resins containing butyl glycidyl ether (BGE) or other highly volatile and hazardous reactive diluents are not acceptable. Variation of component ratios is not permitted unless specifically recommended by the manufacturer. Ensure manufacturer's instructions are printed on each container in which the materials are packaged.

B. Use epoxy grout having a maximum early age height change of 4.0 percent expansion, and having no shrinkage (0.0 percent) in accordance with ASTM C 827, (modified for epoxy grouts by using an indicator ball with a specific gravity between 0.9 and 1.1).

C. Use epoxy grout having a negligible (less than 0.0006 in/in) length change after hardening, and a coefficient of thermal expansion less than 0.00003 in/in F when tested according to ASTM C 531 - Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, and Monolithic Surfacing.

D. Use epoxy grout which will develop a minimum compressive strength of 9000 psi in 24 hours and 13,000 psi in seven days when tested in accordance with ASTM C 579, method B.

E. Use an epoxy grout having a minimum working life of 90 to 120 minutes at 70 degrees F.

F. Use epoxy grout with an effective bearing area of a minimum of 95 percent EBA in accordance with ASTM C 1339 – Standard Test Method for Flowability and Bearing Area of Chemical-Resistant Polymer Machinery Grouts, for bearing area and flow.

G. Use epoxy grout of a chemical formulation recommended by the manufacturer for the particular application. Do not reduce aggregate loading or add solvents to increase flowability.

H. Use epoxy grout having the following minimum properties when tested at 7 Days:

1. Minimum bond strength to concrete of 3000 psi per ASTM C 882 modified.
2. Minimum bond strength to steel of 1700 psi per ASTM C 882 modified.
3. Minimum flexural strength of 2500 psi per ASTM C 580.
4. Minimum tensile strength of 2000 psi per ASTM C 307 -- Standard Test Method for Tensile Strength of Chemical-Resistant Mortar, Grouts, and Monolithic Surfacings.

I. **Manufacturers, or Equal: Five Star DP Epoxy Grout** by **Five Star Products, Inc.; Masterflow 648 CP Plus** by **MBT-Chemrex; Sikadur 42 Grout-Pak** by **Sika Corporation;** or equal.

2.4 CURING MATERIALS

A. For prepackaged grouts, use curing materials as recommended by the manufacturer of prepackaged grouts.

B. For all other grouts, use burlap complying with AASHTO M182, Class 3, or combined burlap and white polyethylene sheeting complying with AASHTO M 171.

2.5 CONSISTENCY

A. Prepare grouts to a consistency 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, use a grout of that consistency. Use the type of grout as indicated herein for the particular application.

B. Adjust the slump for topping grout and concrete/grout fill o match placement and finishing conditions but do not allow the slump to exceed 4-inches.

2.6 MEASUREMENT OF INGREDIENTS

A. Make measurements for cement grout accurately by volume using containers. Do not make shovel measurements.

B. Measure ingredients for prepackaged grouts by means recommended by the manufacturer.

PART 3 -- EXECUTION

3.1 GENERAL

A. Do not place grouts 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, saturate the concrete surface with water for 24 hours prior to placement. Upon completion of the saturation period, remove the excess water with clean, oil free compressed air prior to grouting. Do not place epoxy grouts on wet, moist, or damp concrete substrate.

C. Ensure that surfaces that will be in contact with grout are free of dirt, loose rust, oil, wax, grease, curing compounds, laitance, loose concrete, and other deleterious materials prior to placement of grout.

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.

3.2 GROUTING PROCEDURES

A. **General:** Accomplish the mixing, surface preparation, handling, placing, consolidation, curing, and other means of execution for prepackaged grouts in compliance with the instructions and recommendations of the manufacturer.

B. Grout structural, equipment, tank, and piping support bases, unless indicated otherwise.

1. Block out the original concrete 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, fill the space between the bottom of the plate and the original placement of concrete with non-shrink-type grout through a headbox of appropriate size. Use a mixture of fluid consistency and pour the mixture continuously into the space between the plate and the base concrete. Ensure that forms for grout are tight against retaining surfaces, and seal joints as recommended by the grout manufacturer to be liquid-tight. Coat forms as recommended by the grout manufacturer for easy form release. Where this method of placement is not practical or where required by the ENGINEER, submit alternate grouting methods for acceptance by the ENGINEER.

3.3 CONSOLIDATION

A. Place grout in such a manner, for the consistency necessary for each application, to assure that the space to be grouted is completely filled.

3.4 CURING

A. Cure cement based grouts 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. Furnish, place, and cure Structural Concrete and appurtenant work, formwork, bracing, shoring, supports, falsework, complete and in place, in accordance with the Contract Documents.

B. Conform to requirements of Section 02200 – Earthwork for structural excavation and backfill.

C. Unless otherwise noted, cast structural concrete 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 will be at no additional cost to the OWNER.

D. Standard pre – cast structures include items governed by ASTM C478 or other specific design standard referenced in the drawings or specified elsewhere. Custom designed structures are all other precast structures or pre – cast substitutions for cast – in – place concrete.

1.2 REFERENCE STANDARDS

A. American Concrete Institute (ACI)

ACI 301	Specifications for Structural Concrete for Buildings
ACI 318	Building Code Requirements for Structural Concrete
ACI 347	Guide to Formwork for Concrete
ACI 350	Code Requirements for Environmental Engineering Structures

B. American Welding Society

AWS D1.1	Structural Welding Code

C. ASTM International (ASTM)

ASTM C309	Standard Specification for Liquid Membrane Forming Curing Compounds for Curing Concrete
ASTM C478	Standard Specification for Circular Precast Reinforced Concrete Manhole Sections
ASTM C1064	Standard Test Method for Temperature of Freshly Mixed Hydraulic Cement Concrete
ASTM C1077	Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
ASTM C1107	Standard Specification for Packaged Dry Hydraulic Cement Grout
ASTM D5249	Standard Specification for Backer Material for Use with Cold- and Hot-Applied Joint Sealants in Portland-Cement Concrete and Asphalt Joints
ASTM D5893	

D. Louisiana Department of Transportation and Development (LDOTD)

AML	Approved Materials List
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 227	Making and Field Curing Compressive Strength Specimens for Concrete Pipe
TR 230	Curing, Capping, and Determining the Compressive Strength of Cylindrical Concrete Specimens

E. United States Army Corps of Engineers (USACE)

CRD-C-572	Corps of Engineers Specifications for PVC Waterstop

F. U.S. Product Standards

PS 1	US Voluntary Product Standard – Structural Plywood
PS 20	American Softwood Lumber Standard

1.3 CONTRACTOR SUBMITTALS, SAMPLING, AND TESTING

A. Provide submittals, samples for testing, and testing of materials in accordance with Section 01010 – General Requirements.

B. Submit mixture designs and product data for all products incorporated into the WORK. Provide information sufficient for the ENGINEER to determine compliance with the requirements of these specifications.

1.4 CLASSES AND USES OF CONCRETE

A. Unless noted otherwise on the drawings, furnish concrete as indicated in the table below:

Classes and Uses of Concrete

Concrete Class	Use
A1, A2, A3	Concrete exposed to sea water, and all other concrete except as specified herein
Mass (A1), Mass (A2), Mass (A3)	Mass Concrete
P1, P2, P3	Precast Concrete
S	Drilled Shafts, Seals, and Underwater Placements
M	Minor Structures
R	Unreinforced Sections

PART 2 -- PRODUCTS

2.1 FORM AND FALSEWORK MATERIALS

A. Except as otherwise expressly accepted by the ENGINEER, provide new lumber for use as forms, shoring, or bracing.

B. Conform to the following requirements:

1. **Lumber**: Use Douglas Fir or Southern Yellow Pine, construction grade or better, in conformance with U.S. Product Standard PS 20 - American Softwood Lumber Standard.

2. **Plywood for concrete formwork**: Use new, waterproof, synthetic resin bonded, exterior type Douglas Fir or Southern Yellow Pine plywood manufactured especially for concrete formwork and conform to the requirements of PS 1 - Construction and Industrial Plywood for Concrete Forms, Class I. Use edge – sealed plywood.

3. Use metal, wood, plywood, or other material that will not adversely affect the concrete and will facilitate placement of concrete to the shape, form, line, and grade required.

4. Metal Forms: Use an approved type that will accomplish such results.

5. **Wood forms for surfaces to be painted:** Use Medium Density Overlaid plywood, MDO Ext. Grade.

C. Unless otherwise indicated, provide exterior corners in concrete members with 3/4-inch chamfers or be tooled to a 1/2-inch radius. Don not provide re-entrant corners in concrete members with unless otherwise indicated.

D. Design forms and falsework to support the roof and floor slabs for the total dead load, plus a live load of 50 psf (minimum). Design for a minimum combined dead and live loads of 100 psf.

2.2 FORM TIES

A. Provide form ties with a plastic cone or other suitable means for forming a conical hole to insure that the form tie may be broken off back of the face of the concrete. Use removeable cones for rod ties or other removable form-tie fasteners having a circular cross-section not exceeding 1-1/2 inches. Use such fasteners as to leave holes of regular shape for reaming. Use **Wrench Head Snap Ties** by **MeadowBurke, Snap Ties** by **Dayton/Richmond**, or equal.

B. Removable taper ties may be used when approved by the ENGINEER. If permitted, use **Taper Ties** by **MeadowBurke, Taper Ties** by **Dayton/Richmond**, or equal.

2.3 REINFORCING STEEL

A. Conform to Section 03806 – Reinforcement unless otherwise noted.

2.4 PORTLAND CEMENT CONCRETE

A. Conform to Section 03901 – Portland Cement Concrete.

2.5 CURING MATERIALS

A. Conform to the following requirements and ASTM C 309 - Liquid Membrane-Forming Compounds for Curing Concrete:

1. Use white-pigmented and resin-based compounds. Do not use sodium silicate compounds. Use **Kurez VOX White Pigmented** by **Euclid Chemical Company, Cure R-2** by **L&M Construction Chemicals, 1200-White** by **W.R. Meadows,** or equal. When curing compound must be removed for finishes or grouting, usebe **Kurez DR VOX** by **Euclid Chemical Company, Masterkure-100W** by **ChemRex MBT, L&M Cure R** by **L&M Construction Chemicals, 1100-Clear** by **WR Meadows,** or equal. Ensure compounds used meet local VOC requirements.

2. **Polyethylene Sheet**: Use white polyethylene sheet with a nominal thickness of 6-mils. Use a product with loss of moisture when determined in accordance with the requirements of ASTM C 156 - Standard Test Method for Water Retention by Concrete Curing Materials, not exceeding 0.055 grams per square centimeter of surface.

3. **Evaporation Retardant:** Use **Confilm** by **ChemRex MBT, Eucobar** by **Euclid Chemical Company, E-CON** by **L&M Construction Chemicals, Inc.,** or equal.

2.6 JOINT SEALANTS

A. Use extruded sealants complying with either of the following:

1. **Silicone Sealant (Single Component):** Use a product complying with ASTM D 5893. Use backer material of the appropriate size complying with ASTM D 5249, Type 3. Use silicone sealant, backer materials and primers that are approved products listed on the LDOTD AML (formerly QPL 42).

2. **Silicone Sealant (Two – Component Rapid Cure):** Use two – component silicone sealant complying with ASTM D5893 and meeting the requirements for single component sealants when mixed and prepared in accordance with the manufacturer's recommendations. Use backer material of the appropriate size conforming to ASTM D5249, Type 3. User silicone sealant, backer materials and primers, that are products listed on the LDOTD AML (formerly QPL 42).

2.7 WATERSTOPS

A. **Polyvinyl Chloride (PVC) Waterstop:** Use product complying with U.S. Army Corps of Engineers CRD-C- 572

B. Where not shown on the plans, submit details of installation and splicing, to the ENGINEER for review. When PVC waterstops are used, submit a certificate of compliance indicating compliance with these specifications.

2.8 SPECIAL SURFACE FINISH FOR CONCRETE

A. Use an approved product listed on the LDOTD AML (formerly QPL 14)

2.9 FORM RELEASE AGENTS

A. Use an approved product listed on the LDOTD AML (formerly QPL 29).

2.10 PRECAST CONCRETE

A. **General:** Use a manufacturer whose processes conform with the NCPA Quality Control Manual for Precast Concrete Plants, unless noted otherwise.

B. **Design:** The design of precast concrete units to withstand indicated design load conditions in accordance with applicable industry design standards ACI 318, ACI 350, ASTM, ACPA Design Manual, PCI MNL-120, and AASHTO, and/or as indicated on the drawings. Design must also consider stresses induced during handling, shipping and installation in order to avoid product cracking or other handling damage. Indicate design loads for precast concrete units on the shop drawings. Provide design calculations and drawings of non-standard precast units signed and sealed by a licensed professional engineer and submitted for ENGINEER approval prior to fabrication. Innclude the analysis of units for lifting stresses and the sizing of lifting devices.

C. **Forms:** Use forms for manufacturing precast concrete units the type and design consistent with industry standards and practices. Use forms which of produce uniform products and dimensions and which comply with the requirements specified herein. Apply and utilize form release agent according to the manufacturer's recommendations and do not allow the agent build up on the form casting surfaces.

D. **Reinforcement:** Use reinforcement per Section 03806 – Reinforcement.

E. **Embedded Items:** Where required by the Contract Documents or otherwise required by design for custom or standard pre-cast concrete structures, place embedded items. Where welding is required, perform welding in accordance with AWS D1.1. Provide items embedded in precast concrete of the type required for the intended use.

F. **Concrete:** Comply with the requirements of Section 03901 – Portland Cement Concrete.

G. **Grout:** Comply with the requirements of Section 03315 – Grout.

2.11 MISCELLANEOUS MATERIALS

A. Epoxy Adhesives: Use the following products:

1. For bonding freshly-mixed, plastic concrete to hardened concrete, **Sikadur 32 Hi-Mod Epoxy Adhesive** by **Sika Corporation, Concresive Liquid (LPL)** by **Chem Rex MBT**; **BurkEpoxy MV** by **Burke** by **Edoco,** or equal.

2. For bonding hardened concrete or masonry to steel, **Sikadur 31 Hi-Mod Gel** by **Sika Corporation, BurkEpoxy NS** by **Burke** by **Edoco, Concresive Paste (LPL)** by **Chem Rex MBT**; or equal.

B. Use epoxy grout for grouting reinforcing bars formulated for such application, for the moisture condition, application temperature, and orientation of the hole to be filled.

PART 3 -- EXECUTION

3.1 GENERAL FORMWORK REQUIREMENTS

A. Use forms to confine the concrete and shape it to the required lines wherever necessary. Assume full responsibility for the adequate design of forms, and promptly remove from the site and replace any forms that are unsafe or inadequate in any respect from the

WORK. Provide a sufficient number of forms of each kind to permit the required rate of progress to be maintained. Comply with comply with applicable local, state and federal regulations for the design and inspection of concrete forms, falsework, and shoring. Design, construct, maintain, prepare, and remove forms in accordance with ACI 347 - Guide to Formwork for Concrete and the requirements herein.

B. Use forms that are true in every respect to the required shape and size, which conform to the established alignment and grade, and are of sufficient strength and rigidity to maintain their position and shape under the loads and operations incident to placing and vibrating the concrete.

3.2 CONSTRUCTION

A. **Vertical Surfaces:** Form vertical surfaces of concrete members, except where placement of the concrete against the ground is indicated. Add not less than 1-inch of concrete to the indicated thickness of a concrete member where concrete is permitted to be placed against trimmed ground in lieu of forms. Permission to do this on other concrete members will be granted only for members of comparatively limited height and where the character of the ground is such that it can be trimmed to the required lines and will stand securely without caving or sloughing until the concrete has been placed.

B. **Construction Joints:** Concrete construction joints will not be permitted at locations other than those indicated, except as may be acceptable to the ENGINEER. When a second lift is placed on hardened concrete, take special precautions in the way of the number, location, and tightening of ties at the top of the old lift and bottom of the new to prevent any unsatisfactory effect whatsoever on the concrete. Set pipe stubs and anchor bolts the forms where required.

C. **Form Ties**

1. **Embedded Ties:** Wire ties for holding forms will not be permitted. Do no leave any form-tying device or part thereof, other than metal, in the concrete. Do not remove ties in such manner as to leave a hole extending through the interior of the concrete members. The use of snap-ties which cause spalling of the concrete upon form stripping or tie removal will not be permitted. If steel panel forms are used, provide rubber grommets where the ties pass through the form in order to prevent loss of cement paste. Where metal rods extending through the concrete are used to support or to strengthen forms, leave the rods embedded and terminate the rods terminate not less than 1-inch back from the formed face or faces of the concrete.

2. **Removable Ties:** Where taper ties are approved for use, after the taper tie is removed, thoroughly clean and roughen the hole for bond. Locate a precast neoprene or polyurethane tapered plug at the wall centerline. Completely fill the hole with non-shrink or regular cement grout.

3.3 REUSE OF FORMS

A. Forms may be reused only if in good condition and only if acceptable to the ENGINEER. Light sanding between uses will be required wherever necessary to obtain uniform surface texture on exposed concrete surfaces. Exposed concrete surfaces are defined as surfaces which are permanently exposed to view.

3.4 REMOVAL OF FORMS

A. Strictly follow careful practices for removing the forms, and accomplish this WORK with care so as to avoid injury to the concrete. No heavy loading on green concrete will be permitted. Do not remove forms from members which must support their own weight they have attained at least 75 percent of the 28-Day strength of the concrete. Leave forms for vertical walls and columns in place at least 48 hours after the concrete has been placed. Leave forms for parts of the WORK not specifically mentioned in place for periods of time as recommended in ACI 347.

3.5 PREPARATION OF SURFACES FOR CONCRETING

A. **General:** Thoroughly wet earthen surfaces by sprinkling prior to the placing of any concrete, and keep these surfaces moist by frequent sprinkling up to the time of placing concrete thereon. Ensure surfaces are free from standing water, mud, and debris at the time of placing concrete.

B. **Joints in Concrete:** Concrete surfaces upon or against which concrete is to be placed, where the placement of the concrete has been stopped or interrupted so that, as

determined by the ENGINEER, the new concrete cannot be incorporated integrally with that previously placed, are defined as construction joints. Give the surfaces of horizontal joints a compacted, roughened surface for good bonding. Except where the Drawings call for joint surfaces to be coated, clean the joint surface of laitance, loose or defective concrete, and foreign material, and be roughen to a minimum 1/4-inch amplitude. Accomplish such cleaning and roughening by hydroblasting. Remove pools of water from the surface of construction joints before the new concrete is placed.

C. **Placing Interruptions:** When placing of concrete is to be interrupted long enough for the concrete to take a set, give the working face a shape by the use of forms or other means, that will secure proper union with subsequent WORK. Make construction joints be made only where acceptable to the ENGINEER.

D. **Embedded Items**

1. Do not place concrete until formwork, installation of parts to be embedded, reinforcement steel, and preparation of surfaces involved in the placing have been completed and accepted by the ENGINEER at least 4 hours before placement of concrete. Clean surfaces of forms and embedded items that have become encrusted with dried grout from previous usage before the surrounding or adjacent concrete is placed.

2. Set reinforcement, anchor bolts, sleeves, inserts, and similar items and secured in the forms at locations indicated or by Shop Drawings and as acceptable to the ENGINEER before any concrete is placed. Accuracy of placement is the responsibility of the CONTRACTOR.

E. **Casting New Concrete Against Old:** Where concrete is to be cast against old concrete (defined as any concrete which is greater than 60 Days of age), thoroughly clean and roughen the surface of the old concrete by hydroblasting (exposing aggregate) prior to the application of an epoxy bonding agent. Apply the bonding agent according to the bonding agent manufacturer's instructions and recommendations.

F. Do not place concrete in any structure until water entering the space to be filled with concrete has been properly cut off or has been diverted by pipes, or other means, and carried out of the forms, clear of the WORK. Do not deposit concrete underwater nor allow still water to rise on any concrete until the concrete has attained its initial set. Do not permit water to flow over the surface of any concrete in such manner and at such velocity as will injure the surface finish of the concrete. Pumping or other necessary dewatering operations for removing ground water, if required, will be subject to the review of the ENGINEER.

G. **Corrosion Protection:** Position and support pipe, conduit, dowels, and other ferrous items required to be embedded in concrete construction prior to placement of concrete that there will be a minimum of 2-inches clearance between said items and any part of the concrete reinforcement. Securing such items in position by wiring or welding them to the reinforcement will not be permitted.

H. Provide for openings for pipes, inserts for pipe hangers and brackets, and anchors, where practicable, during the placing of concrete.

I. Accurately set and maintain anchor bolts in position by templates while being embedded in concrete.

3.6 HANDLING, TRANSPORTING, AND PLACING

A. **General:** Placing of concrete in conformance to the applicable requirements of Chapter 8 of ACI 301 and the requirements of this Section. Do not use aluminum materials in conveying any concrete.

B. **Non-Conforming WORK or Materials:** Reject concrete which during or before placing is found not to conform to the requirements indicated herein and immediately remove it from the WORK. Remove from the WORK and replace concrete which is not placed in accordance with these Specifications or which is of inferior quality at no additional cost to the OWNER.

C. **Unauthorized Placement:** Do not place any concrete except in the presence of a duly authorized representative of the ENGINEER. Notify the ENGINEER in writing at least 24 hours in advance of placement of any concrete.

D. Placement in Wall and Column Forms

1. Do not drop concrete through reinforcement steel or into any deep form nor place concrete in any form in such a manner as to leave accumulation of mortar on the form surfaces above the placed concrete. In such cases, use some means such as the use of hoppers and, if necessary, vertical ducts of canvas, rubber, or metal for placing concrete in the forms in a manner that it may reach the place of final deposit without separation. Do not allow the free fall of concrete to exceed 4-feet in walls and 8-feet in columns below the ends of ducts, chutes, or buggies. Uniformly distribute concrete during the process of depositing and do not displace concrete after depositing in the forms more than 6-feet in horizontal direction. Deposti concrete in wall forms uniform horizontal layers not deeper than 2-feet; and take care to avoid inclined layers or inclined construction joints except where such are required for sloping members. Place each later while the previous layer is still soft. Do not exceed a rate of 5 – feet of vertical rise per hour when placing concrete in wall forms. Provide sufficient illumination in the interior of forms so that the concrete at the places of deposit is visible from the deck or runway.

2. Enusre the surface of the concrete is level whenever a run of concrete is stopped. To insure a level, straight joint on the exposed surface of walls, tack a wood strip at least 3/4-inch thick to the forms on these surfaces. Carry the concrete about 1/2- inch above the underside of the strip. About one hour after the concrete is placed, remove the strip and level and any irregularities in the edge formed by the strip with a trowel, and remove laitance.

E. **Conveyor Belts and Chutes:** Design and arrange ends of chutes, hopper gates, and other points of concrete discharge throughout the CONTRACTOR'S conveying, hoisting, and placing system arranged that concrete passing from them will not fall separated into whatever receptacle immediately receives it. If using conveyor belts, use a type acceptable to the ENGINEER. Chutes longer than 50-feet will not be permitted. Use minimum slopes of chutes that concrete of the required consistency will readily flow in them. If a conveyor belt is used, wipe the belt clean by a device operated in such a manner that none of the mortar adhering to the belt will be wasted. Cover conveyor belts and chutes.

3.7 PUMPING OF CONCRETE

A. **General:** If the pumped concrete does not produce satisfactory end results, discontinue the pumping operation and proceed with the placing of concrete using conventional methods.

B. Pumping Equipment:

1. Use pumping equipment having a minimum 2 cylinders and that is designed to operate with one cylinder only in case the other one is not functioning. In lieu of this requirement, the CONTRACTOR may have a standby pump on the Site during pumping.

2. Use a minimum diameter of the hose conduits in accordance with ACI 304.2R - Placing Concrete by Pumping Methods.

3. Replace pumping equipment and hose conduits that are not functioning properly.

4. Aluminum conduits for conveying the concrete will not be permitted.

3.8 TAMPING AND VIBRATING

A. Thoroughly settle and compact concrete as it is placed in the forms or in excavations, throughout the entire depth of the layer which is being consolidated, into a dense, homogeneous mass, filling all corners and angles, thoroughly embedding the reinforcement, eliminating rock pockets, and bringing only a slight excess of water to the exposed surface of concrete. Use high speed power vibrators (8000 to 12,000 rpm) of an immersion type in sufficient number and with at least one standby unit as required.

B. Internally vibrate concrete placed in walls and at the same time rammed, stirred, or worked with suitable appliances, tamping bars, shovels, or forked tools until it completely fills the forms or excavations and closes snugly against all surfaces. Do not place subsequent layers of concrete until the layers previously placed have been worked thoroughly. Provide vibrators in sufficient numbers, with standby units as required, to accomplish the required results within 15 minutes after concrete of the prescribed consistency is placed in the forms. Do not contact the surfaces of the forms with the vibrator. Take care not to vibrate concrete excessively or to work it in any manner that causes segregation of its constituents.

3.9 FINISHING CONCRETE SURFACES

A. **General:** Provide surfaces free from fins, bulges, ridges, offsets, honeycombing, or roughness of any kind, and which present a finished, smooth, continuous hard surface. Allowable deviations from plumb or level and from the alignment, profiles, and dimensions indicated are defined as tolerances and are indicated above. These tolerances are to be distinguished from irregularities in finish as described herein. Do not use aluminum finishing tools.

B. **Formed Surfaces:** Unless the special surface finish is indicated on the drawings, no treatment is required after form removal except for curing, repair of defective concrete, and treatment of surface defects.

C. **Unformed Surfaces:** After proper and adequate vibration and tamping, bring the unformed top surfaces of slabs, floors, walls, and curbs to a uniform surface with suitable tools. Whenever the air temperature exceeds 85 degrees F or the wind speed exceeds 25 mph at the time of placement treat the concrete as follows. Immediately after the concrete has been screeded, treat the concrete with a liquid evaporation retardant. Treat the concrete again after each WORK operation as necessary to prevent drying shrinkage cracks. The classes of finish for unformed concrete surfaces are designated and defined as follows:

1. **Finish U1** - Sufficient leveling and screeding to produce an even, uniform surface with surface irregularities not to exceed 3/8-inch. No further special finish is required.

2. **Finish U2** - After sufficient stiffening of the screeded concrete, float finish surfaces with wood or metal floats or with a finishing machine using float blades. Excessive floating of surfaces while the concrete is plastic and dusting of dry cement and sand on the concrete surface to absorb excess moisture will not be permitted. Float the minimum necessary to produce a surface that is free from screed marks and is uniform in texture. Do not allow surface irregularities in excess of 1/4-inch. Tool joints and edges where indicated or as determined by the ENGINEER.

3. **Finish U3** - After the Finish U2 surface has hardened sufficiently to prevent excess of fine material from being drawn to the surface, perform steel troweling with firm pressure such as will flatten the sandy texture of the floated surface and produce a dense, uniform surface free from blemishes, ripples, and trowel marks. Provide a finish that is smooth and free of irregularities.

4. **Finish U4** - Trowel the Finish U3 surface to remove local depressions or high points. In addition, give the surface a light broom finish with brooming perpendicular to drainage unless otherwise indicated. Provide a surface rough enough to provide a nonskid finish.

D. Finish unformed surfaces according to the following schedule:

UNFORMED SURFACE FINISH SCHEDULE	
Area	**Finish**
Grade slabs and foundations to be covered with concrete or fill material	U1
Floors to be covered with grouted tile or topping grout	U2
Slabs to be covered with built-up roofing	U2
Interior slabs and floors to receive architectural finish	U3
Slabs	U4
Top surface of walls	U3

3.10 CURING AND DAMPPROOFING

A. **General:** Cure concrete not less than 7 Days after placing, in accordance with the methods indicated below for the different parts of the WORK.

Surface to be Cured or Dampproofed	Method
Unstripped forms	1
Construction joints between footings and walls, and between floor slab and columns	2
Encasement and ductbank concrete and thrust blocks	3
Concrete surfaces not specifically provided for elsewhere in this Paragraph	4
Buried slabs and backfilled walls	5

B. **Method 1:** Wet wooden forms immediately after concrete has been placed and keep forms wet with water until removal. If steel forms are used, keep the exposed concrete surfaces continuously wet until the forms are removed. If forms are removed within 7 Days of placing the concrete, continue curing in accordance with Method 4 below.

C. **Method 2:** Cover the surface with burlap mats and keep the surfaces and mats wet with water for the duration of the curing period, until the concrete in the walls has been placed. Do not apply curing compound to surfaces cured under Method 2.

D. **Method 3:** Cover the surface with moist earth not less than 4 hours nor more than 24 hours after the concrete is placed. Do not begin earthwork operations that may damage until at least 7 Days after placement of concrete.

E. **Method 4:** Spray the surface with a liquid curing compound.

1. Apply the compound accordance with the manufacturer's printed instructions at a maximum coverage rate of 200 square feet per gallon and in such a manner as to cover the surface with a uniform film that will seal thoroughly.

2. Where the curing compound method is used, exercise care to avoid damage to the seal during the 7 Day curing period. If the seal is damaged or broken before the expiration of the curing period, repair the break immediately by the application of additional curing compound over the damaged portion.

3. Wherever curing compound has been applied by mistake to surfaces against which concrete subsequently is to be placed and to which it is to adhere, entirely remove the compound by wet sandblasting just prior to the placing of new concrete.

4. Apply curing compound as soon as the concrete has hardened enough to prevent marring on unformed surfaces, and within 2 hours after removal of forms. Make repairs required to be made to formed surfaces within the said 2 hour period; provided, however, delay any such repairs which cannot be made within the said 2 hour period until after the curing compound has been applied. When repairs are to be made to an area on which curing compound has been applied, first wet- sandblast the area involved to remove the curing compound.

5. During the curing period, do not permit traffic of any nature and do not deposit any materials, temporary or otherwise, on surfaces coated with curing compound. Foot traffic and the depositing of materials may be allowed after 3 Days if the surface is covered with 5/8-inch plywood placed over polyethylene sheets.

F. **Method 5:** This method applies to both buried slabs and walls to be backfilled.

1. Keep the concrete continuously wet by the application of water for a minimum period of at least 7 Days beginning immediately after the concrete has reached final set or forms have been removed.

2. Until the concrete surface is covered with the curing medium, keep the entire surface damp by applying water through nozzles that atomize the flow so that the surface is not marred or washed.

3. Use heavy curing mats as a curing medium to retain the moisture during the curing period. Weight or otherwise hold the curing medium substantially in contact with the concrete surface to prevent being dislodged by wind or any other causes. Continuously hold edges in place.

4. Keep the curing blankets and concrete continuously wet by the use of sprinklers or other means both during and after normal working hours.

5. Immediately after the application of water has terminated at the end of the curing period, remove the curing medium, rewet any dry spots, and immediately apply curing compound in accordance with Method 4 above.

6. Dispose of excess water from the curing operation to avoid damage to the WORK.

7. Dampproofing: Dampproof exterior surfaces of buried roof slabs and backfilled walls as follows:

   a. Immediately after completion of curing, spray the surface with a dampproofing agent consisting of an asphalt emulsion. Apply the emulsion in 2 coats. Dilute the first coat to one-half strength by the addition of water and spray on so as to provide a maximum coverage rate of 100 square feet per gallon of dilute solution. Provide a second coat of an application of the undiluted material, and spray the compound on so as to provide a maximum coverage rate of 100 square feet per gallon. Use dampproofing material indicated above.

   b. As soon as the material has taken an initial set, coat the entire area thus coated with whitewash. Any formula for mixing the whitewash may be used if it produces a uniformly coated white surface and remains until placing of the backfill. If the whitewash fails to remain on the surface until the backfill is placed, apply additional whitewash.

G. The CONTRACTOR may submit alternate methods of curing which maintain the concrete in a continuously wet condition for acceptance by the ENGINEER.

3.11 PROTECTION

A. Protect concrete against injury until final acceptance.

B. Protect fresh concrete from damage due to rain, hail, sleet, or snow. Provide such protection while the concrete is still plastic and whenever precipitation is imminent or occurring.

3.12 CURING IN COLD WEATHER

A. Water curing of concrete may be reduced to 6 Days during periods when the mean daily temperature in the vicinity of the Site is less than 40 degrees F; provided that, during the prescribed period of water curing, when temperatures are such that concrete surfaces may freeze, water curing is temporarily discontinued.

B. Concrete cured by an application of curing compound will require no additional protection from freezing if the protection at 50 degrees F for 72 hours is obtained by means of approved insulation in contact with the forms or concrete surfaces; otherwise, protect the concrete against freezing temperatures for 72 hours immediately following 72 hours protection at 50 degrees F. Protect concrete cured by water against freezing temperatures for 72 hours immediately following the 72 hours of protection at 50 degrees F.

C. Discontinue protection against freezing temperatures such that the drop in temperature of any portion of the concrete will be gradual and will not exceed 40 degrees F in 24 hours. In the spring, when the mean daily temperature rises above 40 degrees F for more than 3 Days, 72 hour protection at a temperature not lower than 50 degrees F may be discontinued for as long as the mean daily temperature remains above 40 degrees F; provided, that the concrete is be protected against freezing temperatures for not less than 48 hours after placement.

D. Where artificial heat is employed, take special care to prevent the concrete from drying. Use of unvented heaters will be permitted only when unformed surfaces of concrete adjacent to the heaters are protected for the first 24 hours from an excessive carbon dioxide atmosphere by application of curing compound; provided, that the use of curing compound for such surfaces is otherwise permitted by these Specifications.

3.13 TREATMENT OF SURFACE DEFECTS

A. As soon as forms are removed, carefully examine the concrete surface and immediately rub or grind any irregularities in a satisfactory manner in order to secure a smooth, uniform, and continuous surface. Plastering or coating of surfaces to be smoothed will

not be permitted. Do not make repairs until after inspection by the ENGINEER. In no case will extensive patching of honeycombed concrete be permitted. Repair concrete containing minor voids, holes, honeycombing, or similar depression defects as indicated below. Completely remove and replace containing extensive voids, holes, honeycombing, or similar depression defects. Perform repairs and replacement prompt.

B. Cut back defective surfaces to be repair from trueline a minimum depth of 1/2-inch over the entire area. Feathered edges will not be permitted. Where chipping or cutting tools are not required in order to deepen the area properly, prepare the surface for bonding by the removal of laitance or soft material, plus not less than 1/32-inch depth of the surface film from hard portions by means of an efficient sandblast. After cutting and sandblasting, wet the surface sufficiently in advance of shooting with shotcrete or with cement mortar so that while the repair material is being applied, the surfaces underneath will remain moist but not so wet as to overcome the suction upon which a good bond depends. Use material consisting of a mixture of one sack of cement to 3 cubic feet of sand for the repair. For exposed walls, use cement containing such a proportion of Atlas white portland cement as is required to make the color of the patch match the color of the surrounding concrete.

C. Ream holes left by tie-rod cones with suitable toothed reamers so as to leave the surfaces of the holes clean and rough. Repair these holes in an approved manner with dry-packed cement grout. Do not ream holes left by form-tying devices having a rectangular cross-section, and other imperfections having a depth greater than their least surface dimension, but repair such holes in an approved manner with dry-packed cement grout.

D. Build up and shape repairs in such a manner that the completed WORK will conform to the requirements of this Section as applicable, using approved methods which will not disturb the bond, cause sagging, or cause horizontal fractures. Provide the surfaces of repairs with the same kind and amount of curing treatment as required for the concrete in the repaired section.

3.14 CARE AND REPAIR OF CONCRETE

A. Protect against injury or damage from excessive heat, lack of moisture, overstress, or any other cause until final acceptance. Take particular care to prevent the drying of concrete and to avoid roughening or otherwise damaging the surface. Repair or remove and replace concrete found to be damaged, or which may have been originally defective, which becomes defective at any time prior to the final acceptance of the completed WORK, which departs from the established line or grade, or which, for any other reason, does not conform to the requirements of the Contract Documents, with acceptable concrete.

3.15 PLACING ANCHOR BOLTS

A. Set anchor bolts in piers, bents, abutments or pedestals in an approved non shrink grout listed on the LDOTD AML (formerly QPL 47) at the location and in the manner described herein.

B. Verify the location of anchor bolts to be built into the concrete by the CONTRACTOR prior to setting. Take care to ensure proper setting of bolts. Correct inaccuracies detrimental to the structure by approved means.

C. Set anchor bolts not to be built into the concrete in preformed holes having a minimum diameter of 3 inches to allow for adjustment and deep enough to admit the anchor bolt. Holes may be formed by inserting oiled wooden plugs, metal sleeves or other approved devices into fresh concrete which are withdrawn after concrete has partially set. Adequately protect such holes from ice formation while open. When erecting the members, set members and shoes in place, then fill preformed holes sufficiently with grout so that when anchor bolts are placed to required depth, grout will completely fill holes.

D. If the CONTRACTOR elects to set anchor bolts either at initial casting or by drilling, verify the centerline-to-centerline spacing between anchor bolt holes of each member before setting the anchor bolts. If bolt holes are drilled, drill the diameter of the holes not be less than 1/2 inch larger than the bolt diameter.

E. Construct anchor bolts for cantilevered overhead signs and high mast light poles to ensure the proper performance of the double-nut anchor bolt system (baseplate sandwiched between top and bottom nuts). This requires that the bolts be set properly at

initial casting, the system be constructed free of damage, and a preload be built into each anchor bolt by a specified tightening procedure. Follow the guidelines below:

1) **Inspection**: Inspect the anchor bolts for plan compliance (size and grade, bolt galvanizing, projection length, bolt pattern and orientation, etc.). Verify that the individual holes in the top template locations are not more than 1/8 inch (3 mm) misaligned from their corresponding baseplate holes. Individual bolts must not be out of plumb more than 1/8 inch per 3 feet (3 mm/m). Straightening of misaligned bolts by bending is strictly prohibited. The ENGINEER must approve any corrective action for misaligned bolts. Do not use bolts in nuts that are in a damaged condition; bring anything more than minimal effort by one worker using only a spud wrench to turn off and then back on the nuts to the ENGINEER's attention and corrected to his satisfaction.

2) **Lubrication**: After inspection of the anchor bolts is completed, clean their threads of all foreign matter and then lubricated with beeswax. If erection is delayed more than 24 hours after being lubricated, this cleaning and lubricating must be repeated.

3) **Bolt Tightening Sequence**: Erect the member and completely tighten the bolts with all cantilever elements removed. Tighten the bolts at sequence specified at each step, which calls for tightening. For an eight- bolt pattern, number the bolts 1 through 8 in a clockwise order viewed from above, beginning with bolt 1 on the side away from the heaviest cantilever element. Tighten the bolts in the sequence of 1,5,2,6,8,4,7,3. For a six-bolt pattern, number the bolts 1 through 6 in a clockwise order viewed from above, beginning with bolt 1 on the side away from the heaviest cantilever element. Tighten the bolts in the sequence of 1,4,2,5,6,3.

4) **Tightening Procedures**: Install the bottom nuts on the anchor bolts, one on each bolt. Level the top template by adjusting the bottom nuts so the template rests on each nut and the distance between the top of the concrete shaft and the bottom face of the nut is approximately 1/2 inch (13 mm). Remove the template, lubricate the bearing surfaces of the bottom nuts and washers with beeswax, and erect and plumb the structure as to the satisfaction of the ENGINEER. Adjust the bottom nuts so that each is bearing equally on its washer against the baseplate. With all cantilever elements removed and with the plumbed structure supported by crane, lubricate the bearing surfaces of the top nuts and washers and install the washers and top nuts and turn them onto the bolts so that each top nut is handtight against the washer. Using a wrench, turn the bottom nuts up in the specified sequence to a snug tight condition [snug tight is defined to be the condition where the nut is in firm contact with the baseplate, and it may be assumed that the full effort of a workman on a 12 inch (300 mm) wrench results in a snug condition]. Verify that the structure is still plumb and still supported by the crane. In the specified sequence, turn the top nuts down to the same snug tight condition.

5) Preload is induced into the bolt by tightening the nuts and measuring the tightness by turn-of-nut method. Tighten each top nut in the specified sequence 30 degrees past snug tight (one-half of a hex nut "flat"). Repeat this process of tightening each top nut an additional 30 degrees down until each top nut has been tightened 60 degrees past snug tight.

3.16 PRECAST CONCRETE

A. **Quality Control:** Show that the following quality control tests are performed as required and in accordance with the ASTM International standards indicated.

1) **Slump:** Perform one slump test for each 150 cubic yards of concrete produced per mix design, or once a day, whichever comes first. Perform slump tests in accordance with LDOTD TR 207.

2) **Temperature**: Measure the temperature of concrete when slump or air content tests are made and when compressive test specimens are made in accordance with ASTM C 1064.

3) **Compressive Strength**: Make at least four compressive strength specimens for each 150 cubic yards of concrete of each mix design in accordance with LDOTD TR 226 and LDOTD TR 227.

4) **Air Content:** Make test for air content on wet-cast concrete for each 150 cu yd of concrete, per mix design, but not less often than once each day when air-entrained concrete is used. Determine the air content in accordance with LDOTD TR 202.

5) **Density (Unit Weight):** Perform tests for density a minimum of once per week to verify the yield of batch mixes. Perform density test for each 100 cu yd of lightweight concrete in accordance with LDOTD TR 201. P density tests each 100 cubic yards of concrete per mix design, but not less often than once per day when volumetric batch equipment is used.

B. **Concrete Mixing:** Comply with Section 03901 – Portland Cement Concrete.

C. **Concrete Placement:** Comply with Section 03901 – Portland Cement Concrete and the requirements specified herein.

D. **Curing of Precast Units:** Cure precast units immediately following the initial set of the concrete and completion of surface finishing. Precast units may be cured by moisture retention (burlap) or by heat and moisture.

1) Cure concrete cured by moisture retention with wet burlap or combined wet burlap and white polyethylene sheeting and adhere to the requirements specified within this section.

2) Do not subject concrete cured by heat and steam to setam or hot air until after the concrete has attained its initial set. Apply steam within a suitable enclosure, which permits free circulation of the steam in accordance with ACI 517.2R. If hot air is used for curing, take precautions to prevent moisture loss from the concrete. Do not allow the temperature of the concrete to exceed 150° F. These requirements do not apply to products cured with steam under pressure in an autoclave.

E. **Surface Finish**: Unless special surface finish is noted in the plans,

F. **Stripping Precast Units from Forms:** Do not remove precast units from the forms until the concrete reaches the compressive strength for stripping required by the design. If no such requirement exists, products may be removed from the forms after the final set of concrete provided that stripping damage is minimal. Routinely measure stripping strengths to ensure product has attained sufficient strength for safe handling.

G. **Patching and Repair:** No repair is required to formed surfaces that are relatively free of air voids and honeycombed areas, unless the surfaces are required by the design to be finished.

1) **Repairing Honeycombed Areas:** When honeycombed areas are to be repaired, remove all loose material and cut the area back into essentially horizontal or vertical planes to a depth at which coarse aggregate particles break under chipping rather than being dislodged. Use proprietary repair materials in accordance with the manufacturer's instructions. If a proprietary repair material is not used, saturate the aread with water. Immediately prior to repair, the area should be damp, but free of excess water. Apply a cement-sand grout or an approved bonding agent to the chipped surfaces, followed immediately by consolidating an appropriate repair material into the cavity.

2) **Repairing Major Defects:** Evaluate defects in precast concrete products which impair the functional use or the expected life of products using qualified personnel to determine if repairs are feasible and, if so, to establish the repair procedure.

H. **Shipping Precast Units:** Do not ship precast units, including piles, until the concrete strength has reached at least 75% of the specified 28-day strength, or that damage will not result, impairing the performance of the product.

I. **Installation:** Install precast concrete units to the lines and grades shown in the Contract Documents or otherwise specified. Lift units suitable lifting devices at points provided by the precast concrete producer. Install units in accordance with applicable industry

standards. Upon request, provide installation instructions. Where water-tightness is a necessary performance characteristic of the precast concrete unit's end use, watertight joints, pipe-entry connectors and inserts should be used to ensure the integrity of the entire system.

- END OF SECTION –

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. 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. Provide submittals, samples for testing, and testing of materials in accordance with Section 01010 – General Requirements and Section 01030 – Submittals, Sampling and Testing Plan.

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. Provide all materials required for testing at no additional cost to the OWNER.

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. Comply with the following unless otherwise specified. Use Grade 60 reinforcing steel in structures. Grade 40 steel may be used in Portland cement concrete pavement. Bars smaller than No. 3 need not be deformed. Use deformed bars complying 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: Comply with ASTM 615 and use steel produced at a mill listed on the LDOTD AML (formerly QPL71).

2) Rail-Steel and Axle-Steel Deformed and Plain Bars: Comply with ASTM A 996.

3) Cold-drawn Steel Wire: Comply with ASTM A 1064.

4) Welded Steel Wire Fabric: Conform to ASTM A 1064.

5) Epoxy Coated Reinforcing Steel and patching materials: Comply with AASHTO M 284 and use material listed on the LDOTD AML (formerly QPL 51).

2.2 SPIRAL REINFORCING

A. Comply with any of the following:

1) Billet-Steel Deformed and Plain Bars: Comply with ASTM 615 and use steel produced at a mill listed on the LDOTD AML (formerly QPL71).

2) Rail-Steel and Axle-Steel Deformed and Plain Bars: Comply with ASTM A 996.

3) Cold-drawn Steel Wire: Comply with ASTM A 1064

4) Welded Steel Wire Fabric: Conform to ASTM A 1064.

2.3 TIE BARS

A. Grade 40 steel may be used in Portland cement concrete pavement. Use tie bars which comply with any of the following:

1) Billet-Steel Deformed and Plain Bars: Comply with ASTM 615 and use steel produced at a mill listed on the LDOTD AML (formerly QPL71).

2) Rail-Steel and Axle-Steel Deformed and Plain Bars: Comply with ASTM A 996.

3) Cold-drawn Steel Wire: Comply with ASTM A 1064.

PART 3 -- EXECUTION

3.1 FABRICATION

A. **Fabrication:** Unless otherwise authorized, cold bend bent reinforcing to the shapes shown on the plans in accordance with the following requirements:

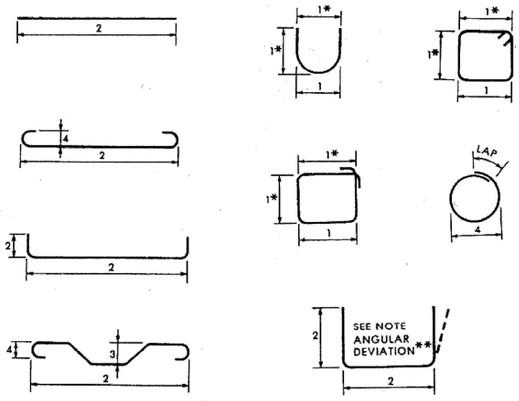
1) **Bending:** Bend stirrups and ties around a pin having a diameter of at least four bar diameters for No. 5 or smaller bars, and at least five bar diameters for larger bars. Bend all other bars, except as otherwise specified herein, around a pin having a diameter as specified in the table below:

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:** Fabricate bars 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:** Ship bar reinforcement in standard bundles, tagged and marked in accordance with the Manual of Standard Practice of the Concrete Reinforcement Steel Institute (CRSI). Use tags made of durable material and marked in a legible manner with waterproof markings. Provide at least one tag per bundle attached by wire. Ensure that tags show the size of reinforcing, number of pieces, and mark or length of bars.

4) **Handling and Coating Repairs:** Handle epoxy coated reinforcing steel in a manner to avoid damage to the coating. Pad bundling bands. Lift bundles with multiple supports or strongbacks to prevent abrasion to the coating due to sag. Use the same patching material used by the applicator. Use prequalified patching material. Make repairs 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 may not exceed 2 percent. Coat ends of coated bars cut during field fabrication 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. Store reinforcing material above ground on platforms, skids or other supports. Protect steel from damage and corrosion.

B. Plainly mark and tag various sizes, grades and lengths to facilitate inspection.

C. Unload and store epoxy coated bars on the project site in a manner to avoid damage or contamination. Store bars off the ground and cover the bars such that formation of condensation and exposure to ultraviolet light is avoided.

3.3 PLACING AND FASTENING

A. Place reinforcement in the position shown on the plans and firmly hold reinforcement in place during placing and setting of concrete. Prior to placing reinforcing in the forms, clean the reinforcement of all 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. Tie bars with No.14 or 16 gage wire at all intersections, except where spacing is less than 1 foot in each direction, tie alternate intersections of the bars.

B. Maintain distance of reinforcement from forms 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. Use hot-dipped galvanized, electroplated with zinc (GS Grade), plastic-coated or stainless steel chairs where in contact with surfaces of concrete. Separate layers of bars by approved devices. The use of pebbles, pieces of broken stone or brick, metal pipe and wooden blocks will not be permitted. Pass vertical stirrups around main tension members and securely

attach the reinforcing to each other. Place bars as to provide the minimum covering, measured from the surface of concrete to face of reinforcing bars, as indicated in the table below. The ENGINEER will inspect reinforcement. Reinforcement is subject to approval before placing concrete.

Condition	***Required Clear Cover, Inches***
For concrete placed against earth	3 inches
For surfaces in contact with water	2 – ½ inches
For formed surfaces in contact with earth	2 inches
For underside of slabs over water, beams, and columns not in contact with water or earth	2 inches
Paving concrete	As indicated on plan details or as per pavement specifications
All other surfaces	2 inches

C. During and after installation of epoxy coated bars, 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. Repair damaged metallic accessories with a suitable material. No more than 0.25 percent of the bar surface area may be left bare.

D. Repair damaged areas of the reinforcing steel and accessories before rusting occurs. Clean coated bars of dirt, paint, oil, grease, form release agent, or other foreign substances prior to incorporating the coated bars into the WORK. Perform placement of concrete in a timely manner with methods and equipment which will not damage the coated materials.

E. Since the epoxy coating is flammable, do not expose coated bars to fire or flame. Cutting coated bars by burning will not be permitted. Do not field bend coated reinforcing steel to be partially embedded in concrete unless specified on the plans or permitted by the ENGINEER.

3.4 SPLICING

A. Furnish reinforcement in the full lengths indicated on the plans. Splicing of bars, except where shown on the plans, will not be permitted without written approval. Stagger splices as far as possible. Unless otherwise specified, lap bars in accordance with the requirements of the table below. Do not make construction joints within the limits of lapped bars. In lapped splices, place bar in wire bars together in such manner as to maintain the minimum clear distance to other bars and to the surface of concrete. Weld reinforcing steel only if detailed on the plans or if authorized in writing. Where welding reinforcement, 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. Use splices that 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. Provide substitute steel with cross-sectional and surface areas equivalent to the design areas or larger. Allowed substitutions will be made at no additional cost to the OWNER.

- END OF SECTION –

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SECTION 03901 – PORTLAND CEMENT CONCRETE

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. 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. Provide mixtures of an approved mix design and use a Louisiana Department of Transportation and Development certified plant. Transport concrete using Louisiana Department of Transportation and Development certified trucks.

D. Assume full responsibility for the design, control, and transportation of concrete mixtures in accordance with these specifications.

1.2 REFERENCE STANDARDS

A. ASTM International (ASTM)

ASTM A48 Standard Specification for Gray Iron Castings

1.3 CONTRACTOR SUBMITTALS, SAMPLING, AND TESTING

A. Provide submittals, samples for testing, and testing of materials in accordance with Section 01010 – General Requirements.

B. Submit mixture design for all concrete mixtures to be incorporated into the WORK. Submit product data for all products to be incorporated into the WORK.

1.4 QUALITY ASSURANCE

A. Assume full responsibility for quality control of materials during handling, proportioning, mixing, and placing operations.

B. Furnish a Certified Concrete Technician at the plant or job site to make adjustments in batch weights for moisture content, to perform necessary adjustments in proportioning materials, and to perform tests necessary for control of the concrete mix within specification requirements. Do not begin daily plant operations until the Certified Concrete Technician has determined that gradations and batch weight adjustments are within specification limits. Use the Certified Concrete Technician or the Authorized Concrete Field Tester to perform the job-site control tests for slump, air content, mix temperature, and then report the documented results to the contractor. The use of an Authorized Concrete Field Tester will not relieve the Certified Concrete Technician from performing the remaining duties as outlined in these specifications.

C. Use a Certified Concrete Technician and Authorized Concrete Field Tester having completed the requirement training prescribed by the Louisiana Department of Transportation and Development. Personnel with a current ACI Concrete Field Testing Technician Grade I certification qualify as an Authorized Concrete Field Tester.

D. **Mix Design:** Submit a mix design on an approved form showing details for concrete to be furnished. Do not start work until the concrete mix design has been accepted by the ENGINEER. Review and acceptance of this mix design does not release the contractor from the responsibility of producing concrete that minimum requirements of the specifications. Proportion the volume of coarse aggregates in concrete meets the mixes in accordance with the Master Proportion Table for Portland Cement Concrete below. This does not apply to mixes for concrete pipe, Types B and D pavement, and minor structure class concrete. Fine aggregate must have fineness Moduli (FM) between 2.20 and 3.00. For an example of proportioning of coarse aggregate, see the LDOTD publication entitled Application of Quality Assurance Specifications for Portland Cement Concrete Pavement and Structures.

Nominal	Volume of Dry – Rodded Coarse Aggregate per Unit Volume of

Maximum Size of Aggregate	Concrete for Different Fineness Moduli of Fine Aggregate				
	2.20	2.40	2.60	2.80	3.00
3/8 Inch	0.52	0.50	0.48	0.49	0.44
½ Inch	0.61	0.59	0.57	0.55	0.53
¾ Inch	0.6	0.66	0.64	0.62	0.60
1 Inch	0.73	0.71	0.69	0.67	0.65
1 – ½ Inch	0.77	0.75	0.73	0.71	0.69
2 Inch	0.80	0.78	0.79	0.74	0.72
3 Inch	0.84	0.82	0.80	0.78	0.76

1. Proportion aggregates for pavement Types B and D mixes in accordance with Section 02003 – Aggregates.

2. Perform trial mixes to demonstrate the mix's performance and the compatibility of components.

3. Submit test results for slump, unit weight, air content, set times, and surface resistivity (i.e., permeability) when required. Develop a curve for compressive strength (flexural strength for pavements if required) at 3, 7, 14, and 28 days. All trial mixes, especially those incorporating ASTM C494 Type S admixtures, must demonstrate their intended specific use and compliance with this section to the ENGINEER. Submit these findings to the ENGINEER for all precast and prestress elements.

4. Furnish materials to the ENGINEER for verification of trial mixes as requested.

5. The ENGINEER may waive the requirement for trial mixes, in writing, where in the opinion of the ENGINEER sufficient information is provided by the CONTRACTOR to substantiate historical performance of the submitted mix. Waiver of trial mixes does not release the CONTRACTOR from the responsibility of producing concrete that meets the minimum requirements of the specifications.

6. Ensure that slumps are within the ranges shown in Table 03901-3 when tested in accordance with DOTD TR 207. The ENGINEER may authorize an increase in maximum slump, without mix segregation, by use of water reducing admixtures. Formulate mixes to produce concrete that, when molded and cured in accordance with DOTD TR 226 and tested in accordance with DOTD TR 230, show an average compressive strength not less than shown in Table 03901-3.

E. Quality Control Tests:

1. Conduct tests to confirm the mix complies with the accepted mix design. Determine gradation and moisture content of aggregates used in the concrete mixture. Test the mixture at the job site for slump, unit weight, temperature, and air content. Keep mix variations within specified control limits for individual samples. Plot test results for gradation, slump, unit weight, and air content on control charts for individual samples. Submit these control charts to the ENGINEER.

2. Monitor admixtures, cementitious the mix chemical materials components (cementitious materials, chemical additives, and aggregates) for variations. As and chemical admixture shipments arrive, verify slump, air content, and initial set time by testing at ambient temperatures. Adjust the mix design to rectify any changes, which would adversely affect constructability, concrete placement, or compliance with the specifications. Document the testing to validate component consistency on the control charts. Note conformance or variation in mix parameters (workability, set times, air content, etc.) on the control charts. Provide a copy of the proposed testing plan to the ENGINEER for record. Acceptance of the plan does not relieve the contractor of the responsibility for satisfying specifications.

3. Select times to obtain control test samples using random number tables in accordance with DOTD S 605 or by random selection. Conform to gradation control limits of aggregates as shown in Section 02003 – Aggregates.

4. Use the LDOTD Materials Sampling Manual to determine the minimum number of quality control tests for structural and pavement concrete. Take additional test samples as directed for slump, concrete temperature, and air content.

5. For minor structure concrete only, a Certified Concrete Technician or Authorized Concrete Field Tester will not be required. However, implement a quality control testing program to ensure that the concrete meets the requirements of these specifications.

6. When producing concrete for Types B and D pavements, determine gradations daily on each stockpile of aggregates. Base all gradation calculations on percent of dry weight. Upon determination of the gradation of each stockpile, mathematically determine the percent of the total aggregates retained based on the proportions of the combined aggregate blend, and check for conformance with Section 02003 – Aggregates. For additional QC requirements for Mass Concrete, see Part 3 of this Section 03901 – Portland Cement Concrete.

7. It is permissible to adjust the ratio of fine to coarse aggregates of the approved mix design by no more than 5 percent.

8. Never adjust to materially affect the volume of concrete. For mixtures incorporating the Type B or D gradation, if the proportions of the aggregate sizes used do not satisfy the gradation requirements of Section 02003 - Aggregates due to changes in the gradation, adjust the proportions to bring the combined aggregates back within specification limits. These minor adjustments for gradation will not require a new mix design. Ensure that the mix produced is uniform, workable and within the specification limits of Table 03901-3. When plant operations do not produce a uniform and workable mix, cease plant operations and take corrective action prior to restart.

9. When slump, air content, concrete temperature, or gradation measurements, as plotted on control charts, uniform and may fall outside tolerance indicate that the mix is not limits, immediately make adjustments to keep the mix within specified limits. Failure to make proper adjustments or the mix deviates from specification requirements, or the mix is obviously defective, the ENGINEER will reject the mix.

10. Do not change sources of any materials or percentages of cementitious materials, until a new Mix Design showing the new material or adjusted proportions has been accepted.

1.5 DELIVERY, STORAGE, AND HANDLING:

A. Comply with the requirements of Part 3 – Execution of this Section 03901 – Portland Cement Concrete and the requirements below.

B. Transportation and Storage of Cementitious Materials: Transport cementitious materials in watertight conveyances and store in separate dry facilities. Reject material that is contaminated, partially set, or contains lumps of caked material. Do not mix brands, mills, types, grades, or classes unless authorized by the ENGINEER. The ENGINEER may waive this requirement in case of plant breakdown during production to allow concrete, conforming to the requirements of this Section 03901 – Portland Cement Concrete, furnished from another plant to finish a placement in progress.

C. Handling and Storage of Aggregates: Stockpile aggregates so that no detrimental degradation, contamination or segregation of aggregates results. Do not incorporate any foreign material into the aggregates. Provide a positive separation between natural ground and stockpile. Do not intermingle individual stockpiled materials. Do not add material to working faces of the stockpiles during continuous operations. Maintain drainage of stockpiles to control moisture content. Control aggregates to maintain the required gradation. Do not use aggregates that have become segregated or contaminated.

PART 2 -- PRODUCTS

2.1 GENERAL

A. Use cement, fly ash, ground granulated blast-furnace slag, and microsilica (silica fume) certified by the manufacturer in accordance with current LDOTD procedures.

B. Maintain accurate records of cement, fly ash, ground granulated blast-furnace slag, and silica fume deliveries and their use. Furnish copies of these records to the ENGINEER in such form as required.

C. **Mixture Substitutions:** In accordance with Table 03901-2, these are the allowable mixture substitutions:

Structural Class	**Substitute**
A1	**No Subsititutions**
A2	**No Substitutions**
A3	**No Substitutions**
P1	**P2, P3**
P2	**P3**
P3	**No Substitutions**
S	**No Subtitutions**
MASS (A1)	**No Subtitutions**
MASS (A2)	**No Substitutions**
MASS (A3)	**No Subtitutions**
Minor Structure Class	
M	**A1, B, D**
R	**A1, B, D**
Pavement Type	
B	**D**
D	**B**
E	**No Substitutions**

2.2 COMPOSITION OF CONCRETE

A. Provide the type of cement and Portland cement concrete composed of components as specified in this Section 03901 – Portland Cement Concrete and Table 03901-3. For mix designs not conforming to the requirements of this Section 03901 or Table 03901-3, the approval of the ENGINEER is required.

B. **Cement:** Allowable types of cement are as follows:

Use	**Allowable Cement Types**
General Construction	Type I and/or Type II Portland Cement; Blended Hydraulic Cement, Type IL Portland lime cement
Concrete Pavement	Type I and/or Type II Portland Cement; Blended Hydraulic Cement, Type IL Portland Lime Cement, Type III Cement for High Early Strength Applications Only

Pre – Stressed or Pre – Cast Concrete	Type I and/or Type II Portland Cement; Blended Hydraulic Cement; Type IL Portland Lime Cement

C. Cementitious Material Substitution:

1. For structural classes of concrete, fly ash conforming to Part 2 of this Section 03901 – Portland Cement Concrete may be partially substituted for Portland cement on a pound for pound basis. For purposes of cement material substitution with fly ash and slag, do not treat Type IL cement as blended.

2. A binary concrete mix is one that combines Portland cement and one additional cementitious replacement, e.g., ground granulated blast furnace slag (GGBFS) or fly ash (class C or F).

3. A ternary concrete mix is one that combines Portland cement with two additional cementitious replacements, e.g., GGBFS and fly ash (class C or F) or fly ash (both class C and F).

4. The maximum substitution rate for binary mixtures is 30 percent fly ash or 50 percent GGBFS.

5. The maximum substitution rate for ternary mixtures containing Type I, II, III, or 1L Portland cement is 70 percent of cement. When using Type IP or IS Portland cement, the maximum substitution rate for ternary mixtures is 40 percent. Ternary combinations using both class C and F fly ash are allowable. When using fly ash ternary mixtures, replace Portland cement with class C and class F fly ash in equal amounts. When using combinations of GGBFS and fly ash, the amount of GGBFS must be equal to or greater than the amount of fly ash.

6. For pavement types of concrete (Types B and D), the maximum substitution rate for ternary mixtures is limited to 50 percent of cement and for binary mixtures is 30 percent fly ash or 50 percent GGBFS.

7. The use of Type III Portland cement outside of the specified allowances for precast, prestress, and specified HES pavements requires the approval of the Chief Construction ENGINEER.

D. Chemical Admixtures:

1. Only use admixtures listed on the Approved Materials List.

2. Use an air-entraining admixture in all concrete. Test the total air content of the concrete in accordance with DOTD TR 202, and meet the requirements specified in Table 03901-3.

3. Use set-retarding admixtures in an amount sufficient to produce the necessary retardation. Consider the influence of different materials and job conditions, including local weather on setting characteristics.

4. Include the amount of water incorporated in admixtures as a part of required mixing water.

5. Follow manufacturer's recommendations for adding and mixing high range water reducers (HRWR, superplasticizer) to the mix.

6. When using multiple admixtures, ensure the same company manufactures all the admixtures, and they are all compatible.

E. Water: Ensure that the total amount of water in the mixture, including admixtures and free water, does not exceed the maximum water- cementitious ratio specified in Table 03901-3. Free water includes all water entering the mix with the aggregates, except water absorbed by the aggregate.

F. Aggregates: Ensure that all aggregates for use in Portland cement concrete meet the requirements of Section 02003 – Aggregates.

G. Fine Aggregates: Ensure that fine aggregates comply with the requirements of Section 02003 – Aggregates.

H. Course Aggregates: Ensure that coarse aggregates are the grade specified in Table 03901 – 3 and comply with Section 02003 – Aggregates.

2.3 PORTLAND CEMENT

A. Use Portland cement from the Approved Materials List complying with AASHTO M 85. Alkali content calculated as sodium oxide equivalent may not exceed 0.60 percent by weight.

2.4 BLENDED HYDRAULIC CEMENT

A. Use blended hydraulic cement Type IP, Type IS, or Type IL from the Approved List and comply with AASHTO M 240. The alkali content of blended hydraulic cement calculated as sodium oxide equivalent may not exceed 0.60 percent by weight. Type IP may contain up to 30 percent by weight of fly ash or up to 30 percent by weight of bottom ash, provided that the bottom ash is inter-ground with the cement clinker. Fly ash and bottom ash must comply with AASHTO M 295, Class C or F. Type IS cement may contain up to 50 percent by weight of ground granulated blast-furnace slag. Grade 100 and Grade 120 ground granulated blast-furnace slag (slag cement) must comply with AASHTO M 302. Do not treat Type IL Portland limestone cement as blended cement for purposes of cement material substitution with fly ash and slag.

2.5 MASONRY CEMENT AND MORTAR CEMENT

A. Comply with ASTM C91 for masonry cement. Comply with ASTM C1329 for mortar cement. Mix mortar cement in accordance with ASTM C270 or use pre-blended dry mortar cement complying with ASTM C1714 and mix according to the manufacturers recommendations

2.6 AGGREGATES

A. Use aggregates complying with the requirements of Section 02003 – Aggregates.

2.7 ADMIXTURES

A. Use admixtures listed on the LDOTD AML.

2.8 WATER

A. Use water human consumption or in compliance with the following when tested in accordance with AASHTO T 26:

Contaminant	Maximum Allowable Percent by Weight
Alkali	0.1
Organic Solids	0.1
Inorganic Solids	0.4
Salt	0.5
Sugar, Oil, or Acid	0.0

2.9 FLY ASH

A. Use fly ash from the Approved Materials List. Comply with AASHTO M 295 for Class C and Class F. Comply with ASTM C618 for Class N. Alkali content calculated in accordance with DOTD TR 531 may not exceed 2.5 percent

2.10 GROUND GRANULATED BLAST – FURNACE SLAG (GGBFS)

A. Use Grade 100 or Grade 120 ground granulated blast-furnace slag from the Approved Materials List and comply with AASHTO M 302.

2.11 MICROSILICA

A. Use microsilica (silica fume) from the Approved Materials List and comply with AASHTO M 307.

PART 3 -- EXECUTION

3.1 SAMPLING AND TESTING

A. Perform sampling and testing in accordance with the LDOTD "Materials Sampling Manual and Testing Procedures Manual". Furnish necessary materials for testing at no additional cost to the OWNER. For pumped concrete, sample at the discharge end of pump.

3.2 EQUIPMENT

A. Provide sufficient plant capacity and transporting equipment to ensure delivery at the required rate. Ensure that the rate of delivery provides for proper handling, placing and finishing of concrete and maintains a workable surface. Ensure that methods of delivering and handling concrete facilitate placing with a minimum of rehandling and without damage to the structure or concrete.

B. Plant Equipment: Ensure that batch plants include approved storage, weigh hoppers, and measuring devices. Properly seal and vent equipment to minimize contamination, dusting and loss of material. Ensure uniform distribution of the incorporated materials. Provide adequate water supply and a device for automatically controlling the amount of water used in each batch. Provide communication between the concrete batcher and loader operator

1. Direct Fill Elevating Weigh Hoppers: For plants using direct-fill elevating weigh hoppers, use computer controlled lights as an indicator of aggregate weights, but not as the sole means of control for aggregate proportioning. Provide means of control so that, as approaching the quantity desired in the weigh hopper, material may be added slowly and shut off with precision. Ensure that weigh hoppers eliminate accumulation of materials and discharges completely. Make provisions for removal of overloads.

2. Storage Bins and Silos: For plants with storage bins, ensure that the bins have adequate separate compartments for each size of aggregate. Design each compartment to discharge efficiently and freely. Provide a means of control so that, as approaching the quantity desired in the weigh hopper, material may be added slowly and shut off with precision. Ensure that silos are weatherproof, sealed, free of holes, and prevent contamination. Ensure complete separation for each cementitious material. Design silos to freely discharge and equip with vibrators and/or aerators to maintain flow of material and prevent accumulation. Provide silos with a positive means of shut off without leaking into the weigh hopper

3. Measuring Devices: Equip batch plants to proportion materials by approved weighing/metering devices. Moisture probes are allowed to determine the moisture content of aggregates for batch adjustment, provided the accuracy is within 0.5 percent of the results obtained by the Certified Concrete Technician in accordance with DOTD TR 106 and confirmed by the ENGINEER. Use separate scale systems: one for aggregates, and another for cementitious materials. Weigh each size of aggregate from separate bins either individually or cumulatively. Weighing each cementitious material cumulatively in the same hopper is allowable but measure the weight of the cement first before other cementitious materials. Ensure that weigh hoppers eliminate accumulation of materials and discharge completely. Make provisions for removal of overloads. Ensure that scales are accurate to 0.5 percent throughout the range of use. Use scales graduated to 0.1 percent of the rated scale capacity. When beam type scales are used, ensure that poises are lockable into any position to prevent accidental change of position, and the weigh beam and a telltale device is in view of the operator. Plant measuring devices are be subject to approval by the ENGINEER. Ensure that scales are tested, inspected, and certified every 90-calendar days 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 and more frequently when the ENGINEER deems it necessary to assure their accuracy. Use a qualified independent scale service or the Weights and Measures Division of the Louisiana Department of Agriculture and Forestry to certify the plant's laboratory-measuring devices annually at no direct cost to the OWNER. Batch individual aggregates within 2 percent, and the cumulative total

weight of aggregates within 1 percent of the required weight. Ensure that cementitious materials are within 1 percent of the required weight. For smaller batches of 1 to 3 cubic yards, the quantity of cement and cumulative quantity of cementitious materials may be neither less than the required amount nor more than 4 percent in excess. Cement in standard bags need not be weighed; however, furnish in full bag increments and adjust the quantities of other materials accordingly. Do not use bagged fly ash or GGBFS. Measure the mixing water by volume or weight. Ensure that water measuring devices are accurate to 1 percent at 1/2 the maximum allowable water per batch and the maximum graduation is 1 gallon. Use approved methods and equipment for adding admixtures into the batch. Measure the quantity of admixtures with an accuracy of 3 percent. Provide a separate dispensing device for each admixture.

4. Batch Tickets: Certified concrete plants may be equipped with an approved automatic ticket printer system for recording required batching information. Enter actual weights of material batched each time on the Batch Certification Report or an approved electronic document. When an automatic ticket printer system is not used, determine quantities and batching information by visual observation. Record these quantities on the Batch Certification Report. Ensure that the approved ticket printer system is tamper-proof and prints 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 printer breakdown, determine quantities by visual observation and certify as stated above. Ensure that all records of batches show batch number, day, month, year, and time of day to the nearest minute for each batch. Record any added water on the Batch Certification Report Provide to the ENGINEER, a legible copy of all batch records identified with lot number and mix design number.

C. Hauling Equipment: Ensure that hauling equipment is watertight and capable of discharging concrete at a controlled rate without segregation.

1. Truck Mixer: Provide revolving-drum truck mixers, equipped with tanks for carrying any additional portion of the mixing water and capable of dispensing to the nearest gallon. Replace pick-up and throwover blades in the mixing drum when worn beyond the limit recommended by the manufacturer. Have available a copy of the manufacturer's design, showing dimensions and arrangements of blades in reference to original height and depth. Equip truck mixers with electrically or mechanically actuated revolution counters. Locate counters to provide safe and convenient inspection. In a prominent place, attach to each truck mixer a metal plate on which is plainly marked the maximum rated capacity of the drum in terms of concrete volume and rotation speed for both agitating and mixing speeds.

2. Agitator Hauling Equipment: Furnish agitators with blades or paddles to effectively agitate the mix and prevent segregation. Provide covers when directed. Attach to each agitator in a prominent place, a metal plate on which is plainly marked the designed uses for the equipment, the maximum rated capacity in terms of concrete volume, and agitation speed.

3. Non Agitator Hauling Equipment: Ensure that the bodies of non-agitating hauling equipment are clean, smooth, metal, and mortar-tight containers. Provide covers when directed.

4. Portable Mixers: Provide portable mixers with a minimum capacity of one cubic yard and capable of accurately and uniformly mixing and discharging concrete without segregation.

3.3 BATCHING AND MIXING

A. Thoroughly mix concrete in a mixer of an approved size and type, which will ensure uniform distribution of materials throughout the mix.

B. Do not use mixers with worn blades or excessive build-up. Replace pickup and throw- over blades or mixing paddles in the mixing drum or mixing unit when worn beyond the limit recommended by the manufacturer. Have available a copy of the manufacturer's design, showing dimensions and arrangements of blades in reference to original height and depth. Begin mixing operations within 15 minutes after addition of cement to the aggregates. When there is an interruption to the mixing operations, thoroughly clean the mixer. Remove the entire contents of the mixer from the drum before placing materials for a succeeding batch. Add a portion of mixing water in advance of cement and aggregates. Do not use a mixer having a rated capacity of less than one cubic yard or

charge a mixer in excess of its rated capacity. Do not produce batches smaller than one cubic yard.

C. **Central Plant and Site Mixing:** Mix concrete until uniformity is achieved but not less than 60 seconds. Mixing time begins after all materials are in the mixer. Mixing time ends when the discharge chute opens. Ensure that the mixer is equipped with an approved timing device, which automatically locks the discharge lever when charging the drum and releases it at the end of the mixing period. During mixing, operate the mixer at its designed drum speed as shown on the manufacturer's nameplate on themixer

D. Truck Mixing: In accordance with 901.09, measure aggregates and cementitious materials for concrete and charge into the drum at the proportioning plant. Ensure that the size of the batch does not exceed the maximum rated mixing capacity as stated by the manufacturer and stamped on a metal plate on the mixer. When using a truck mixer for complete mixing, mix each batch at designated mixing speed until uniformity is achieved, but not less than 70 revolutions. Ensure that all materials, including mixing water, are mixer drum before actuating the revolution counter or taking an reading. Ensure that any additional revolutions during transit are designated agitating speed. in the initial at the Add a minimum of 75 percent of the prescribed amount of batch water at the plant. If the slump is low at the jobsite, add up to the “maximum water that can be added at jobsite” as indicated on the Batch Certification form. Ensure that water added at the jobsite does not exceed the maximum allowable water-cementitious material ratio or exceed the maximum allowable slump by more than 1/4 inch. Reject the load if these criteria are exceeded. Add water and/or admixtures at the job site in one or two increments with additional mixing within the range of 20 to 30 revolutions at designated mixer speed for each increment. When adding to a partial load, add only a proportional amount of water or admixtures. Follow the manufacturer’s recommendations when adding and mixing admixtures to the mix. Perform slump, air, temperature, and unit weight tests, and mold cylinders after the addition of all components into the mix

E. Partial Mixing at Central Plant (Shrink Mixing) When partially mixing at a central plant, reduce the mixing time to a minimum of 30 seconds. Complete required mixing in a truck mixer at mixing speed until uniformity is achieved but not less than 10 revolutions.

F. Time Limitations: Ensure that the maximum time from the addition of cement to the mix to final placement of the concrete is 90 minutes or a maximum of 300 revolutions, whichever occurs first. When transport is by non-agitator truck, ensure that the maximum time from the addition of cement to the mix to final ENGINEER may reduce the conditions contributing to concrete. placement maximum rapid loss of the concrete is 45 minutes. The allowable time for any observed of plasticity or uniformity of the For special applications, the stated time limitations may be modified based on trial batch results.

G. Hauling Equipment: Transport fresh concrete in a truck mixer, agitator, or other certified equipment. Non-agitator trucks are only allowed for pavement concrete. Ensure that the volume of mixed concrete transported in an agitator truck at agitation speed is in accordance with the manufacturer's specified rating.

H. Protable Mixing: Obtain written approval from the Chief Construction ENGINEER to use portable or volumetric mixers for PCCP patching and minor structureconcrete.

I. Delivery: Provide sufficient plant capacity and transporting equipment to ensure delivery at the required rate. Ensure that methods and rate of delivery and handling of concrete facilitate placement, without damage to the structure or fresh concrete.

3.4 WEATHER AND TEMPERATURE LIMITATIONS

A. Concrete used in precast/prestress structural elements may be exempt from the following temperature limitations at the determination of the Construction Fabrication ENGINEER. Prepare for rain and hot or cold weather concrete placement well in advance of these events.

B. The contractor is responsible for proper mixing, placing, and curing of all concrete. At no cost to the OWNER, remove and replace any unacceptable concrete as determined by the ENGINEER.

C. Cold Weather Limitations: Do not place concrete when the internal temperature of the concrete is below 45°F nor on frozen subgrade or into forms that are below32°F.

1. Portland Cement Mixes: Discontinue concreting operations when a descending air temperature at the jobsite, in the shade, and away from artificial heat, reaches 35°F or NOAA forecasts the temperature to be less than 32°F within the 24-hour period

following placement. Do not resume PC concreting operations until an ascending air temperature at the jobsite, in the shade, and away from artificial heat, reaches 32°F; provided the high temperature forecasted by NOAA is above 35°F and remains above 32°F for a minimum of 24 hours.

2. Binary Mixes: Discontinue concreting operations when a descending air temperature at the jobsite, in the shade, and away from artificial heat, reaches 40°F or NOAA forecasts the temperature to be less than 35°F within the 36-hour period following placement. Do not resume concreting operations until an ascending air temperature at the jobsite, in the shade, and away from artificial heat, reaches 40°F; provided the high temperature forecasted by NOAA is above 45°F and remains above 40°F for a minimum of 36 hours.

3. Ternary Mixes: Discontinue concreting operations when a descending air temperature at the jobsite, in the shade, and away from artificial heat, reaches 45°F or NOAA forecasts the temperature to be less than 40°F within the 48-hour period following placement. Do not resume concreting operations until an ascending air temperature at the jobsite, in the shade, and away from artificial heat, reaches 45°F; provided the high temperature forecasted by NOAA is above 50°F and remains above 45°F for a minimum of 48 hours. Written authorization from the Chief Construction ENGINEER is required for all concrete operations outside these cold weather limitations.

D. Hot Weather Limitations: During hot weather concreting, it is critical to reduce the evaporation rate from concrete to minimize plastic shrinkage cracking by having an appropriate concrete mix design, placement methods, and curing operations. Furthermore, additional moisture loss precautions may be essential when other environmental conditions (i.e. relative humidity, air temperature, and wind velocity) accelerate water evaporation from the concrete. Hot weather limitations commence when the internal temperature of the concrete during placement, exceeds 85°F. If these conditions exist, maintain an internal concrete placement temperature less than 90ºF or submit concrete trial-batch test results for the concrete mix designs conforming to the requirements for production during hot weather conditions. Meet the following requirements:

1. Maintain a minimum internal concrete temperature of 94°F throughout the trial-batching process.

2. After initial mixing, hold the trial batch in the mixer for 90 minutes. During this period, turn the drum intermittently for 30 seconds every five minutes. In between the intermittent turning of the drum, cover the drum opening with an impermeable cover to prevent moisture loss and to maintain heat. At the end of the 90-minute period, remix the trial batch a minimum of one minute and then test for slump and air content.

3. After completion of a 90-minute mixing period, ensure that the trial batch has the desired workability, with slump and air content within the specified range as shown in Table 03901-3. Allow the addition of water if the slump is below the target range but do not exceed the maximum water-to cementitious material ratio. Remix a minimum of two minutes after addition of second water. Furthermore, ensure that concrete temperature is not less than 94°F at any time during the trial batch testing.

4. Remove and replace concrete placed at a temperature exceeding 90ºF that fails to meet the hot weather trial-batch acceptance criteria at no cost to the OWNER. The CONTRACTOR is responsible for proper mixing, placing, and curing of concrete as determined by the ENGINEER. Regardless of any hot weather precaution taken, remove and replace all concrete attaining an internal temperature in excess of 99ºF during placement at no additional cost to the OWNER.

E. **Rain Protection**: Prior to any concreting operations, have available at the jobsite sufficient plastic sheeting material to prevent rainwater from marring or leaving indentations in any fresh concrete. Lap sections of plastic sheeting a minimum of 18 inches and extend coverage beyond edges so that edges are not marred by falling rainwater. Secure plastic sheeting so that it will remain in place to protect the surface. As soon as conditions permit, reapply all curing compound washed away by the rain. Repair all areas of tining or surface finishing marred by rain or plastic sheeting coverage. Repair all rain-damaged areas at no cost to the OWNER.

3.5 MASS CONCRETE

A. Mass concrete is defined as a structural concrete placement having a least dimension of 48 inches or greater, or if designated on the plans or in the project specifications as being mass concrete. Structural Class S concrete is exempt from mass concrete requirements.

B. Submit proposals for the mass concrete mix design, analysis, temperature monitoring, and control, including insulation and methods, to the ENGINEER for review and acceptance a minimum of 30 days prior to the placement of any mass concrete.

C. The structural class designation for mass concrete is Class MASS (A1, A2, or A3) as shown in Table 901-3.

D. Use Type II Portland cement. Replace Portland cement with fly ash at 20 percent to 50 percent by weight or replace with slag cement at 50 percent to 70 percent by weight or a ternary mix meeting specification requirements. Certify that the cementitious combination generates a heat of hydration of not more than 70 calories/gram at 7 days as determined by ASTM C186 or ASTM C1702.

E. Use Type B or D aggregate gradation for mass concrete.

F. Do not use accelerating admixtures in mass concrete.

G. Produce a structure free from thermal cracks. Place mass concrete continuously to eliminate cold joints. Control differential temperatures by appropriate use of insulated forms, curing blankets, or other acceptable methods. If during the first 48 hours after placement, the temperature differential nears 35ºF, take corrective measures immediately to remain within the limits. Furthermore, revise the plan to maintain the limits on differential temperature on any remaining placements of mass concrete. Obtain the ENGINEER's acceptance of the revised plan prior to implementation. Strength gain and cooling of the mass concrete placements can take a long time. Take all such time and strength considerations into account when planning construction activities.

H. Submit an analysis to the ENGINEER of the projected thermal developments within the mass concrete elements for the anticipated concrete and ambient temperatures, along with the proposed mix design and construction methods. Include a copy of model results, with site and element specific data, and any electronic files. Describe the measures and procedures intended to maintain, monitor, and control the temperature differential between the interior and exterior of the mass concrete elements. A maximum temperature during curing of 160ºF and a maximum differential temperature of 35ºF is allowed. An abbreviated submittal may be allowed for previously approved mass concrete mix designs.

I. Provide temperature-monitoring devices to record temperature development between the interior and the exterior of the element at points acceptable to the ENGINEER. Monitor a minimum of two independent sets of interior and exterior points for each element to provide redundancy. Locate the monitoring points at the geometric center of the element for the interior point and two inches from the surface along the shortest line from the geometric center to the nearest surface of the element for the exterior point. Use automatic sensing and recording instruments that record information at a maximum interval of one hour. Calibrate monitoring devices to the manufacture's recommendations. Use devices that operate within the temperature range of 0 to 180ºF with an accuracy of ± 2ºF. Take readings and record the temperature data at intervals no greater than 6 hours to ensure that the automatic devices are working properly and that the temperatures are within allowable limits. The intervals of one and six hours begin immediately after casting is complete and continue until the maximum temperature differential is reached and begins to drop. Transmit these readings to the ENGINEER daily. Prior to the placement of mass concrete, perform a test of the automatic and manual thermal sensing and recording equipment to ensure they are operational.

3.6 ACCEPTANCE CRITERIA

A. Remove and replace concrete not complying with specifications requirement at no additional cost to the OWNER.

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	Average Compressive Strength, psi, at 28 Days	Grade of Coarse Aggregate[1]	Surface Resistivity, kΩ-cm)[2]	Maximum Water/Cementitious Material Ratio	Air Content, Percent by Volume[3]	Slump Range, Inches[5]		
						Non – Vibrated[4]	Vibrated	Slip Form Paving[6]
Structural Class								
A1	*4,500*	*57M, 67, 89M[9], B,D*	*22*	*0.45*	*2-7*	*2-5*	*2-4[4]*	*N/A*
A2	*6,500[11]*	*57M, 67, 89M[9], B,D*	*22[11]*	*0.45*	*2-7*	*2-5*	*2-4[4]*	*N/A*
A3	*9,000[11]*	*57M, 67, 89M[9], B,D*	*22[11]*	*0.36*	*2-7*	*2-5*	*2-4[4]*	*N/A*
P1	*6,000[8]*	*57M, 67, 89M[9], B,D*	*22*	*0.44*	*2-7*	*N/A*	*2-6[10]*	*N/A*
P2	*8,500[8]*	*57M, 67, 89M[9], B,D*	*22*	*0.40*	*2-7*	*N/A*	*2-6[10]*	*N/A*
P3	*10,000[8]*	*57M, 67, 89M[9], B,D*	*22*	*0.40*	*2-7*	*N/A*	*2-6[10]*	*N/A*
S	*4,500*	*B, D*	*22*	*0.53*	*2-7*	*6-8*	*N/A*	*N/A*
Mass (A1)	*4,500*	*B, D*	*22*	*0.53*	*2-7*	*N/A*	*2-4[4]*	*N/A*
Mass (A2)	*6,500[11]*	*B, D*	*22[11]*	*0.46*	*2-7*	*N/A*	*2-4[4]*	*N/A*
Mass (A3)	*9,000[11]*	*B, D*	*22[11]*	*0.36*	*2-7*	*N/A*	*2-4[4]*	*N/A*
Minor Structure Class								
M	3,000	57M, 67, *89M[9]*, B, D	---	0.56	2-7	2-5	*2-4[4]*	1-2.5
R	1,800	57M, 67, B, D	---	0.70	2-7	2-5	*2-4[4]*	N/A
Pavement Type								
B	*4,000*	*B, D*	---	*0.53*	*2-7*	*N/A*	*2-4*	*1-2.5*
D	*4,000*	*B, D*	---	*0.53*	*2-7*	*N/A*	*2-4*	*1-2.5*
E	*4,000*	*57M, 67, 89M[9], B,D*	---	*0.40*	*2-7*	*N/A*	*2-4*	*1-2.5*

1. Use combined aggregate gradation complying with Section 02003 – Aggregates.
2. Value based on 4" x 8" cylinder tested at 28 – days of age.
3. See specifications for air entrainment requirements.
4. 8 inch maximum slump allowed if water reducers are used.
5. Additional slump may be allowed only with approval of the Engineer.
6. Also slump range for other concrete placed by extrusion methods.
7. See specifications for allowable cement types.

1. Values shown represent the minimum compressive strengths allowed for all cylinders.
2. Only use grade 89M Coarse Aggregate when specified or permitted by the ENGINEER.
3. No more than 2 – inch slump differecntial for any dsign placement. Allow 8 inch maximum slump if water reducers are used.
4. Average Compressive Strength and Resistivity at 56 days.
5. Dry – cast concrete for concrete pipe is exempt from this table.

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SECTION 05500 - MISCELLANEOUS METALWORK

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. Provide miscellaneous metalwork and appurtenances, complete and in place, in accordance with the Contract Documents.

1.2 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

1.3 CONTRACTOR SUBMITTALS, SAMPLING, AND TESTING

A. Provide submittals, samples for testing, and testing of materials in accordance with Section 01010.

B. Submit mill certificates for all steel to be incorporated into the WORK. Provide shop drawings for all components illustrating the dimensions of the components. Provide product information on all nuts, bolts, and accessories as necessary for the ENGINEER to determine compliance with the specification requirements.

PART 2 -- PRODUCTS

2.1 **GENERAL REQUIREMENTS**

A. **Corrosion Protection:** Unless otherwise indicated, coat fabricated steel metalwork which will be used in a corrosive environment and/or will be submerged in water/wastewater in accordance with Section 09800 - Protective Coating and do not galvanized prior to coating. Hot – dip galvanize other miscellaneous steel metalwork after fabrication.

B. **Stainless Steel:** Unless otherwise indicated, use Type 316 stainless steel for steel metalwork and use boats be of Type 316 stainless steel. Where anaerobic conditions are noted, use Type 304 stainless steel.

C. **Aluminum:** Unless otherwise indicated, use Alloy 6061-T6. Coat contact surfaces of aluminum in contact with concrete, masonry, wood, porous materials, or dissimilar metals in accordance with Section 09800.

D. **Cast Iron:** Unless otherwise indicated, use iron castings conforming to the requirements of ASTM A 48, Class 50B or better.

2.2 **STRUCTURAL STEEL**

A. **Structural Steel:** Use structural steel complying 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. Use bolts complying with ASTM A 325 for connections, unless indicated otherwise. Use ASTM A 193 and A 194, Type 316 stainless steel bolts used to connect dissimilar metals.

C. **Welded Anchor Studs:** Use 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. Clean and coat structural steel in accordance with Section 09800 - Protective Coating.

E. Galvanize steel members in contact with aluminum as specified herein, unless indicated otherwise.

F. Furnish structural members full length without splices unless otherwise indicated or approved by the ENGINEER.

2.3 **BOLTS AND ANCHORS**

A. **Standard Service (Non-Corrosive Application):** Unless otherwise indicated, provide steel bolts, anchor bolts, washers, and nuts. Provide threads on galvanized bolts formed with suitable taps and dies such that they retain their normal clearance after hot-dip galvanizing. Except as otherwise indicated, use steel for bolt material, anchor bolts, and cap screws complying with the following:

1. Structural connections: ASTM A 307, Grade A or B, hot-dip galvanized.

2. Anchor Bolts: ASTM A 307, Grade A or B, or ASTM A 36, hot-dip galvanized.

3. High strength bolts where indicated: ASTM A 325.

4. Pipe and equipment flange bolts: ASTM A 193, Grade B-7.

B. **Corrosive Service:** Use stainless steel bolts, nuts, and washers in the locations listed below:

1. Buried locations.

2. Submerged locations.

3. Locations subject to seasonal or occasional flooding.

4. Inside hydraulic structures below the top of the structure.

5. Inside buried vaults, manholes, and structures that do not drain through a gravity sewer or to a sump with a pump.

6. Chemical handling areas.

7. Inside trenches, containment walls, and curbed areas.

8. Locations indicated by the Contract Documents or designated by the ENGINEER to be provided with stainless steel bolts.

C. Where stainless steel bolts are required, provide stainless seel bolts, anchor bolts, nuts, and washers of Type 316 stainless steel, Class 2, conforming to ASTM A 193 for bolts and to ASTM A 194 for nuts. Protect threads on stainless steel bolts with an antiseize lubricant suitable for submerged stainless steel bolts, to meet government specification MIL-A-907E. Use lubricant suitable for contact with potable water and listed on NSF 61. Use "PURE WHITE" by **Anti-Seize Technology,** Franklin Park, IL, 60131, AS-470 by **Dixon Ticonderoga Company,** Lakehurst, NJ, 08733, or equal.

D. **Bolt Requirements**

1. Use bolt and nut material made of free-cutting steel.

2. Use nuts capable of developing the full strength of the bolts. Provide Coarse Thread Series threads conforming to the requirements of the American Standard for Screw Threads. Provide bolts and cap screws hexagon heads and provide Heavy Hexagon series nuts.

3. Install bolts and nuts with washers fabricated of material matching the base material of bolts, except that hardened washers for high strength bolts must conform to the requirements of the AISC Specification. Install lock washers fabricated of material matching the bolts where indicated.

4. Provide bolts of length such that the bolt extends at least 1/8-inch beyond the outside face of the nut before tightening. For anchor bolts, provide bolts of such length such that the bolt is flush with the face of the nut before tightening.

E. **Adhesive Anchors and Rods:** Use adhesive anchors in drilled holes in concrete or mansonry.

1. Use adhesive anchors and rods which employ an injectable adhesive. Use adhesive furnished in side-by-side refill packets that keep components separate prior to installation. Use side – by – side refill packets which use static mixing nozzles which thoroughly combines components and allows injection directly into drilled hole. Only use injection tools and static mixing nozzles as recommended by manufacturer. Follow manufacturer's recommended instructions. Use **HILTI – HY 500 MAX – SD** or equal.

2. Furnish rodd with chamfered ends so that either end will accept a nut and washer. Alternatively, furnish rods with at 45 degree chisel end on one end to allow for easy insertion into an adhesive – filled hole. Use anchor rods manufactured to meet ISO

898 Class 5.8, ASTM A193 Grade B7 (high strength carbon steel anchor). Use **HILTI HAS Rods** or equal.

F. **Expanding-Type Anchors:** Do not use expanding type (or "wedge") anchors for any application.

G. **Non-Shrink Grouted Anchors**: Do not use non –shrink

2.4 POWDER-DRIVEN PINS

A. **Materials:** If permitted, use heat-treated steel alloy powder driven pins. If the pins are not inherently sufficiently corrosion-resistant for the conditions to which they will be exposed, protect the pins an acceptable manner. Use pins with capped or threaded heads capable of transmitting the loads the shanks are required to support. Where pins that are connected to steel use pints with longitudinal serrations around the circumference of the shank.

2.5 IMPACT ANCHOR

A. If permitted, use expansion type anchors in which a nail type pin is driven to produce the expansive force. Use pins with a zinc sleeve with a mushroom style head and stainless steel nail pin. Use **Metal Hit Anchors,** manufactured by **Hilti, Inc., Rawl Zamac Nailin,** manufactured by **the Rawlplug Company;** or equal.

PART 3 -- EXECUTION

3.1 GENERAL

A. **Measurements:** Verify all dimensions and make any field measurements necessary. Assume full responsibility for accuracy and layout of work. Review the Drawings, and report any discrepancies to the ENGINEER for clarification prior to starting fabrication.

3.2 STRUCTURAL STEEL

A. **Fabrication:** Fabricate structural steel in accordance with the Drawings, AISC Specifications, and as shown on the Shop Drawings. Properly mark materials and match-mark for field assembly. Where finishing is required, complete assembly including bolting and welding of units, before start of finishing operations.

B. **Connections:** Bolt and weld shop and field connections as indicated. Make connections which develop full strength of members joined and which conform to AISC standard connections. Unless otherwise indicated, make welds conforming to AISC LRFD Specification for Structural Steel Buildings.

C. **Welded Construction:** Comply with the current AWS D1.1 Code for procedures, appearance, and quality of welds and welders, and methods used in correcting welding work. Grind all exposed welds for welded architectural metal work exposed to view smooth. Use shielded metal arc welding method or gas metal arc welding methods for welding structural steel.

D. **Holes for Other Work:** Provide holes 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:** Apply shop paint primer 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:** Load structural members in such a manner that they may be transported and unloaded without being excessively stressed, deformed, or otherwise damaged. Protect structural steel members and packaged materials from corrosion and deterioration. Store material in a dry area and do not place materials in direct contact with the ground. Do not place materials on the structure in a manner that might cause distortion or damage to the members or the supporting structures. Repair or replace damaged materials or structures as directed.

G. **Erection:** Comply with the AISC Specifications and Code of Standard Practice, and with indicated requirements. Install high – strength bolts in accordance with the AISC Specification for Structural Joints using ASTM A 325 Bolts. Provide friction type connections, unless indicated otherwise. Furnish 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. Assume the full responsibility for designing and installing any temporary bracing required for the safe erection of all structural steel members.

H. **Setting Bases and Bearing Plates:** Prior to the placement of non-shrink grout beneath base and bearing plates, clean the bottom surface of the plates of all bond-reducing materials. Clean the concrete and masonry bearing surface of all bond-reducing materials and roughen the surface to improve bonding. Set loose and attached baseplates and bearing plates for structural members on wedges, leveling nuts, or other adjustable devices. Tighten anchor bolts after the supported members have been positioned and plumbed and the non-shrink grout has attained its indicated strength. Grout baseplates with non-shrink grout to assure full uniform bearing. Complete grouting prior to placing loads on the structure.

I. **Field Assembly:** Set structural frames accurately to the lines and elevations indicated. Align the various members and adjust to form a part of a complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces which will be in permanent contact before assembly. Perform adjustments to compensate for discrepancies in elevations and alignments. Level and plumb individual member within AISC tolerances. Establish required leveling and plumbing measurements on the mean operating temperature of the structure.

J. **Misfits at Bolted Connections:** Where misfits in erection bolting are encountered, immediately notify the ENGINEER. Submit a proposed 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. Do not enlarge incorrectly sized or misaligned holes in members by burning or by the use of drift pins. Correction of misfits is part of the WORK.

K. **Gas Cutting:** Do not use gas cutting torches in the field for correcting fabrication errors in the structural framing, except when approved by the ENGINEER. Finish gas cut edges equal to a sheared appearance.

L. **Touch – Up Painting:** Immediately after erection, clean all field welds, bolted connections, and abraded areas of the shop paint primer. Apply touch-up paint primer by brush or spray which is the same thickness and material as that used for the shop paint. Repair galvanized surfaces which have been field welded or damaged in accordance with Section 05500. Finish paint all structural steel as indicated in Section 09800.

3.3 POWDER DRIVEN PINS

A. **Powder-Driven Pins:** If permitted, use craftsperson certified by the manufacturer as being qualified to install the manufacturer's pins. Drive pins in one initial movement by an instantaneous force that has been carefully selected to attain the required penetration. Conform to the following requirements where "D" = pin's shank diameter:

Material Penetrated by Pin	Material Minimum Thickness	Pin Shank Penetration in Supporting Material	Minimum Space From Pin's CL to Edge of Penetrated Material	Minimum Pin Spacing
Concrete	16D	6D minimum	14D	20D
Steel	1/4-inch	Steel thickness	4D	7D

3.4 WELDING

A. **Method:** Provide welding using 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. Use welders qualified in accordance with the AWS Standards governing same.

B. **Quality:** In assembly and during welding, adequately clamp, support, and restrain components as to minimize distortion and for control of dimensions. Use reinforcement as indicated by the AWS Code. Upon completion of welding, remove weld splatter, flux,

slag, and burrs left by attachments. Repair welds to produce a workmanlike appearance, with uniform weld contours and dimensions. Grind sharp corners of material that is to be painted or coated to a minimum of 1/32-inch on the flat.

3.5 GALVANIZING

A. Galvanize structural steel plates shapes, bars, and fabricated assemblies required to be galvanized after the steel has been thoroughly cleaned of rust and scale in accordance with the requirements of ASTM A 123. Straighten any galvanized part that becomes warped during the galvanizing operation. Galvanize olts, anchor bolts, nuts, and similar threaded fasteners, after being properly cleaned, in accordance with the requirements of ASTM A 153.

B. Make field repairs to damaged galvanizing by preparing the surface and applying a coating.

1. Prepare surfaces by 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. Apply coating 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. Install drilled anchors and reinforcing bars in strict accordance with the manufacturer's instructions. Roughen holes with a brush on a power drill, cleaned and dry. Do not install drilled anchors until the concrete has reached the required 28-day compressive strength. Do not load anchors 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. 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, includes 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. Do not coat the following surfaces:

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. Glass

6. Equipment nameplates

7. Platform gratings, stair treads, door thresholds, and other walk surfaces, unless specifically indicated to be coated.

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.

E. Where protective coatings are to be performed by a subcontractor, provide 5 references which show that the painting subcontractor has previous successful experience with the indicated or comparable coating systems. Include the name, address, and the telephone number for the owner of each installation for which the painting subcontractor provided the protective coating.

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 Compounds 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. Provide submittals, samples for testing, and testing of materials in accordance with Section 01010 – General Requirements.

B. Submit product data on all coatings to be incorporated into the WORK.

1.4 SPECIAL CORRECTION OF DEFECTS REQUIREMENTS

A. **Warranty Inspection:** Conduct a warranty inspection during the eleventh month following completion of all coating and painting work with the CONTRACTOR and a representative of the coating material manufacturer in attendance. Repair any defective work 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.

PART 2 -- PRODUCTS

2.1 GENERAL

A. **Suitability:** Use suitable coating materials as recommended by the manufacturer. 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. Propose a compliant substitution product of equal quality. Unless indicated otherwise, proposed substitute materials will be considered as indicated above. Coating materials must have a record of satisfactory performance in industrial plants, manufacturing facilities, and water and wastewater treatment plants.

C. **Compatibility:** In any coating system use only compatible materials from a single manufacturer in the work. Direct particular attention to compatibility of primers and finish coats. If necessary, apply a barrier coat between existing prime coat and subsequent field coats to ensure compatibility.

D. **Containers:** Seal coating materials in containers that plainly show the designated name, formula or specification number, batch number, color, date of manufacture, and name of manufacturer at the time of use.

E. **Colors:** Select all colors and shades of all coats of paint as indicated by the ENGINEER. Apply each coat in a slightly different shade to facilitate inspection of surface coverage of each coat. Select finish colors from the manufacturer's standard color samples provided by the ENGINEER.

F. Substitute or "Or-Equal" Products

1. Establish equality of products in accordance with the Contract Documents, by furnishing 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. Utilize protective coating materials which are standard products produced by recognized manufacturers who are regularly engaged in production of such materials for essentially identical service conditions. Where requested, 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. Bear all such costs involved as part of the WORK if a proposed substitution requires changes in the WORK.

2.2 INDUSTRIAL COATING SYSTEMS

A. **System 3 - Aluminum Silicone Resin:** Provide aluminum silicone resin material suitable for a service temperature of up to 1,000 degrees F, and 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 5 - Inorganic Zinc/Polyurethane:** Utilize an inorganic zinc primer that is 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. Provide an intermediate coat with a high-build two component epoxy and a solids content of at least
69 percent by volume. Utilize a finish coats with 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. Apply an intermediate coat 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. Apply more than one finish coat 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, spot abrasive blast and coat all damaged and uncoated areas after construction using the indicated material.

C. **System 6 - Inorganic Zinc, Silicone Topcoat:** Provide a self-curing, zinc silicate coating material with a two component inorganic coating material that contains at least 85 percent of metallic zinc by weight in the dried film. System will 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

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:** Provide a high build, amine cured, epoxy resin with a solids content of at least 80 percent by volume, that is suitable for long-term immersion service in potable water and municipal wastewater. For potable water service, utilize a coating material indicated 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, prime the pipe and fittings using a primer recommended by the PVC tape manufacturer. After being primed, wrap the pipe with a 20-mil adhesive PVC tape, half-lapped, to a total thickness of 40 mils.

B. **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. 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. Utilize a skilled craftsmen and experienced supervision on all WORK.

B. Produce coatings in a workmanlike manner with an even film of uniform thickness. Treat edges, corners, crevices, and joints with special attention to ensure thorough cleaning and an adequate thickness of coating material. Ensure finished surfaces are free from runs, drops, ridges, waves, laps, brush marks, and variations in color, texture, and finish. Complete the hiding so that the addition of another coat would not increase the hiding. Give special attention to ensure that edges, corners, crevices, welds, and similar areas receive a film thickness equivalent to adjacent areas. Utilize drop cloths or other precautionary measures to protect adjacent areas and installations.

C. Clean, repair, and refinish all damage to surfaces resulting from the WORK back to original condition.

3.3 STORAGE, MIXING, AND THINNING OF MATERIALS

A. **Manufacturer's Recommendations:** Unless otherwise indicated, strictly observe 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.

B. Utilize all protective coating materials within the manufacturer's recommended shelf life.

C. **Storage and Mixing:** Store coating materials under the conditions recommended by the Material Safety Data Sheets, and thoroughly stir, strain, and maintain a uniform consistency during application. Do not mix coatings of different manufactures together.

3.4 PREPARATION FOR COATING

A. **General:** Clean all indicated surfaces receiving protective coatings prior to application of coatings. Examine all surfaces to be coated, and correct all surface defects before application of any coating material. Touch-up all marred or abraded spots on shop- primed and on factory-finished surfaces prior to any coating application. Ensure all surfaces to be coated are dry and free of visible dust.

B. **Protection of Surfaces Not to be Coated:** Protect all surfaces not receiving protective coatings during surface preparation, cleaning, and coating operations.

C. Remove, mask, or otherwise protect all hardware, lighting fixtures, switchplates, machined surfaces, couplings, shafts, bearings, nameplates on machinery, and other surfaces not being painted. Utilize drop cloths to prevent coating materials from falling on or marring adjacent surfaces. Protect the working parts of all mechanical and electrical equipment from damage during surface preparation and coating operations. Mask openings in motors to prevent entry of coating or other materials.

D. Exercise care not to damage adjacent work during blast cleaning operations. Conduct spray painting under carefully controlled conditions. Assume full responsibility and pay all costs for the prompt repair of any and all damage to adjacent work or adjoining property occurring from blast cleaning or coating operations.

E. **Protection of Painted Surfaces:** Coordinate cleaning and coating so that dust and other contaminants from the cleaning process will not fall on wet, newly coated surfaces.

3.5 SURFACE PREPARATION STANDARDS

A. Include the following referenced surface preparation specifications of the Steel Structures Painting Council as 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 is 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 is limited to no more than 5 percent of each square inch of surface area.

3.6 METAL SURFACE PREPARATION (UNGALVANIZED)

A. Utilize the minimum abrasive blasting surface preparation as indicated in the coating system schedules included at the end of this Section. Utilize the higher degree of cleaning where there is a conflict between these specifications and the coating manufacturer's printed recommendations for the intended service.

B. Provide workmanship for metal surface preparation in conformance with the current SSPC Standards and this Section. Match blast cleaned surfaces to 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. Remove all oil, grease, welding fluxes, and other surface contaminants by solvent cleaning per SSPC SP1 - Solvent Cleaning prior to blast cleaning.

D. Round or chamfer all sharp edges and grind smooth all burrs, surface defects and weld splatter prior to blast cleaning.

E. Select the type and size of abrasive to produce a surface profile that meets the coating manufacturer's recommendation for the particular coating and service conditions. Provide clean, hard, sharp cutting crushed slag as abrasives for submerged and severe service coating systems. Do not utilize automated blasting systems for surfaces that will be in submerged service. Do not utilize metal shot or grit 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. Do not reuse abrasives unless an automated blasting system is used for surfaces that will be in non-submerged service. Maintain clean oil-free abrasives for automated blasting systems. Provide an abrasive mix with at least 50 percent grit.

G. Comply with the applicable federal, state, and local air pollution control regulations for blast cleaning.

H. Supply compressed air for air blast cleaning at adequate pressure from well maintained compressors equipped with oil and moisture separators that remove at least 95 percent of the contaminants.

I. Clean surfaces of all dust and residual particles of the cleaning operation by dry air blast cleaning, vacuuming, or another approved method prior to painting.

J. Vacuum clean all enclosed areas and other areas where dust settling is a problem and wipe area clean with a tack cloth.

K. Remove damaged or defective coating by the blast cleaning to meet the clean surface requirements before recoating.

L. Utilize SSPC SP2 or SSPC SP3 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.

M. Completely remove shop applied coatings of unknown composition before the indicated coatings are applied. Examine all valves, castings, ductile or cast iron pipe, and fabricated pipe or equipment for the presence of shop-applied temporary coatings. Completely remove temporary coatings by solvent cleaning per SSPC SP1 before the abrasive blast cleaning work has been started.

N. Solvent clean shop primed equipment in the field before finish coats are applied.

3.7 SURFACE PREPARATION OF FERROUS SURFACES WITH EXISTING COATINGS

A. **General:** Remove all grease, oil, heavy chalk, dirt, or other contaminants by solvent or detergent cleaning prior to abrasive blast cleaning. Determine the generic type of the existing coatings by laboratory testing.

B. **Abrasive Blast Cleaning:** 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 remove by abrasive blast cleaning to SSPC SP6. Clean areas of tightly adhering coatings 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, apply intermediate coatings per the paint manufacturer's recommendation for the indicated coating system or completely remove the existing coating prior to abrasive blast cleaning. Conduct a small trial application for compatibility prior to painting large areas.

D. **Unknown Coatings:** Completely remove coatings of unknown composition 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, use paint-compatible corrosion inhibitors, and begin coating application as soon as the surfaces are dry. Utilize water abrasive blasting with high pressure water with sand injection. In both methods, utilize equipment commercially produced equipment with a successful service record. Do not use wet blasting methods for submerged and severe service coating systems unless indicated.

3.8 PLASTIC, FIBER GLASS AND NONFERROUS METALS SURFACE PREPARATION

A. Sand or brush off blast cleaned plastic and fiber glass surfaces prior to solvent cleaning with a chemical compatible with the coating system primer.

B. Solvent-clean all non-ferrous metal surface to remove all soluble surface contaminants followed by brush-off blast cleaning to remove insoluble contaminants and to achieve a uniformly profiled surface.

C. Clean and dry all surfaces prior to coating application.

3.9 SHOP COATING REQUIREMENTS

A. Unless otherwise indicated, shop prime and then finish coat in the field after installation with the indicated or selected color all items of equipment, or parts of equipment which are not submerged in service. Ensure all methods, materials, application equipment and all other details of shop painting comply with this section. If the shop primer requires topcoating within a specified period of time, finish coat the equipment in the shop and then touch-up painted after installation.

B. Perform all surface preparation and coating work in the field for 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.

C. Perform all surface preparation and coating work in the field for the interior surfaces of steel water reservoirs, except for Part A surfaces

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. Prime and finish coat such equipment in the shop and touch up in the field with the identical material after installation. 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. Submit the coating material data sheet 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. Protect shop painted surfaces during shipment and handling by suitable provisions including padding, blocking, and the use of canvas or nylon slings. Do not expose primed surfaces to the weather for more than 2 months before being topcoated, or less time if recommended by the coating manufacturer.

G. Repair damage to shop-applied coatings in accordance with this Section and the coating manufacturer's printed instructions.

H. Ensure shop primers and field topcoats are compatible and meet the requirements of this Section. Submit copies of applicable coating manufacturer's data sheets with equipment Shop Drawings.

3.10 APPLICATION OF COATINGS

A. Ensure the application of protective coatings to steel substrates is in accordance with SSPC PA1 - Paint Application Specification No. 1.

B. Inspect all cleaned surfaces and all coats prior to each succeeding coat. Schedule such inspection in advance with the ENGINEER.

C. Paint blast cleaned ferrous metal surfaces before any rusting or other deterioration of the surface occurs. Limit blast cleaning to only those surfaces that can be coated in the same working day.

D. Apply coatings in accordance with the manufacturer's instructions and recommendations, and this Section, whichever has the most stringent requirements.

E. Give special attention 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. Give special attention to materials that will be joined so closely that proper surface preparation and application are not possible. Coat such contact surfaces prior to assembly or installation.

G. Apply finish coats, including touch-up and damage repair coats in a manner that will present a uniform texture and color matched appearance.

H. Do not apply coatings 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. Determine dewpoint by use of a sling psychrometer in conjunction with U.S. Dept. of Commerce, Weather Bureau psychometric tables.

J. Abrasive blast clean unburied steel piping and prime before installation.

K. Apply the finish coat on all work after all concrete, masonry, and equipment installation is complete and the work areas are clean and dust free.

3.11 CURING OF COATINGS

A. 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.

3.12 SHOP AND FIELD INSPECTION AND TESTING

A. General: 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. Perform all such work 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, does not relieve the CONTRACTOR of its responsibility to perform the work in accordance with these Specifications.

D. Erect and move scaffolding to locations where requested by the ENGINEER to facilitate inspection. Furnish additional illumination to cover all areas to be inspected.

E. **Inspection Devices:** 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. Make dry-film thickness gauges available for the ENGINEER'S use at all times while coating is being done, until final acceptance of such coatings. Furnish the services of a trained operator of the holiday detection devices until the final acceptance of such coatings. Operate holiday detection devices only in the presence of the ENGINEER.

F. **Holiday Testing:** 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. Mark, repair, or recoat areas that contain holidays 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: utilize pulse-type holiday detector such as **Tinker & Rasor Model AP-W, D.E. Stearns Co. Model 14/20**, or equal. Adjust the

unit 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: use **Tinker & Rasor Model M1 non-destructive type holiday detector, K-D Bird Dog,** or equal. Operate the unit at less than 75- volts. For thicknesses between 10 and 20 mils, add a non-sudsing type wetting agent, such as **Kodak Photo-Flo,** or equal, to the water prior to wetting the detector sponge.

G. **Film Thickness Testing:** On ferrous metals, measure the dry film coating thickness 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. Test each coat for the correct thickness. Do not take measurements until at least 8 hours after application of the coating. On non-ferrous metals and other substrates, measure the coating thicknesses 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.

3.13 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 stormwater	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 or concrete encased small steel pipe or conduit.	Removal of dirt, grease, oil	(200) PVC tape
FM-14	Structural steel, miscellaneous metalwork, and supports	Per Section 05500	Galvanized per Section 05500

3.14 COATING SYSTEM SCHEDULE, NON-FERROUS METAL, PLASTIC, FIBER GLASS

A. Where isolated non-ferrous parts are associated with equipment or piping, use the coating system for the adjacent connected surfaces. Do not coat handrails, gratings, frames or hatches. Only use primers recommended by the coating manufacturer.

	Item	**Surface Prep.**	**System No.**
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-6	Buried or concrete encased non-ferrous metal pipe.	Removal of dirt, grease, oil	(200) PVC tape

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SECTION 11178 – ELEVATION OF EXISTING VERTICAL TURBINE PUMP MOTORS

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. Provide all labor, materials, supervision, equipment, travel, utilities, transportation, supplies, tools, and services necessary for the elevation of vertical turbine pump motors as specified herein and as indicated on the drawings.

B. Remove each pump along with all other appurtenances, in accordance with the Sequence of Construction. Remove each pump under the OWNER's supervision. After removal, arrange for the repair shop to dismantle each 54" pump and conduct an assessment of which of the 54" pumps is more suitable for rehabilitation and modification. Submit a written report and recommendation from the repair shop to the OWNER prior to rehabilitation of any pump.

C. Use the drawings for general guidance only. Verify all dimensions, sizes, locations, and equipment mountings in the field. Ascertaining and verify all sizes, dimensions, quantities, prior to Bidding.

D. Various items necessary and proper for the construction may not be shown on the Drawings or named in the Specifications. This does not relieve the CONTRACTOR of his responsibility to furnish and/or perform said items in order to accomplish the intent of the Contract.

E. Provide all items, articles, materials, etc. necessary for the complete installation of the pump, including anything mentioned herein, scheduled, or shown in the Drawings, and all labor, workmanship, tools, etc. required for the proper installation thereof to accomplish the intention. In general, provide any item of labor or material that is obviously necessary for a completed system to accomplish the intention, whether specifically mentioned or not.

F. **Qualifications of Repair Facility:** Employ a pump repair facility with a verifiable record of at least 15 years of successful and trouble – free repair experience of similar equipment in similar applications and size equal or larger than the equipment in this contract. Submit a record of experience to the ENGINEER during the submittals phase.

1.2 REFERENCE STANDARDS

A. NOT USED

1.3 CONTRACTOR SUBMITTALS, SAMPLING, AND TESTING

A. Furnish submittals in accordance with Section 01010 and Section 01030 – Submittals and Sampling Plan.

B. **Source Approval/Submittal:** Submit product information for all materials required to establish compliance with the specifications. Include at least the following:

1. Certified shop and installation drawings showing all important details and dimensions.

2. Descriptive literature, bulletins, and/or catalogs of the equipment.

3. Data on the characteristics and performance of each pump.

4. Total weight of each modified pump.

5. A schedule of the date of shop testing and delivery of the equipment to the job site.

6. Description of pump repair shop test procedures and equipment.

7. Copies of all test results.

8. Qualifications of the pump rebuilder.

C. **Operation and Maintenance Manual:** Furnish complete operating and maintenance instructions or all equipment included under these specifications. Include troubleshooting data and full preventive maintenance schedules, and complete spare parts lists with ordering information.

D. **Torsion and Vibration Analyses**

1. Arrange for and submit torsional and lateral vibration analyses for each rehabilitated pump.

2. Employ an experienced specialist from the equipment manufacturer to perform a complete torsional and lateral vibration analysis of each distinct equipment, motor, and variable speed drive. Identify the dry and wet lateral critical speeds plus the torsional critical speeds of the system. Prepare and submit appropriate lateral and critical speed maps.

3. Do not allow an active critical speed to be within 25 percent of the operating speed range. Do not start fabrication of the equipment 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.

F. **Pump Condition Assessment Report:** Provide a written report documenting the condition of the pumps upon receipt at the shop, along with written recommendations for which pump is more suitable for repair and modification. Present these recommendations for review prior to proceeding with rehabilitation of the pump.

1.4 QUALITY ASSURANCE

A. To assure unity of responsibility, assume full responsibility for the satisfactory installation and operation of each pump assembly, including pumps, drives, engines, and controls as specified.

B. Remove, rehabilitate, and reinstall pumps in accordance with the best practice and methods. Ensure that rehabilitated and modified pumps will operate satisfactorily when installed.

C. Ensure that rebuilt equipment furnished under this Specification is like new and which is compatible with the standard products of the manufacturers. Provide working parts of the rebuilt pumps, such as bearings, wearing rings, shaft, sleeves, etc., that are to standard dimensions, such that parts will be interchangeable between like units and such that the OWNER may, at any time in the future, obtain replacement and repair parts for those furnished in the rebuilt machines. Properly mark parts for identification and location in the machines as shown on assembly drawings in service manuals.

D. The term “pump rebuilder”, where used herein, is understood to mean the entity supervising the modifications to the pumps.

E. **Costs:** Assume full responsibility and pay all costs for inspection, startup, testing, adjustment, and instruction services performed by pump repair shop 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.

F. **Quality and Tolerances:** Closely adhere to tolerances and clearancesas shown on the Shop Drawings

1. Provide machine work 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. Provide castings which are homogeneous and free from non-metallic inclusions and defects. Clean surfaces of castings which are not machined 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. Notify the ENGINEER of larger defects. Do not carry out repair welding of such defects 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. Pay all costs of casting new material as part of the WORK.

3. Provide materials which meet or exceed the physical and mechanical properties in accordance with the reference standards.

G. **Machine Finish:** Provide the type of finish which is the most suitable for the application. Show finish in micro-inches in accordance with ANSI B46.1. Use the following finishes unless otherwise directed.

1. Provide surface roughness not greater than 63 micro-inches for surfaces in sliding contact.

2. Provide surface roughness not greater than 250 micro-inches for surfaces in contact where a tight joint is not required.

3. Provide surface finish not greater than 500 micro-inches for other machined surfaces.

4. Finish contact surfaces of shafts and stems which pass through stuffing boxes and contact surfaces of bearings to a surface finish not greater than 32 micro-inches.

H. **Shop Fabrication:** Perform shop fabrication in accordance with the Contract Documents and referenced standards.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Properly protect all parts and components so that no damage or deterioration will occur during a prolonged delay from the time of shipment until installation is completed and the units and equipment are ready for operation.

B. All equipment and parts must be properly protected against any damage during a prolonged storage period at the site.

C. Do not dismantle assembled parts and components for shipment unless permission is received in writing from the OWNER.

D. Protect finished surfaces of all exposed openings by blanks strongly built and securely bolted thereto.

E. Properly protect finished iron or steel surfaces not painted to prevent rust and corrosion.

F. After all tests, drain all entrapped fluids and oil prior to shipment, and take proper care to protect parts from the entrance of water during shipment, storage, and handling.

G. Properly mark each box or package to show its net weight in addition to its contents.

1.6 **TOOLS AND SPARE PARTS**

A. Provide one (1) set of all special tools (if required) for normal operation and maintenance. Furnish such tools in a suitable steel tool chest complete with lock and duplicate keys.

B. Properly bind and label all spare parts for easy identification without opening the packaging and suitably protected for long term storage.

PART 2 -- PRODUCTS

2.1 GENERAL

A. Provide rehabilitated and modified pumps complete and operable. Design and proportion all parts to have liberal strength, stability, and stiffness and to be especially adapted for the service to be performed and with due consideration of the project site.

B. Any replacement or additional anchor bolts to be coated with epoxy coating. Provide nuts and washers to match existing. Use anti-seize agent with all bolts.

C. Attach nameplates giving the name of the manufacturer and all pertinent data to each pump, motor, and control panel.

D. Rehabilitate and modify pumps using standard dimensions such that parts will be interchangeable between like units.

2.2 EXISTING EQUIPMENT DESCRIPTION

A. Existing pump information is indicated below:

Pump Description	20” Drainage Pump	54” Drainage Pump	54” Drainage Pump
Equipment Number	01-E1	01-E2	01-E2
Quantity	1	1	1
Manufacturer	Verti – Line	Peerless	Peerless
Manufacturer’s Serial Number	8G8-04835	304986	304987

B. Specific requirements of modification for each item of equipment is indicated in Section 3.

2.3 MODIFIED PUMP CONSTRUCTION REQUIREMENTS

A. Materials and construction details are indicated in the table below:

Column Shaft and Couplings	Provide extended column shafts of Type 416 stainless steel shaft in maximum 10-ft lengths, turned, ground and polished with a minimum 8- mils thick hard chrome journal. Size column shafts for a critical speed of 20 percent above maximum operating speed. Provide shaft couplings of Type 410 stainless steel, keyed to the shaft.
Columns	Provide extended pump columns of Steel pipe, minimum 0.375-inch thick, with 12-mils DFT minimum thickness epoxy lining and coating, in maximum 10-ft lengths, flanged ends with O-ring seals, Neoprene or Buna-N, lineshaft bearing retainers. Top and bottom sections not to exceed 5-ft lengths. Flange ends with registered fit, line bored and machine square about the shaft access flange ends and through bolting. Provide eyebolts which can be utilized in the column flange bolt holes. Design the columns for appropriate wind, live, dead, and seismic loads. Attach the extended column to the pump base plate by a minimum of four 4” minimum Schedule 80 ASTM A53 steel pipes set at 90 degrees apart, connecting the top motor base ring with the head support plate.
Shaft Lubrication	Furnish each rehabilitated pump with a lubrication solenoid valve interlocked with the pump starter, a bypass ball valve and a sight glass. Provide a one gallon storage tank on each pump. Provide structural support to raise the tank as required to allow gravity flow to the pumps. Use schedule 40 black steel pipe and bronze body and stainless steel ball suitable for lubrication oil service.
Shaft Seal (for enclosed lineshaft only)	Provide close tolerance bronze shaft bushing with oil lubrication connection with oiler solenoid valve, 110 volts, 1 phase, 60 hertz, and bypass valve.
Line Shaft Bearing	For enclosed line shaft: bronze bearings

Suction Bell Bearing	Close tolerance bronze sleeve type bearing with length min 2-1/2 times shaft diameter, permanently grease-lubricated for suction bell with non-soluble grease
Motor Shaft Coupling	Precision 4 piece, heavy-duty adjustable spacer coupling, with registered fit, to allow for impeller adjustment for hollow shaft motors.
Anchor, Discharge Head to Sole Plate, and Wetted Bolts	Type 316 stainless steel.

2.4 SERVICE FACTORS

A. **Drive Trains and Service Factors:** Apply service factors in the selection or design of mechanical power transmission components. Design and rate all components of drive train assemblies between the prime mover and the driven equipment to deliver the maximum peak or starting torque, speed, and horsepower. Consider all of the applicable service factors, 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, use the following load classifications in determining service factors:

Type of Equipment	Service Factor	Load Classification
Pumps centrifugal	1.0	Uniform

B. Mechanical Service Factors

	Mechanical Service Factors	
	Electric Motor	
Uniform	1.25	

2.5 WELDING

A. Unless otherwise indicated, provide welding conforming to the following:

1. Latest revision of AWWA D100.

2. Latest revision of AWWA C206.

3. Provide 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, with continuous seal welds to prevent entrance of air or moisture.

4. Use 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 for all welding. Employ welders and equipment qualified in accordance with the AWS Standards.

5. In assembly and during welding, adequately clamp, support, and restrain components to minimize distortion and for control of dimensions. Use weld reinforcement as specified by the AWS code. Upon completion of welding, remove weld splatter, flux, slag, and burrs left by attachments. Repair welds to produce a workmanlike appearance, with uniform weld contours and dimensions. Grind sharp corners of material that is to be painted or coated to a minimum of 1/32-inch on the flat.

B. **Protective Coating:** Paint or coat all equipment in accordance with Section 09800 - Protective Coating, unless otherwise indicated. Coat non-ferrous metal and corrosion-resisting steel surfaces with grease or lubricating oil. Protect coated surfaces from abrasion or other damage during handling, testing, storing, assembly, and shipping.

2.6 BEARINGS

A. **General:** Provide bearings which conform to the standards of the American Bearing Manufacturers Association, Inc. (ABMA).

B. To assure satisfactory bearing application, consider fitting practice, mounting, lubrication, sealing, static rating, housing strength, and lubrication in bearing selection.

C. Provide lubricated-for-life bearings and that are factory-lubricated with the manufacturer's recommended grease to insure maximum bearing life and best performance.

D. **Anti-Friction Type Bearing Life:** Except where otherwise indicated, provide bearings with a minimum L-10 life expectancy of 10 years or 60,000 hours.

2.7 GASKETS AND PACKINGS

A. Use mechanical seals for packing around rotating shafts (other than valve stems), as recommended by the pump rebuilder and approved by the ENGINEER.

2.8 NAMEPLATES

A. Provide stainless steel nameplates which are 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. Provide the manufacturer's name, model, serial number, size, characteristics, and appropriate data describing the machine performance ratings.

2.9 EQUIPMENT LUBRICANTS

A. Install lubricants for all equipment during storage and prior to initial testing of the equipment. After successful initial testing, final testing, and shop completion startup testing as specified in the specifications, conduct one complete lubricant change on all equipment. Pay for and assume full responsibility for the proper disposal of all used lubricants. The OWNER will then be responsible for subsequent lubricant changes.

2.10 SLEEVE-TYPE COUPLINGS

A. **General:** Provide sleeve – type couplings where indicated. Do not substitute a sleeve- split coupling for the sleeve coupling unless approved by the ENGINEER.

B. **Construction:** Use sleeve couplings complying with AWWA C219 - Standard for Bolted Sleeve-Type Couplings for Plain-End Pipe. Use steel couplings with steel bolts, without pipe stop. Use couplings sizes to fit the pipe and fittings indicated. Use a middle ring not less than 1/4-inch thick or at least the same wall thickness as the pipe to which the coupling is connected. If the strength of the middle ring material is less than the strength of the pipe material, increase the thickness of the middle ring to have the same strength as the pipe. Use couplings of either 5- or 7-inches long for sizes up to and including 30- inches and 10-inches long for sizes greater than 30-inches, for standard steel couplings, and 16-inches long for long-sleeve couplings. Provide followers of single-piece contoured mill sections welded and cold-expanded as required for the middle rings, and of sufficient strength to accommodate the number of bolts necessary to obtain adequate gasket pressures without excessive rolling. The shape of the follower of such design as to provide positive confinement of the gasket. Provide stainless steel bolts and nuts complying with the requirements of Section 05500.

C. **Pipe Preparation:** Where required, prepare the pipe ends for flexible steel couplings. Provide plain ends which are smooth and round for a distance of 12-inches from the ends of the pipe, with outside diameter not more than 1/64-inch smaller than the nominal outside diameter of the pipe. Test the middle ring by cold-expanding a minimum of one percent beyond the yield point, to proof-test the weld to the strength of the parent metal. Subject the weld of the middle ring to an air test for porosity.

D. **Gaskets**

1) Use gaskets for sleeve-type couplings made of rubber-compound material that will not deteriorate from age or exposure to air under normal storage or use conditions. Use gasket rubber meeting the following specifications:

a. Color - Jet Black

b. Surface - Non-blooming

c. Durometer Hardness - 74 plus and minus 5

d. Tensile Strength - 1000 psi Minimum

e. Elongation - 175 percent Minimum

1) Use gaskets which are immune to attack by impurities normally found in water or wastewater. Provide gaskets meeting the requirements of ASTM D 2000 - Classification System for Rubber Products in Automotive Applications, AA709Z, meeting Suffix B13 Grade 3, except as noted above.

E. **Piping Connection to Equipment:** Where piping connects to mechanical equipment such as pumps, compressors, and blowers, bring the piping to the equipment connection aligned and perpendicular to the axis of the flange or fitting for which the piping is to be connected. Ensure that the piping does not impose excessive stress to the equipment connection to cause misalignment of the equipment. Assign the responsibility to the equipment manufacturer to review the piping connection to the equipment and submit any modifications to the ENGINEER for review.

F. **Restrained Joints:** Use harnessed couplings unless thrust restraint is provided by other means. Use harnesses which are designed by the coupling manufacturer in accordance with Manual M11, or as indicated. Provide harnesses for the maximum test pressure of the pipe in which they are installed. Where harness sets are installed near the suction and discharge of the pump, use harness bolts having zero elongation to prevent misalignment of the pump imparted by the thrust within the piping system.

G. **Manufacturers, or equal**

1. Dresser, Style 38

2. Ford Meter Box Co., Inc., Style FC1 or FC3

3. Smith-Blair, Style 411

PART 3 -- EXECUTION

3.1 GENERAL

A. Unless otherwise noted, any equipment or materials removed by the CONTRACTOR become the property thereof. Assume responsibility and pay all costs for their demolition and/or removal per all applicable codes and regulations.

B. Establish a strict schedule of when the pump is in the possession of the CONTRACTOR, the shipping company, and the pump repair shop. Supply the OWNER with updates whenever possession changes hands.

C. Arrange for shipping the pumps to the site location provided by the pump repair shop representative. Protect the pump from the elements at all times prior to arrival at the pump repair shop site location.

D. After pump modification and rehabilitation is complete, arrange for shipping the pump to the project site. Protect the pump from the elements at all times after receiving possession of the pump from the pump repair shop and prior to completed installation.

E. Assume full responsibility and pay all costs for the installation, arrangement, and operation of all connected components of the assembled pump assembly from and including the drive shaft between the pump and the right angle gear drive.

F. Use mechanics skilled in this type of work for the erection and installation of the WORK of this section.

G. Three (3) pumps are to be removed, and two pumps are to be rehabilitated and/or modified and reinstalled under this contract. Because the pump repair shop

rehabilitation of the pumps may take several weeks, the CONTRACTOR may choose to demobilize from the project site during this time at no additional cost to the OWNER. Assume full responsibility for the development of this part of the schedule, and provide to the OWNER notice of when mobilizations and demobilizations occur, with 48 hours advance notice when possible. During any demobilization, leave the project site clean and the remaining equipment fully operational. Cover and adequately secure openings or disconnected components to allow OWNER personnel to continue to work at and operate the pump station in a safe manner.

3.2 PUMP REMOVAL

A. Submit to the OWNER, for approval prior to disassembly of each pumps, his procedure to safely disassemble without damaging the pump or surrounding facilities and equipment.

3.3 TESTS AND WARRANTY

A. Perform such tests on each pump as necessary to demonstrate to the ENGINEER and OWNER compliance with the design criteria of these specifications.

B. Provide warranty which allows for repair, replacement or remuneration options, to satisfaction of the OWNER.

C. Provide all pump components with a full one (1) year performance warranty which allows for the replacement of any failed part at no cost to the OWNER.

3.4 CLEANING AND PAINTING

A. Coat modified and or rehabilitated pumps in accordance with Section 09800 – Protective Coatings.

3.5 MODIFICATION OF EQUIPMENT 01-E1 (EXISTING 20" VERTI-LINE PUMP)

A. The existing 20" pump is operational. Modify the pump such that the bottom of the pump motor is at or above the elevation indicated on the drawings. Ensure that the modified pump is completely operable in all respects. Major items of rehabilitation include, but may not necessarily be limited to, the following items:

1. Equip the pump with a line shaft extension and enclosing tube designed by the pump rebuilder;

2. Equip the pump with a 16" diameter column designed by the pump rebuilder. Install and connect four (4) supporting tubes to the pump base plate as specified herein.

3. Equip the pump with new lip seals, shaft couplings, bronze tube beatings, coupling guards, and miscellaneous hardware as required. Re – install the existing automatic oiler and return the oiler to service.

4. Re-install, align, and start up the pump into service in a fully operable condition.

3.6 MODIFICATION OF EQUIPMENT 01-E2 (EXISTING 54" PEERLESS PUMPS)

A. Two (2) 54" pumps are at the station and are inoperable. Remove both 54" pumps and deliver each pump motor to a qualified motor repair assembly for dismantling, assessment, and potential rewinding. See Section 01010 – General Requirements and Section 16201 – Low Voltage Motor Condition Assessment and Repair for additional requirements.

B. Upon receipt of the pumps at the pump repair shop, dismantle each pump. Select one pump to repair and return the other pump to the OWNER. The pump repair shop may use parts from both pumps to provide one (1) fully functional and operational 54" drainage pump. Return all other pump components to the OWNER, along with a complete packing list, suitably packaged for long term storage in a climate – controlled warehouse setting.

C. **Rehabilitation of Pump:** The following scope of services is anticipated to be necessary to return one 54" pump to service. Bid for the most stringent scope of services necessary to return the pump to service.

1. **Suction Bell**: Rehabilitate the suction bell by bringing the registered connection to square and plumb in order to provide a rigid connection to the bowl assembly. If

necessary, replace the bushing with bronze bushings similar to the apparent factory dimensions. Prepare and coat the suction bell with protective coatings as specified in Section 09800 – Protective Coatings.

2. **Intermediate Bowl Repair**: Rehabilitate all registered connections by bringing the registered connections to square and plumb to provide a rigid connection to the suction bell and column pipe. Adjust and cut the bowl assembly as appropriate for receipt of the pump adapter bearing. If necessary, bore and sleeve as required to receive the pump shaft and shaft enclosing tube. Replace the bowl lining in kind. Prepare and coat the intermediate bowl with protective coatings as specified in Section 09800 – Protective Coatings.

3. **Propeller:** Rehabilitate the existing impeller or propeller by adding material as necessary to restore the propeller to the apparent factory lines and dimensions. Repair all superficial damage to the satisfaction of the ENGINEER. If necessary, bore the impeller be bored to receive shaft as specified herein. Balance the impeller or propeller dynamically and statically.

4. **Shaft Enclosing Tube (Lubrication Tube):** Rehabilitate existing or fabricate new shaft enclosing tubes. Provide the uppermost tube with provisions such that it receives an o – ring for sealing as appropriate and appropriate connection for the pump lubricator (oiler). Fabricate new shaft enclosing tubes from stainless steel as specified herein. Use NPT connections between each shaft enclosing tube. For new tubes, use pipe of a minimum of Schedule 40 thickness, and be at a minimum of the same inside diameter of the existing pump enclosing tubes.

5. **Bearings:** Provide and install a new screw bearing and new adapter bearing as necessary to align and tension the pump shaft.

6. **Bowl Shaft:** Rehabilitate an existing or fabricate and install a new bowl shaft. Provide a bowl shaft of at a minimum of the same outside diameter of the existing bowl shaft.

7. **Motor Shaft:** Fabricate and install a new motor shaft of stainless steel meeting the design requirements specified herein, but at a minimum of the same outside diameter of the existing motor shaft.

8. **Line Shaft:** Rehabilitate existing line shafts or fabricate and install a new stainless steel line shaft meeting the design criteria specified herein. Provide a shaft with a thickness which is at a minimum of the same outside diameter of the existing line shaft.

9. **C – Ring:** Fabricate and install a new C – ring.

10. **Shaft Couplings:** Fabricate and install new shaft couplings of stainless steel in the rehabilitated pump.

11. **Bolts, Nuts, and Hardware:** Assemble the rehabilitated and modified pump with new nuts, bolts, and washers per Section 05500 – Miscellaneous Metalwork. All nuts and bolts with anti – sieze compound as specified in Section 05500 – Miscellaneous Metalwork.

12. **Gaskets:** Install new gaskets between each column pipe and all other pump connections requiring a water tight seal.

13. **Oil Seals**: Seal both ends of the enclosing tube to prevent the leakage of the lubricant and entrance of water or other material into the shaft enclosing tube.

14. **Oil Reservoir:** Provide the rehabilitated and modified pump with an oil – lubricated lubricated line shaft. Furnish and install a minimum one – gallon aluminum oil reservoir with a solenoid valve. Interconnect the solendoid valve to the pump control panel specified elsewhere.

15. **Pump Column:** Prepare and coat the pump column with protective coatings as specified in Section 09800 – Protective Coatings.

16. **Pump Discharge Head:** If necessary, bring the discharge head to round within the original circumference of the discharge pipe. Prepare and coat the pump discharge head and discharge pipe with protective coatings as specified in Section 09800 – Protective

17. **Motor:** Install the rehabilitated, or if directed by the OWNER and ENGINEER, a new electric motor in the rehabilitated pump assembly.

D. As a part of the rehabilitation of the 54" pump, modify the pump such that the bottom of the pump motor is at or above the elevation indicated on the drawings. Provide a modified pump which is completely operable in all respects.

1. Provide the pump with a line shaft extension and enclosing tube designed by the pump repair shop.

2. Equip the pump with a column matching the original outside diameter designed by the pump rebuilder. Fabricate, install, and connect four (4) support pipes to the pump base plate as specified herein.

3. Equip the rehabilitated and modified pump with new automatic oiler, lip seal, shaft couplings, bronze tube beatings, coupling guards, and miscellaneous hardware.

4. Re-install, align, and start up the pump into service in a fully operable condition

3.7 SERVICES OF PUMP REPAIR SHOP

A. **Inspection, Startup, and Field Adjustment**: Provide a qualified representative of the pump repair shop to visit the Site for one day per pump 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. Provide an authorized training representative of the pump repair shop to visit the Site for one day per pump to instruct the OWNER's personnel in the operation and maintenance of the equipment, including step-by-step troubleshooting with necessary test equipment. Provide instruction specific to the equipment provided.

2. Provide a representative with at least two (2) years experience.

3. Schedule training a minimum of 3 weeks in advance of the scheduled session.

4. Submit proposed training materials for review.

5. Leave training materials 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 each pump, 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, make necessary corrections for the equipment to meet the acceptance criteria.

3.8 INSTALLATION

A. **General:** Install equipment in accordance with the manufacturers and pump repair shop's written recommendations.

B. **Alignment**: Field test equipment to verify proper alignment.

3.9 FIELD ASSEMBLY

A. Coat all studs, cap screws, bolt and nuts used in field assembly with "**Never Seize"** compound or equal.

3.10 WELDING

A. Clean welds of weld-slag, splatter, etc. to provide a smooth surface.

3.11 FIELD TESTS

A. Field test pumps after installation to demonstrate satisfactory without excessive noise, cavitation, vibration, or overheating of bearings or motor.

B. Conduct the following field testing:

1. Start equipment, check, and operate the equipment over its entire operating range. Ensure that vibration levels are 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 to ensure trouble free operation.

C. The ENGINEER will witness field-testing. Notfiy the ENGINEER of the test schedule three days in advance.

D. In the event that any equipment fails to meet the test requirements, modify and retest equipment until it satisfies the requirement.

3.12 WARRANTY

A. Warrant all equipment for a period of one (1) year. Commence the warranty period commence on the date of final payment.

B. Warrant all equipment to be free from defects in workmanship, design, and materials. If any part of the equipment should fail during the warranty period, replace the part and return the equipment to service at no expense to the OWNER.

- END OF SECTION -

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SECTION 15200 - VALVES

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. Provide valves and appurtenances, complete and operable, in accordance with the Contract Documents.

B. **Unit Responsibility:** Make a single manufacturer responsible for coordination of design, assembly, testing, and furnishing each valve. Assume full responsibility for compliance with the requirements of each valve section.

C. **Single Manufacturer:** Where 2 or more valves of the same type and size are required, the provide valves furnished by the same manufacturer.

1.2 REFERENCE STANDARDS

A. American Society of Mechanical Engineers (ASME)

ASME B16.1	Standards for Pipe and Fittings
ASME B16.5	Pipe Flanged and Flanged Fittings

B. American Water Works Association (AWWA)

AWWA C500	Metal Seated Gate Valves for Water Supply Service
AWWA C504	Rubber Seated Butterfly Valves
AWWA C507	Standard for Ball Valves
AWWA C508	Swing Check Valves for Waterworks Service
AWWA C509	Resilient Seated Gate Valves for Water Supply Service
AWWA C511	Reduced Pressure Principle Backflow Prevention Assembly
AWWA C515	Reduced Wall, Resilient Seated Gate Valves for Water Supply Service

C. ASTM International (ASTM)

ASTM A48	Standard Specification for Gray Iron Castings
ASTM A126	Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings
ASTM A351	Standard Specification for Castings, Austenitic, for Pressure Containing Parts
ASTM A395	Standard Specification for Ferritic Ductile Iron Pressure Retaining Castings for Use at Elevated Temperatures
ASTM A515	Standard Specification for Pressure Vessel Plates, Carbon Steel, for Intermediate and High – Temperature Service
ASTM A536	Standard Specification for Grav Iron Castings
ASTM B16	Standard Specification for Free-Cutting Brass Rod, Bar, and Shapes for Use in Screw Machines
ASTM B62	Standard Specification for Composition Bronze or Ounce Metal Castings
ASTM B148	Standard Specification for Aluminum Bronze Sand Castings
ASTM B371	Standard Specification for Copper – Zinc – Silicon Alloy Rod

ASTM B584	Standard Specification for Copper Alloy Sand Castings for General Applications
ASTM B763	Standard Specification for Copper Alloy Sand Castings for Valve Applications

D. Military Specifications and Standards (MSS)

MSS SP25	Standard Marking Systems for Valves, Fittings, Flanges, and Unions

E. National Sanitation Foundation (NSF)

NSF 14	Plastics Piping System Components and Related Materials
NSF 61	Drinking Water System Components – Health Effects

1.3 CONTRACTOR SUBMITTALS, SAMPLING, AND TESTING

A. Furnish submittals in accordance with Section 01010.

B. **Submittal/Source Approval:** Submit product information on each valve type to be incorporated into the WORK. Include at a minimum the following information:

1. Valve name, size, pressure rating, identification number (if any), and specification section number.

2. Complete information on valve actuator, including size, manufacturer, model number, and mounting.

3. Assembly drawings showing part nomenclature, materials, dimensions, weights, and relationships of valve handles, handwheels, position indicators, limit switches, integral control systems, needle valves, and control systems.

4. Valve Labeling: A schedule of valves to be provided with stainless steel tags, indicating in each case the valve location and the proposed wording for the tag.

5. Technical Manual: Provide required technical information for each valve.

6. Spare Parts List:

PART 2 -- PRODUCTS

2.1 PRODUCTS

A. **General:** Provide new valves of current manufacture.

B. **Valve Actuators:** Unless otherwise indicated, provide actuators as specified herein.

C. **Valve Marking:** Provide valves which are permanently marked in accordance with MSS SP25 - Standard Marking Systems for Valves, Fittings, Flanges, and Unions.

2.2 MATERIALS

A. **General:** Use materials suitable for the intended application. Unless otherwise indicated, provide materials complying with the following requirements:

1. **Cast Iron:** Close-grained gray cast iron, conforming to ASTM A 48 - Gray Iron Castings, Class 30, or to ASTM A 126 - Gray Iron Castings for Valves, Flanges, and Pipe Fittings.

2. **Ductile Iron:** ASTM A 536 - Ductile Iron Castings, or to ASTM A 395 - Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures.

3. **Steel:** ASTM A 216 - Steel Castings, Carbon Suitable for Fusion Welding for High-Temperature Service, or to ASTM A 515 - Pressure Vessel Plates, Carbon Steel, for Intermediate- and Higher-Temperature Service.

4. **Bronze:** ASTM B 62 - Composition Bronze or Ounce Metal Castings, and valve stems not subject to dezincification must conform to ASTM B 584 - Copper Alloy Sand Castings for General Applications.

5. **Stainless Steel:** Provide stainless steel valve and operator bodies and trim conforming to ASTM A 351 - Steel Castings, Austenitic, for High-Temperature Service, Grade CF8M, or provide be Type 316 stainless steel.

2.3 VALVE CONSTRUCTION

A. **Bodies:** Provide valve bodies that are cast, with smooth interior passages. Provide wall thicknesses that are uniform and in agreement with the applicable standards for each type of valve, without casting defects, pinholes, or other defects that could weaken the body. Provide flanged valve ends unless otherwise noted which are rated for the maximum temperature and pressure to which the valve will be subjected.

B. **Internal Parts:** Provide internal parts and valve trim as indicated for each individual valve. Where not indicated, provide valve trim of Type 316 stainless steel or other best suited material.

C. **Nuts and Bolts:** Provide nuts and bolts on valve flanges and supports in accordance with Section 05500 - Miscellaneous Metalwork.

2.4 VALVE ACCESSORIES

A. Furnish valves complete with the accessories required to provide a functional system.

2.5 WELL SERVICE AIR VALVES

A. **Design:** Provide a fully automatic float operated valves designed to exhaust air which is present in the pump column on pump startup and allow air to re-enter the column on pump shutdown or should a negative pressure occur.

B. **Materials:** Provide well service air valves constructed of ASTM A126 Class B cast iron for Class 125 and Class 250 valves. Provide valves with float, guide shafts, and bushings constructed of Type 316 stainless steel. Non-metallic guides and bushings are not acceptable. Provide Buna – N resilient seats.

C. **Connections:** Provide valves 3” and smaller with full size NPT inlets and outlets equal to the nominal valve size. Provide hexagonal body connection for a wrench connection. Provide valves sizes 4 inches and larger with bolted flange inlets equal to the valve size. Provide valves with flanges complying with ANSI B16.1 for Class 125 or Class 250 iron flanges and ANSI B16.42 for Class 300 ductile iron flanges. Provide valves 6 inches and smaller with NPT outlets; provide valves larger than 6” with have ANSI B16.1 Class 125 outlet flanges. Provide valves which include two additional NPT connections for the addition of Air Release Valves, gauges, testing, and draining.

D. **Standards, Approvals and Verification:** Provide valves which are manufactured and tested in accordance with AWWA Standard C512. Use valves manufactured by an entity having an in – house quality management system that is certified to ISO 9001:2000 by an accredited, certifying body.

E. **Manufacture:** Provide valves coated with a factory applied fusion bond epoxy interior coating. Provide valves coated with a universal primer exterior coating to be removed and replaced during coating as prescribed in Section 09800 – Protective Coatings.

F. **Manufacturer, or Equal:** VM 104S by Val Matic, Elmhurst, Illinois

PART 3 -- EXECUTION

3.1 VALVE INSTALLATION

A. **General:** Install valves and accessories in accordance with the manufacturer's written instructions and as indicated. Firmly support valves to avoid undue stresses on the pipe.

B. **Access:** Install valves with easy access for actuation, removal, and maintenance and to avoid interference between valve actuators and structural members, handrails, or other equipment.

- END OF SECTION -

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PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. Provide electrical WORK, complete and operable, in accordance with the requirements of the Contract Documents.

B. It is the intent of these specifications that the electrical system be suitable in every way for the service required. Furnish all material and WORK which may be reasonably implied as being incidental to the WORK of this section at no additional cost to the OWNER.

C. The WORK of this section is required for the operation of electrically driven equipment provided under other sections of the Specifications. The CONTRACTOR's attention is directed to the requirement for the proper coordination of the WORK of this section with the WORK of the individual equipment sections.

D. Unless otherwise noted, provide UL- labeled assembled electrical equipment. Provide UL – labeled individual electrical components and supply from a nationally recognized manufacturer.

E. Ensure the installation of electrical equipment requiring the assembly of individual electrical components not assembled by a recognized manufacturer is supplied by a UL – recognized electrical fabrication shop and is UL – labeled by the fabrication shop.

F. Furnish all conduit, wire, control equipment, and field connections as required for motors and process equipment furnished under other sections of the Specifications.

G. Mount and wire speed, level, pressure and temperature measurement systems furnished under other sections of the Specifications.

H. Make all field connections to instrument panels and other control panels and devices furnished under this section and other sections of the Specifications.

1.2 REFERENCE STANDARDS

A. In addition to the reference standards identified throughout these specifications, comply with the applicable requirements of the National Electric Code, the Occupational Safety and Health Act of 1970, with additions and requirements of any local codes applicable at the location of the WORK.

B. Require all electrical equipment to list and bear the label of Underwriter's Laboratories, Inc. (UL) or an independent testing agency acceptable to the ENGINEER and the local code enforcement authority having jurisdiction.

C. Ensure installation and/or demolition of electrical equipment and materials complies with the requirements of OSHA (29 CFR 1910 and 29 CFR 1926 as applicable), state building standards, and applicable local codes and regulations.

D. Where the requirements of the specifications conflict with UL, NEMA, NFPA, or other applicable standards, allow the more stringent requirements to govern.

1.3 SERVICE AND METERING

A. The power company serving the WORK of this section is CLECO.

B. Be responsible for the coordination and interface with the power company throughout the performance of the WORK of this CONTRACTOR.

C. Comply with the service requirements of the Power Company as identified in the Special Provisions.

1.4 PERMITS AND INSPECTIONS

A. Be responsible for obtaining and paying for all permits and inspections as required by the authorities having jurisdiction over the WORK.

B. Pay all connection and turn – on service charges required by the power company.

1.5 INTERPRETATION OF DRAWINGS

A. During the period of construction, provide clarifying detail drawings to compliment the electrical plans, as may be necessary in the opinion of the ENGINEER, to show the proper installation of various appliances or equipment with relation to the project.

B. The drawings and specifications are intended to be descriptive only, and any error or omissions of detail in either does not relieve the CONTRACTOR from the obligations thereunder to install in correct detail any and all materials necessary for complete and operating electrical systems to the extent shown on the Drawings and described in this Specification.

C. The drawings are generally diagrammatic and the locations of equipment, fixtures, outlets, and similar devices shown on the Drawings are approximate only unless detailed or dimensioned. Utilize structural conditions, physical interference, and the location of electrical terminations on equipment to determine the exact locations and routing of cables and conduits. The ENGINEER will determine and approve the exact locations during construction. Obtain in the field all information relevant to the placing of electrical work, and, in case of any interference with other work, proceed as directed by the ENGINEER, and furnish all labor and materials necessary to complete the work in an approved manner.

D. Examine the architectural, structural, mechanical, electrical, and instrumentation plans and shop drawings for the various equipment in order to determine exact routing and final terminations for all conduits and cables. Stub conduits up as near as possible to equipment terminals.

E. The Drawings are not intended to show exact locations of conduit runs. Run each three-phase circuit in a separate conduit unless otherwise shown on the Drawings. Unless otherwise approved by the ENGINEER, install conduit shown exposed as exposed; install conduit shown concealed as concealed. Where circuits are shown as “home runs", provide all necessary fittings and junction boxes for a complete raceway installation. Coordinate and obtain approval from the ENGINEER during construction for the final routing of all “home run” circuits. Run "Home run" circuits shown concealed as concealed unless approved otherwise by the ENGINEER.

F. Verify with the ENGINEER the exact locations and mounting heights of lighting fixtures, switches and receptacles prior to installation.

G. Support surface mounted panel boxes, junction boxes, conduit, etc., by stainless steel spacers and hardware to provide a clearance between wall and equipment.

H. Circuit layouts are not intended to show the number of fittings, or other installation details. Furnish all labor and materials necessary to install and place in satisfactory operation all power, lighting, and other electrical systems shown. Install additional circuits wherever needed to conform to the specific requirements of the equipment.

1.6 CONTRACTOR SUBMITTALS, SAMPLING, AND TESTING

A. Furnish submittals in accordance with Section 01010.

B. Submit product data for all electrical and control panel components to be incorporated into the WORK. Provide sufficient data for the ENGINEER to determine compliance with specification requirements.

1.7 QUALITY ASSURANCE

A. Quality assurance requirements are continued throughout this specifications section.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Fully protect all materials and equipment against damage from any cause. Cover all materials and equipment, both in storage and during construction, in such a manner that no finished surfaces will be damaged, marred, or splattered with water, foam, plaster, or paint. Keep all moving parts clean and dry. Replace or refinish all damaged materials or equipment, including face plates of panels and switchboard sections, at no additional expense to the OWNER.

PART 2 -- PRODUCTS

2.1 GENERAL

A. Ensure all equipment and materials are new and are listed by UL or other nationally recognized testing laboratories, and bear the UL label where UL requirements apply. Provide equipment and materials which are the products of experienced and reputable manufacturers in the industry. Provide similar items in the WORK produced by the same manufacturer. Ensure all equipment and materials are of industrial grade standard of construction.

B. Where a NEMA enclosure type is indicated in a non – hazardous location, utilize that type of enclosure, despite the fact that certain modifications such as cutouts for control devices may negate the NEMA rating.

C. **Mounting Hardware:** Provide stainless steel nuts, bolts, and washers. Provide continuous threaded, galvanized steel, 3/8" diameter minimum threaded rods for trapeze supports. Provide struts or mounting of conduits and equipment that are stainless steel. Where contact with concrete or dissimilar metals may cause galvanic corrosion, utilize suitable non-metallic insulators to prevent such corrosion. Do not use aluminum struts. Provide struts as manufactured by Unistrut, 8-Line, or ·equal. Provide anchors for attaching equipment to concrete walls, floors and ceilings that are stainless steel expansion anchors, such as "Rawl-Bolt," "Rawl-Stud" or "Lok-Bolt" as manufactured by Rawl; similar by Star, or equal. Do not use wood plugs.

D. **Electrical Identification:**

1. **Nameplates:** Fabricate nameplates from white letter, black face laminated plastic engraving stock, Formica type ES-1, or equal. Securely fasten each using fasteners of brass, cadmium plated steel, or stainless steel, screwed into inserts or tapped holes, as required. Provide block style engraved characters with no characters smaller than 1 /8-inch high.

2. **Conductor and Equipment Identification:** Provide conductor and equipment identification devices which are either imprinted plastic-coated cloth marking devices such as manufactured by Brady, Thomas & Betts, or equal, or provide heat-shrink plastic tubing, imprinted split-sleeve markers cemented in place, or equal.

2.2 ELECTRICAL RACEWAY SYSTEMS

A. **General:** Ensure pull and junction boxes, fittings, and other indicated enclosures comply with the requirements of this Section.

B. **Conduit:** Ensure conduit complies with the following requirements.

1. **Rigid Aluminum Conduit:** Provide rigid aluminum conduit manufactured of 6063 alloy, temper T-1. Furnish rigid aluminum conduit manufactured in accordance with ANSI C80.5 – Rigid Aluminum Conduit, and UL-6 – Rigid Metal Electrical Conduit.

2. **Rigid Non – Metallic Conduit:** Provide rigid non-metallic conduit which is Schedule 80 PVC, sunlight resistant. Provide rigid PVC conduit manufactured in accordance with NEMA TC-2 Electrical Plastic Tubing and Conduit, and UL-651 – Standard for Rigid Non-metallic Conduit standards.

3. **Rigid PVC Coated Galvanized Steel Conduit**: Provide conduit, prior to PVC coating, which meets the requirements for RGS conduit above. Bond PVC coating to the outer surface of the galvanized conduit. Ensure the bond between the coating and the conduit surface is greater than the tensile strength of the coating. Ensure PVC coating thickness is not less than 40 mils. Provide PVC coated RGS manufactured in accordance with UL6, ANSI C80.1, and NEMA RN – 1 - PVC Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.

4. **Liquid – tight Flexible Conduit:** Provide liquid-tight flexible conduit constructed of a flexible galvanized metal core with a sunlight resistant thermoplastic outer jacket. Provide liquid-tight flexible conduit manufactured in accordance with UL-360 – Steel Conduits, Liquid-Tight Flexible.

C. **Boxes and Fittings for Power and Control:** Provide terminal boxes, junction boxes, pull boxes, and fittings for power and control which conform to the following requirements dependent upon the area NEMA classifications as noted on the drawings.

1. **NEMA 4X Areas:** Provide boxes in NEMA 4x areas which are manufactured of a type 316 stainless steel. Weld back and sides to form a one piece construction. Attach doors or covers with #316 stainless steel captive fasteners or hinges. Ensure the cover to box joints are made watertight with a mechanically retained gasket.

2. **Cast Aluminum Device Boxes:** Provide cast aluminum device boxes be Type FD. Ensure all cast aluminum boxes and fittings be copper-free aluminum with threaded conduit connections, cast aluminum covers, and stainless steel screws as manufactured by the Killark Electric Co., Crouse-Hinds Co., L.E. Mason Co., or equal.

3. **Conduit Hubs:** Provide conduit hubs as manufactured by Myers Electric Products, Inc., Raco Div., Appleton Electric Co., or equal.

4. **Conduit Sealing Bushings:** Provide conduit sealing bushings that are O.Z. Gedney Type CSB or equal.

D. **Conduit Mounting Equipment:** Provide conduit mounting equipment which complies with the following requirements:

1. Provide hangers, rods, backplates, unistrut, beam clamps, etc., unless otherwise noted that are hot-dipped galvanized iron or steel as manufactured by the Appleton Electric Co., Thomas and Betts Co., Unistrut Corp., or equal.

2. Ensure hangers, rods, backplates, unistrut, beam clamps, etc., which are used with aluminum conduit are manufactured from copper free aluminum, or stainless steel and are suitable for use in corrosive environments. Provide stainless steel hardware.

3. Ensure hangers, rods, backplates, unistrut, beam clamps, etc., which are used with PVC coated conduit are PVC coated with an outer jacker of 40 mil PVC permanently bonded to the outer surface.

E. **Conduit Identification Bands:** Provide conduit identification bands that are an embossed noncorroding, nonrusting (stainless steel) metallic band which encircles the conduit and is permanently secured without the use of adhesives or screws (use stainless steel wire).

2.3 UNDERGROUND DUCT SYSTEMS

A. **General:** Unless otherwise noted on the plans, ensure the underground duct system is Schedule 80 PVC conduit encased in reinforced concrete. Concrete encase all underground conduits included in a duct bank with a minimum of 3 inch concrete on all sides as shown on the Drawings. (This provision includes conduits that are under building floor slabs.

B. **Duct Banks:** Furnish underground ducts that are Schedule 40 PVC. Encase ducts in red-dyed concrete with steel reinforcing bars. Provide Class M Concrete per Sections 03805 and 03901. Incorporate red colorant of an integral red-oxide coloring pigment in the proportion of 8 pounds per cubic yard of concrete. Provide concrete which is dyed red throughout the ducts. Surface treatment will not be accepted. Include any costs of cleaning coloring pigment from the concrete delivery equipment and other related cleanings in the Bid. Ensure duct contains a No. 2/O bare stranded copper ground wire. Provide a ground wire which is continuous through the duct bank and terminates at power distribution equipment and grounding grid. Install continuous lengths of underground warning tapes 12 inches above and parallel to all duct banks. Provide tape that is 6 inches wide polyethylene film imprinted “CAUTION – ELECTRIC UTILITIES BELOW”. Provide underground warning tape as manufactured by Brady or equal.

2.4 WIRE AND CABLE

A. **General Wire and Cable (600 Volt or Less):** Ensure all wire rated 600 volts, installed within a duct or conduit, for all power motor, lighting, receptacle feeders and branch circuits are Type THW (Thermoplastic) or RHW (Ethylene Propylene Rubber) per UL and NEMA requirements. Size conductors for feeders as defined in Article 100 of the NEC to prevent a voltage drop exceeding 3 percent at the farthest outlet of power, heating, and lighting loads, or combinations of such loads, and where the maximum total voltage drop on both feeders and branch circuits to the farthest connected load does not exceed 5 percent. Do not utilize a conductor smaller than No. 12 AWG for power, motor, lighting, receptacle feeders and branch circuits. Strand these conductors with THW type

insulation. Provide cable for potentiometer circuits which are mutli-conductor No. 16 AWG twisted and shielded. Provide ground wire installed in raceways which is NEC Type THW, green. Provide bare ground wires where shown on Drawings. Provide 600 Volt wire and cable as manufactured by Southwire, Republican, American, Okonite or equal.

B. **Control Wire (600 Volt or Less):** Provide Control Wire, installed within a duct or conduit, which is the same type as all power and lighting wire defined above. Ensure the control wiring is No. 14 AWG THW Stranded. Provide Control Wires in panels and cabinets that is No. 14 AWG (minimum) type THHN/THWN, UL approved, rated for 75 degrees C for dry locations, and be as manufactured by Southwire, Republican, American, Okonite or equal.

C. **Cable Terminations:** Provide compression connectors which are Burndy “Hi Lug”, Thomas & Betts “Sta-Kon”, or equal. Provide split bolt type threaded connectors of high strength copper alloy. Pressure type, twist-on connectors will not be acceptable. Provide pre - insulated fork tongue lugs which are Thomas 7 Betts, Burndy, or equal. Utilize general purpose insulating tape which is Scotch No. 33, Plymouth “Slip-knot”, or equal. Ensure high temperature tape is polyvinyl as manufactured by Plymouth, 3M, or equal. Provide labels for coding all 600 volt wiring that is computer printable or pre-printed, self-laminating, self-sticking, as manufactured by W.H. Brady, 3M, or equal. Provide stress cone material for make-up of medium voltage shielded cable which is manufactured by Raychem, 3M, or equal. Terminations and splices must be designated to provide voltage stress relief and containing no air voids that would release ozone thereby deteriorating the cable. A class 2* (IEEE Standard Test Procedures and Requirements for High- Voltage Alternating Current Terminations) termination for voltage stress control and complete external leakage insulation is required. Termination kits must contain performed pennant stress cones and be sized acceptable if made of EPR and used on EPR cable. Require splices be premolded, permanent. Furnish straight or wye splices which are suitable for manhole or direct burial installation. Provide splices with suitable shield grounding devices as required.

D. **Splices for Power Conductors:** Join conductors with a long barrel compression type connector using the die as recommended by the splice manufacturer. Provide three (minimum) crimps on each side of the cable joint. Maintain insulation integrity as recommended by the cable manufacturer and provide a heat shrink boot or outer covering and epoxy filling sized for the cable being spliced. Provide splice kits as manufactured by Ideal Industries, 3M Co., Raychem, or equal.

E. **Termination and Splices for Control Conductors:** Furnish insulated compression type connectors of the expanded vinyl insulated parallel or pigtail type as manufactured by Ideal Industries, 3M Co., Panduit Corp., or equal. Provide spade connectors of the type utilizing the upturned spade end design to prevent connector pullout. Provide connectors as manufactured by the Ideal Industries, 3M Co., Panduit Corp., or equal.

F. **Cable Identification:** Utilize wire markers of the heat shrinkable tube design with custom typed identification numbers, exactly as detailed on the Drawings. Provide tube and typed markings which are of a permanent, non-smearing, solvent resistant design similar to Raychem TMS, Ideal Industries, 3M Co., or equal.

2.5 MISCELLANEOUS EQUIPMENT

A. **Disconnect Switches (Non – Fused):**

1. Provide disconnect switches which are heavy duty, quick make, quick break, visible blades, 600 Volt, 3 Pole with full cover interlock, interlock defeat and flange mounted operating handle. Ensure all current carrying parts are copper.

2. Furnish stainless steel NEMA 4 enclosures.

3. Furnish stainless steel NEMA 4X enclosures.

4. Furnish cast aluminum NEMA 7 enclosures.

5. Furnish switches as manufactured by the Square D Co.; General Electric; Cutler-Hammer, or equal.

B. **Manual Transfer Switch:**

1. Provide manual transfer switches which are heavy duty, double throw, quick-break, quick-make, 3 or 4 Pole, 600 Volt, with Ampere rating as shown on the Drawings.

2. Provide switches which are UL-1008 listed, electrically and mechanically interlocked, with electrical initiation of transfer with pushbuttons mounted on the front of the enclosure. Provide a safe external manual operator for switching under load.

3. Provide wall mounted switch enclosures that are NEMA 1.

4. Provide manual transfer switches which are Russelectric Inc. Model RMTD-MAN, ASCO Model 7NTS; GE Zenith Controls ZTSM Series, or equal.

C. **Detectable Warning Tape:**

1. Mark each duct bank section by means of a detectable warning tape (tracer tape) as shown on the Drawings. Ensure the detectable warning tape is capable of being detected or located by either conductive or inductive location techniques.

2. Provide detectable warning tape which consists of 5 mil (.005-in) overall thickness; five-ply composition; ultra-high molecular weight; virgin polyethylene; acid; alkaline and corrosion resistant; with 150 pounds of tensile break strength minimum per 6-in width.

3. Ensure the top side of the tracer tape is color banded red for electrical and high voltage lines, and orange for signal, communication, telephone and fire alarm lines. Provide tracer tape which is 4-in wide with four color bands. Inscribe the tape with the warning message for the utility such as “CAUTION – ELECTRICAL LINED BURIED BELOW”. Provide tape as manufactured by Mutual Industries, Inc.; Terra Tape, Div. of Reef Industries Inc. or equal.

D. **Corrosion Inhibitors:**

1. Furnish all equipment enclosures, terminal boxes, etc, located in a corrosive rated area (where shown on the Drawings) that contains electrical or electronic equipment or terminal strips with an internally mounted, chemically treated corrosion inhibitor pad.

2. Provide corrosion inhibitor pads as manufactured by Hoffman Engineering Co.; 3M; AGM Container Controls, or equal.

E. **Equipment Identification Nameplates:** Provide all field mounted electrical equipment such as disconnects, push button stations, etc, with a weather resistant engraved laminoid equipment identification nameplate screwed or bolted adjacent to the device. Furnish a nameplate which identifies the mechanical equipment controlled exactly as shown on the electrical single-line drawings (i.e., P 95 Cooling Water Pump No. 1).

F. **Arc Flash Protection Warning Signs:**

1. Provide field-affixed arc flash warning labels on all switchboards, panelboards, industrial control panels, and motor control centers in accordance with National Electrical Code Article 110.16.

2. As a minimum, furnish warning signs which state “WARNING: Arc Flash and Shock Hazard, Appropriate PPE required”, and which are designed in accordance with ANSI Z535.4-1998. Where available from the equipment manufacturer, provide additional information including Flash Hazard boundary, incident energy, voltage shock hazard, PPE required, etc..

2.6 GROUNDING SYSTEM

A. **General:** Ensure all components of the grounding electrode system are manufactured in accordance with ANSI/UL 467 – Standard for Safety Grounding and Bonding Equipment, and conform to the applicable requirements of National Electrical Code Article 250 and local codes.

B. **Grounding Electrode System**: Provide grounding loop conductors which are bare annealed copper conductors suitable for direct burial. Provide conductors which are #2/0

unless indicated otherwise. Provide ground rods which are copper-clad steel conforming to ANSI/UL 467. Provide ground rods that are ¾ inch diameter and 10 feet long unless indicated otherwise. Where ground rod lengths indicated on the Contract Drawings are unavailable, couple together ground rods using threaded copper alloy couplings. Make cable-to-cable and cable-to-ground rod connections using exothermic welds. Provide exothermic welds by Cadweld, Enrico Products, or equal. Utilize grounding clamps to bond each separately derived system to the grounding electrode conductors. Ensure manufacturers of grounding materials be Copperweld, Blackbum, Burndy, or equal.

2.7 LIGHTING

A. **Exterior Fixtures:** Provide exterior fixtures in combination with their mounting pole and bracket capable of withstanding 100 MPH winds without damage. Provide exterior fixtures which have corrosion-resistant hardware and hinged doors or lens retainer. Furnish fixtures specified with integral photo-electrical control of the fixture manufacturer's standard design. Furnish and install the following fixture, or equal:

Watts	60W
Lamp	Light Emitting Diode (LED)
Voltage	120V
Lens	Open Acrylic
Actuation	Photocell
Manufacturer	Acuity American Electric LNH32LEDE60 or Equal

B. **Photo Cells:**

1. Furnish photocells suitable for power duty with individual fixtures. Furnish enclosure which is NEMA 3R or 4. Ensure contacts are rated for 2,000 watts continuous at 120 Volts. Ensure the unit turns on at 1.5 footcandles and off at 5.5 footcandles.

2. Provide photocells that are Tork, Model 2101; Intematic; Paragon, or equal.

2.8 PUMP CONTROL PANEL

A. Provide a pump control panel to control the large pump in accordance with plan details and these specifications.

B. Unless more stringent requirements are required in other sections or articles of these specifications, provide panels manufactured by an Underwriters Laboratory (UL) Certified 508A panel manufacturer. Provide UL Certification number with submittals. Provide panel which is designed and manufactured using industrial rated individual components with high power surge capability. Printed circuit boards are not acceptable.

C. Provide a control panel containing at a minimum the following equipment:

1. NEMA 4X stainless steel enclosure with 3 point latches, and inner swing-out panels - Hoffman or equal, designed for rack mounting.

2. Non fused disconnect.

3. All controls and indicators to be mounted on inner swing-out panels. Do mount equipment on the outer doors.

4. One soft starter, WEG, or approved equal with NEMA rated external bypass contactors and overloads.

5. Circuit breakers for each motor

6. Phase monitor active only when operating on bypass contactors

7. Surge protection - Square D SDSA 3650

8. Control power transformer with 3 fuses

9. 22mm HOA switch, Soft Start-Bypass switch and run lights for each pump

10. 22mm high temp lights

11. Lugs to accept parallel feeders as indicated on drawings

12. Breakers for control power, lighting, and outlets as indicated;

13. Terminals for all external wiring

14. Aux contacts that close upon loss of power, pump running, high temp

15. Fiber optic floats and accessories

16. Courtesy light

17. Remote alarm light with red glass globe and guard and mounting accessories

18. Panel heater and thermostat

19. Other devices as indicated on the drawings.

20. Pump solenoid controls

D. Operation:

1. On the canal rising above the pump on level, start the pump. Pump to run to the off level.

E. Include panel which encloses and is wired for all motor branch components, circuit breakers, switches, pilot lights, relays, and other AC and DC control components as shown on diagrams and as required to perform functions as described in this and other sections of the specifications. Provide terminal strips for connection of all external wiring. Provide terminal strips of heavy-duty types with barriers between points. Provide nameplates with white letters on black laminated phenolic plastic background glued to enclosure. Provide the enclosure with Hoffman or equal corrosion inhibitors.

F. Provide control equipment, 22 or 30mm Square D, Allen Bradley, Cutler Hammer, ABB or equal as follows:

1. Push Buttons – Flush button, momentary contact

2. Selector Switches – Standard operator, maintained contact

3. Toggle Switches – Maintained Contact

4. Pilot Lights – Light Emitting Diode (LED)

G. Furnish the following spare partss

1. Four (4) of each size control and power fuses

2. Six (6) of each size indication lamps.

H. Deliver spare parts to the OWNER with a copy of receipt to be provided to the ENGINEER.

2.9 METERING EQUIPMENT

A. Provide a current transformer compartment and meter socket complying with the requirements of CLECO.

2.10 ELECTRIC MOTOR FOR 350 HP PUMP

A. If directed, furnish and install a new motor for the 350 HP pump. Provide a new hollow shaft, high – thrust motor with a weather protected Type I premium efficient motor suitable for continuous duty. Provide motor which is random – wound with a service factor of 1.15. Provide motor with Class “F” Insulation and a base diameter of 30.5 “. Coupling shall be 2-15/16” bore with 3/4” key. Provide motor equipped with a non –

reverse ratchet and which rotates the direction necessary for proper pump function. Provide motor which is compatible with rehabilitated pump.

PART 3 -- EXECUTION

3.1 GENERAL EXECUTION REQUIREMENTS:

A. **Incidentals:** Provide all materials and incidentals required for a complete and operable system, even if not required explicitly by the Specifications or the Drawings. Typical incidentals are terminal lugs not furnished with vendor supplied equipment, compression connectors for cables, splices, junction and terminal boxes, and control wiring required by vendor furnished equipment to connect with other equipment indicated in the Contract Documents.

B. **Field Control of Location and Arrangement:** The Drawings diagrammatically indicate the desired location and arrangement of outlets, conduit runs, equipment, and other items. Determine exact locations in the field based on the physical size and arrangement of equipment, finished elevations, and other obstructions. Follow locations shown on the Drawings as closely as possible.

1. Where conduit development drawings or “home runs” are shown, route the conduits in accordance with the indicated installation requirements. Expose or encase routings as indicated. Size conduits encased in a slab for conduit OD to not exceed one-third of the slab thickness and be laid out and spaced to not impede concrete flow.

2. Install all conduit and equipment in such a manner as to avoid all obstructions and to preserve head room and keep openings and passageways clear. Locate lighting fixtures, switches, convenience outlets, and similar items within finished rooms as indicated. Where the Drawings do not indicate exact locations, the ENGINEER will determine such locations. If equipment is installed without instruction and must be moved, the OWNER will bear no additional cost for it to be moved. Adjust lighting fixture locations slightly to avoid obstructions and to minimize shadows.

C. **Workmanship:** Install all materials and equipment in strict accordance with printed recommendations of the manufacturer. Ensure installation is accomplished by Workers skilled in the Work. Coordinate installation in the field with other trades to avoid interferences.

D. **Incoming Utility Power Equipment**: Provide incoming utility power equipment in conformance with the utility’s requirements.

E. **Equipment Anchoring**: Rigidly anchor in place floor supported, wall, or ceiling hung equipment and conductors by methods that will meet seismic requirements in the area where project is located. Provide wall-mounted panels that weigh more than 500 pounds or which are within 18 inches of the floor with fabricated steel support pedestals. If the supported equipment is a panel or cabinet enclosed within removable side plates, ensure it matches supported equipment in physical appearance and dimensions. Ensure transformers hung from 4-inch stud walls and weighing more than 300 pounds have auxiliary floor supports. Provide leveling channels anchored to the concrete pad for switchgear, motor control equipment and pad-mounted transformer installations. Anchoring methods and leveling criteria specified in the written recommendations of the equipment manufacturers are considered a part of the Work of this Contract.

F. **Equipment Identification:** Identify equipment and devices as follows:

1. **Nameplates:** Provide nameplates for all panelboards, control and instrumentation panels, starters, switches, and pushbutton stations. In addition to name plates, equip control devices with standard collar-type legend plates.

2. **Control Devices:** Identify control devices within enclosures as indicated. Follow identification guidance in the subparagraph above.

3. **Toggle Switches:** Toggle switches which control loads out of sight of switch and require all multi-switch locations of more than 2 switches to have suitable inscribed finish plates.

4. **Empty Conduits:** Tag empty conduits at both ends to indicate the destination at the far end. Where it is not possible to tag the conduit, identify the destination marking an adjacent surface.

5. **Equipment Names**: Utilize equipment names and tag numbers, where indicated on the Drawings, on all nameplates.

6. **Circuit Directories:** Furnish typewritten circuit directories for panelboards. Ensure directories accurately reflect the outlets, lighting, and/or other devices connected to each circuit.

G. **Cleaning:** Prior to final acceptance, thoroughly clean. Thoroughly clean exposed parts of cement, plaster, and other materials. Remove all oil and grease spots with a non-flammable cleaning solvent. Carefully wipe such surfaces and scrape out all cracks and corners. Apply paint touch-up to all scratches on panels and cabinets. Vacuum-clean electrical cabinets or enclosures.

H. **Cutting and Patching:** Be responsible for all cutting, fitting and patching, including attendant excavation and backfill, required to complete the WORK, Assume responsibility to make several parts fit together, to uncover portions of the WORK to provide for installation of ill – timed WORK, remove and replace defective WORK, to remove and replace WORK not conforming to the requirements of the Contract Documents, to remove samples of installed WORK as specified for testing, and as required to provide routine penetrations of non – structural surfaces for installation of piping and electrical conduit. Submit a written request to the OWNER and ENGINEER prior to executing any cutting and patching which affects the WORK of the OWNER, structural value or integrity of any element of the WORK, integrity or effectiveness of weather – exposed or moisture – resistant elements or systems, the efficiency, operation life, maintenance or safety or operation elements, and the visual qualities of sight – exposed elements.

I. **Materials:** Comply with specifications and standards for each specific product involved.

J. **Inspection:** Comply with the following:

1. Inspect existing conditions of Project, including elements subject to damage or to movement during cutting and patching.

2. After uncovering WORK, inspect conditions affecting installation of products, or performance of Work.

3. Report unsatisfactory or questionable conditions to the OWNER's Representative in writing; do not proceed with Work until the OWNER's Representative has provided further instructions.

K. **Preparation:** Comply with the following:

1. Provide adequate temporary support as necessary to assure structural value or integrity of affected portion of Work.

2. Provide devices and methods to protect other portions of the project from damage

3. Provide protection from elements for that portion of the Project which may be exposed by cutting and patching WORK, and maintain excavations free from water.

L. **Performance**: Comply with the following:

1. Execute cutting and demolition by methods which will prevent damage to other Work, and will provide proper surfaces to receive installation of repairs;

2. Execute excavating and backfilling by methods which will prevent settlement or damage to other Work.

3. Employ original Installer or Fabricator to perform cutting and patching for weather – exposed or moisture resistant elements and/or for sight – exposed finished surfaces.

4. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances and finishes.

5. Restore Work that has been cut or removed; install new products to provide completed Work in accord with requirements of Contract Documents.

6. Fit Work airtight to pipes, sleeves, ducts, conduit and other penetrations through surfaces.

7. Refinish entire surfaces as necessary to provide an even finish - to match adjacent finishes. For continuous surfaces, re-finish finishes to the nearest intersection. For assemblies, re-finish the entire unit.

M. **Labor and Progress:** Employ a competent electrical foreman on the job throughout the entire period of construction to see that his work is carried on without delay and completed as rapidly as possible. Empower the foreman to make decisions relating to the electrical work proposed in this project.

N. **Sleeves, Forms, Cutting and Patching:** Be responsible for laying out and installing the work in advance of the pouring of pads, floors, walls, etc., and furnish and install all sleeves that may be required for the electrical work. Provide sleeves for all conduits penetrating walls, partitions, and floors.

O. **Equipment Mounting:** Be responsible for furnishing and setting all anchor bolts, equipment leveling channels, etc., required to install this equipment. Furnish stainless steel material for all mounting brackets and hardware. Where electrical equipment is located on damp or wet walls, walls exposed to weather, or other locations as directed, “stand-off" mount it 2-inches from the wall in a manner so that the rear of the equipment is freely exposed to air circulation. Allow the ENGINEER to approve the method of mounting before equipment is installed. Ensure all equipment enclosures are of the NEMA classification noted on the plan drawings for the area in which the device will be mounted.

P. **Equipment Storage and Installation**: Prior to installation, store all electrical equipment entering into this contract including motor control center, starters, transformers, lighting fixtures, etc., in a warm dry indoor area adequately protected against mechanical injury or damage by water. Equipment stored outdoors under tarpaulins or plastic covers will not be considered as meeting this requirement. If any apparatus has been damaged, such damage will be repaired at no additional cost to the OWNER. If any apparatus has been subject to possible injury by water, thoroughly dry it and put through such special tests as directed by the ENGINEER or replace at no additional cost to the OWNER. Do not begin the installation of electrical equipment until the structures are complete enough to provide protection from weather and vandalism (i.e., walls, doors, windows, and roof installed). Investigate each space in the structure through which equipment must pass to reach its final location. If necessary, require the manufacturer to ship his material in sections sized to permit passing through such restricted areas in thestructure.

Q. **Record Drawings:** Maintain a neatly marked set of record drawings showing the installed location and/or routing of conduits, cables, pull boxes, junction boxes, and outlets. All deviations from the control schematics required by equipment actually utilized are to be kept current with the work and subject to inspection by the ENGINEER at any time. Deliver two sets of marked final record drawings to the ENGINEER prior to final acceptance of the work. Give particular care to describing the exact locations of all exterior conduit, duct banks, control circuits, conduit schedules, cable schedules, and single line modifications.

R. **Operation and Maintenance Manuals:** Furnish operating manuals covering operations and maintenance on each type of equipment. Bind the instructions and provide at the following at least the minimum:

1. A comprehensive index.

2. A complete "As Constructed" set of approved shop fabrication drawings, interconnection wiring drawings, and individual wiring drawings.

3. A complete list of the equipment supplied, including serial numbers, ranges, and pertinent data.

4. Full specifications on each item.

5. System schematic drawings "As Constructed", illustrating all components, piping, instrument and electrical connections of the systems supplied for this water treatment facility.

6. Written process description that defines the process function detailing the service, maintenance, preventive maintenance and operation instructions for each component/item supplied and installed on/in this water treatment facility.

7. Clearly identify special maintenance requirements particular to this system, along with special calibration and test procedures.

8. Incorporate a functional description of the entire system into the operating instructions with references to the system's schematic drawings and instructions.

9. Complete parts lists with stock numbers.

10. List of manufacturer's recommended spare parts for one year's operation.

3.2 ELECTRICAL RACEWAY SYSTEMS

A. **General:** Install raceways between equipment as indicated. Electrically and mechanically complete raceway systems before conductors are installed. Ensure bends and offsets are smooth and symmetrical, and created with tools designed for this purpose. Utilize factory elbows wherever possible. Where raceway routings are indicated on plan views, follow those routings to the extent possible. Where raceways are indicated but routing is not shown, such as home runs or on conduit developments and schedules, select raceway routings that are in strict accordance with the NEC, customary installation practice. Encase, expose, conceal, or place the raceway under the floor as indicated. Adjust routings adjusted to avoid obstructions. Coordinate with all other trades prior to installation of raceways. Extra compensation will not be given for lack of such coordination nor will the OWNER be held fiscally (or otherwise) responsible for the removal and re-installation to resolve conflicts. Ensure support rod attachments for ceiling-hung trapeze and cable tray installations meet the seismic requirements in the area where the project is located. Install exposed raceways parallel or perpendicular to structural beams. Provide expansion fittings with bonding jumpers wherever raceways cross building expansion joints. Install all exposed raceways at least ½-inch from walls or ceilings except that at locations above finished grade where damp conditions do not prevail, install exposed raceways ¼-inch minimum from the face of walls or ceilings by the use of clamp backs or struts. Wherever contact with concrete or dissimilar metals can produce galvanic corrosion of equipment, provide suitable insulating means to prevent such corrosion.

B. **Conduit:** Unless specified otherwise herein, ensure all exposed conduit is rigid aluminum conduit. Utilize a Schedule 80 PVC for all conduit concealed, buried, or encased in concrete. Where conduit emerges from concrete encasement, utilize a PVC coated RGS elbow for transition from the concrete. Ensure conduit emerges from the concrete perpendicular to the surface whenever possible. Do not encase conduit in the bottom floor slab below grade. Ensure encased conduit’s outer diameters does not exceed 1/3 of the concrete slab thickness. Coat all threads with a conductive lubricant before assembly. Ensure joints are tight, thoroughly grounded, secure, and free of obstructions in the pipe. Adequately ream all conduit to prevent damage to the wires and cables inside. Utilize strap wrenches and vises to install conduit to prevent wrench marks on conduit. Replace conduit with wrench marks at no additional cost to the OWNER. Wherever possible, slope conduit runs to drain at one or both ends of run. Wherever conduit enters substructures below grade, slope the conduit to drain at one or both ends of run. Wherever conduit enters substructures below grade, slope the conduit to drain water away from the structure. Take extreme care to avoid pockets or depressions in conduit. Utilize flexible metal conduit not exceeding 4 feet in length to make connections to lay-in type grid lighting fixtures. Utilize liquid-tight flexible conduit not exceeding 3 feet in length to make connections to motors and other equipment subject to vibration. Provide equipment subject to vibration which is normally provided with wiring leads with a cast junction box for the make-up of connections.

C. **Conduit Usage:** Utilize Aluminum Rigid Conduit (A.R.C.) exclusively throughout the plant in all above grade installations unless indicated otherwise on the drawings. Do not use aluminum conduit below grade and do not encase with concrete or grout in any locations. Ensure all conduit stub-ups are coated with Galvanized Rigid Steel PVC and then have a transition made to aluminum conduit for above grade installation. Utilize Galvanized Rigid Steel (G.R.S.) conduit for above grade where aluminum is unacceptable. Ensure all conduit stub-ups from below grade are made with Galvanzied Rigid Steel. Utilize PVC Conduit for concrete encased duct bank-runs only, unless detailed otherwise on the Drawings. Utilize Electrical Metallic Tubing (E.M.T.) only in finished office areas to supply120/240 volt branch circuit lighting and receptacles through ceiling or wall spaces only. Utilize G.R.S. for conduits supplying circuits of this

type which penetrate an exterior wall or floor slab. Utilize “Sealtite” conduit only at motor terminations, equipment where vibration is present, or at equipment requiring frequent movement for adjustment. Utilize PVC coated G.R.S. in corrosive areas at locations as noted on the Drawings.

D. **Installation:** Surface or flush mount switch, outlet, and control station boxes as noted on the Drawings. Do not use conduit smaller than ¾-inch electrical trade size. Utilize pull fittings when conduit runs exceed the equivalent of 300 foot straight run (ensure each 90 degree bend is the equivalent of 50 feet of straight conduit). Ensure the number of bends does not exceed three (3) 90 degree bends or a 150 foot straight run with three 90 degree bands. Do not pull wire into any conduit until the raceway run is complete in all details. Tightly plug the ends of all conduits to exclude debris and moisture while the buildings are under construction. Secure all conduits and fittings on exposed work by means of metal clips and backplates. Run all conduits on exposed WORK at right angles to and parallel with the surrounding wall and ensure conformance with the form of the ceiling. No diagonal runs will be allowed. Furnish concentric bends in parallel conduit runs. Exceptions must be approved by the ENGINEER. Terminate conduit termination in gasketed enclosures with conduit hubs. Utilize conduit wall seals for all conduits penetrating walls below grade or other locations shown on the Drawings. Utilize expansion and deflection fittings where conduits cross building expansion joints. Stub-up conduit runs concealed in floor slabs, walls, etc., as close as possible to the equipment they feed. Space conduit supports at intervals of 8 feet or less as required to obtain rigid construction and prevent sagging. Furnish double locknuts and insulated bushings for conduit terminating in pressed steel boxes. Utilize liquid tight, flexible metal conduit for all motor terminations and other equipment where vibration is present except hazardous locations. Utilize flexible couplings in hazardous locations for all motor terminations and other equipment where vibration is present. Make all locknut and bushing-type conduit terminations using locknuts on the inside and outside of the enclosure. Only furnish bonding type locknuts which penetrate the enclosure surface when tightened. Utilize a suitable thread lubricant for making joint and connections to insure a tight joint and to prevent steel conduit threads from rusting. Tightly screw up conduit joints and connections using wrenches to insure good conductivity. Before cable installation, draw a test mandrel having a diametrical clearance of not more than ¼ inch compared to the conduit interior diameter, through all conduits to be used for main distribution feeders. Make watertight all threaded joints in conduits above lighting fixtures or other equipment that will trap water, where leakage into joint will migrate into equipment, by applying sealing compound to threads when making up the joint. Provide conduit connections to enclosures (junction boxes or equipment housings) on the bottom or on the side or back near the bottom to prevent entrance of water. Do not support conduit from process or utility piping. Install drains at the lowest point of all overhead conduits to remove water from the conduit system. Drain conduits emerging from the ground and extending above ground more than 10 feet within two feet of grade. Provide connections to enclosures (junction boxes or equipment housing) on the bottom or on the side or back near the bottom. Install drains or drain seals in each enclosure and be as close as practical to the point of connection.

E. **Aluminum Conduit Requirements:** Additional requirements for aluminum conduits are as follows:

1. Utilize an anti-galling conductive thread lubricant for all joints and connections.

2. If conduits leave a concrete encasement, coat with a bituminous paint for about 6 inches on each side of the exit point.

F. **Pulling of Conductors:** For conduit installation, pull wire and cables into conduit in one piece between termination or splice points, and as follows:

1. Determine and observe the pulling tension recommended by the cable manufacturer. Pulling eyes are preferred for large cables.

2. Do not use petroleum-based greases for lubricating wires and cables having neoprene or other nonmetallic exterior jackets. Liberally coat all insulated conductors with suitable pulling lubricant before pulling.

G. **Identification Application Scheme:** Install a conduit identification band in all power, instrumentation, alarm and control conduits at each end of the run and at intermediate junction boxes, manholes, etc., as directed by the ENGINEER. Install conduit bands before conductors are pulled into conduits. Coordinate the exact identification band location with the ENIGNEER at the time of installation to provide uniformity of placement and ease of reading. Notify the ENIGNEER in the event of any conduit number omission

and it will be his responsibility to furnish a properly sequenced number to the CONTRACTOR. Ensure conduit numbers are exactly as shown on the Drawings. Unless noted otherwise, the identification application scheme will be as follows:

1. Conductors carrying instrumentation low level signals (4-20 ma, 1-5 V, etc.), are to be run only in “I” series conduits.

2. Conductors carrying equipment alarm signals are to be run in “A” series conduits.

3. In general, run other conductors for power, lighting, receptacles, instrumentation 120 V power, etc., in conduit prefixed with a letter designating the MCC or Panel from which it receives its power.

3.3 UNDERGROUND DUCT SYSTEMS

A. **General:** Install underground duct bank raceways to Structures and Pull Point pullboxes as indicated. Ensure raceway systems are electrically and mechanically symmetrical and are fabricated with tools designed for this purpose. Utilize factory elbows wherever possible. Follow raceway routings on plan views to the extent possible. Adjust routings to avoid obstructions. Coordinate with all other trades prior to installation of underground raceways. There will be no extra compensation for lack of coordination, and the OWNER will bear no responsibility for extra costs related to removal and reinstallation for conflict resolution.

B. **Duct Banks:** Assemble duct using high impact non-metallic spacers and saddles to provide conduits with vertical and horizontal separation. Set plastic spacers every 5 feet. Anchor the duct array every 5 feet to prevent movement during placement of concrete. Install the duct on a grade line of at least 3 inches per 100 feet, sloping towards pullboxes or manholes. Install duct and adjust pullbox and manhole depths so that the top of the concrete envelope is a minimum of 18 inches below grade and a minimum of 24 inches below roadways. Accomplish changes in direction of the duct envelope by more than 10 degrees horizontally or vertically using bends with a minimum radius 24 times the duct diameter. Stagger duct couplings a minimum of 6 inches. Install a gravel bed at the bottom of trench. Clean each bore of the completed ductbank by drawing through it a standard flexible mandrel one foot long and ¼ inch smaller than the nominal size of the duct. After passing of the mandrel, draw a wire brush and swab through. Ensure spare raceways which are not indicated to contain conductors have a 1/8 inch polypropylene pull cord installed throughout the entire length of the raceway. Form all concrete encased conduit ducts to prevent concrete overspills and excesses that exceed the 3” minimum cover for the conduits in the duct. Grout duct trances smooth; terminate ducts with flush end bells. Assemble sections of pre-fabricated manholes and pullboxes with waterproof mastic and set on a 12-inch bed of gravel as recommended by the manufacturer or as required by field conditions. Ensure duct penetration through walls of manholes, pullboxes, and building walls below grade are watertight. Route concrete encased ductbank under building foundations. Tie the ductbank re-bar into the building’s foundation re-bar. Butt the ductbank against the underside of the slab. Trinistion outdoor stub-ups to galvanized rigid steel PVC-coated conduits on all stub-ups.

C. **Installation:** Encase all underground conduit runs and ductbanks in red concrete. Install ducts to drain away from buildings; drain ducts between manholes or handholes towards the handholes or manholes. Ensure raceway slopes are not less than 3 inches per 100 feet. Reinforce duct banks with re-bar as indicated on the Drawings. Use galvanized rigid steel PVC coated conduit for all risers where the conduit leaves concrete encased duct run. Extend the PVC above the top of exposed concrete.

3.4 WIRE AND CABLE

A. **General:** Provide and terminate all power, control, and instrumentation conductors.

B. **Installation:** Do not pull conductor wires into a raceway until the raceway has been cleared of moisture and debris. Pull the proper size mandrel through the conduit to insure no obstacles exist inside the conduit. Ensure pulling tensions on raceway cables are within the limits recommended by the cable manufacturer. Where needed, utilize wire pulling lubricant that is UL approved. Install instrumentation wire in separate conduits and do not run in the same raceway with power and control wiring. Neatly group wire in panels, cabinets, and wireway using nylon tie straps, and fan out to terminals. Carefully handle all conductors to avoid kinks or damage to insulation. Pull all wire and cable from Wire/Cable reels. Lengths of wire/cable laid on the ground prior to pulling into the conduit is not acceptable. Utilize lubrication to facilitate wire pulling. Use lubricants which are UL approved for use with the insulation specified. Run Low Voltage

Power conductors #2 AWG (600v) and larger as well as Medium Voltage Power conductors in a conduit separate from the control conductors. Uniquely identify all wires, cables, and each conductor of multiconductor cables (except lighting and receptacle wiring at each end with wire and cable markers. Ensure the identification shows the origination and destination on each end of the wire. Mark all device wire termination points to denote the device terminal numbers. Install shielded instrumentation wire from terminal to terminal with no splicing at any intermediate point. Install shielded instrumentation wire in conduit and pull boxes that contain only shielded instrumentation wire. Only ground shielding on instrumentation wire at the transmitter end only.

C. **Splices and Terminations:** Properly tape and insulate all wire taps and splices according to their respective classes. In general, do not splice cables in underground manholes or pullboxes. If splices are necessary, bring the cables above ground and terminate in a NEMA 4X, stainless steel terminal or splice cabinet on a concrete pad. Splices in underground manholes and pullboxes may be made only with the approval of the ENGINEER. Directly terminate stranded conductors on equipment box lugs making sure that all conductor strands are confined within lug. Use forked-tongue lugs where equipment box lugs have not been provided. Properly tape excess control and instrumentation wire and terminate as spares.

1. **Power Wire and Cable:** All 120/208-volt, 12/240-volt, and 480/277-volt branch circuit conductors may be spliced in suitable fittings at locations determined by the CONTRACTOR. Splice or terminate all cables rated above 2,000 volt only at equipment terminals indicated. Wrap splices to motor leads in motor terminal boxes with mastic material to form a mold and then tape them with a minimum of two layers of varnished cambric tape overtaped with a minimum of two layers of high temperature tape. Terminate shielded power cable with pre-assembled stress cones in a manner approved by the cable and terminal manufacturer. Submit the proposed termination procedure as described for shop Drawings.

D. **Cable Identification:** Apply wire markers to all control, alarm, and instrumentation wires or cables installed under this project. Label each end of the wire to identify the origination and destination of the wire. Include the origination number, destination number and the terminal number at each end of the wire that the wire is connected to. Ensure the numbers are exactly as noted on the Drawings. Notify the ENGINEER in the event of any wire number omission and it will be his responsibility to furnish a properly sequenced number to the CONTRACTOR. Install wire markers before wires are connected to their designated terminals.

1. Color code all power wiring not having individualized identification numbers with electrical tape or colored wire jacket in accordance with the following scheme.

Conductor	**Wire Color**	**Tape Color (120/240 Volt)**	**Tape Color (120/208 Volt)**	**Tape Color (277/480 Volt)**
Phase A	Black	Black	Black	Brown
Phase B	Black	Orange (High Leg)	Red	Orange
Phase C	Black	Blue	Blue	Yellow
Neutral	White (White with Red Stripe when 277V Neutral is in box or conduit with other voltage)	-	-	-
Equipment Ground	Green	-	-	-

E. **Termination and Splices:** In general, no splices will be allowed in manholes, handholes, or below grade located boxes. In special circumstances where splices are required, the ENGINEER may allow their use. However, do not proceed until written approval has been received from the ENGINEER. Do not make splices or terminations in push button control stations, control devices (i.e., pressure switches, flow switches,

etc.), conduit bodies, etc. Ensure termination and splices comply with the following requirements below.

1. **480 Volt Power Conductors**: Terminations use pressure connectors (split bolt type at motor terminal boxes). Splices (where allowed) use compression type connector and water-proof with heat shrink boot or epoxy filling. Splices allowed at terminal boxes only.

2. **Control Conductors:** Directly wire termination on saddle-type terminals with a maximum of two conductors. Make termination on screw type terminals with a maximum of two conductors. Make splices (where allowed) with insulated compression type connectors.

3. **Instrumentation Signal Conductors (Including alarm, low- and high- level signals):** Terminations same as for control conductors. Splices allowed at terminal boxes only.

4. **120 Volt Lighting and Receptacles:** Ensure terminations are as device requires. Make splices with wire nuts.

5. **Medium Voltage Conductors:** Terminate 5 and 15 KV conductors using termination kits approved by the Cable Manufacturer and in strict accordance with the manufacturer's instructions.

3.5 GROUNDING

A. **General:** Furnish and install a complete grounding system in strict accordance with Article 250 of the National Electrical Code and as hereinafter specified and shown on the Drawings. Ensure all components of the grounding electrode system are manufactured in accordance with ANSI/UL 467 – Standard for Safety Grounding and Bonding Equipment, and conform to the applicable requirements of National Electrical Code Article 250 and local codes. It is the intent of this Specification that all new enclosures of current carrying equipment (and other metallic devices as detailed or directed by the ENGINEER) be interconnected by copper equipment grounding conductors.

B. **Equipment Ground:** Maintain ground continuity throughout the facility by means of a ground conductor run in all conduits. Provide insulated copper conductors for grounding conductors run in conduit, sized in accordance with the NEC and the requirements for wire and cable. Bond metal equipment platforms which support any electrical equipment to the nearest ground bus or to the nearest switchgear ground bus. This grounding requirement is in addition to the raceway grounding required in the preceding paragraph. If not indicated otherwise, provide #6 AWG conductor in ¾ inch conduit. CUse copper bonding jumpers to obtain a continuous metallic ground for equipment such as expansion joints, cable trays, switchgear, and motor control centers.

C. **Grounding Electrode System:** Install the grounding electrode system with all required components in strict accordance with National Electrical Code Article 250. Utilize exothermic weld to connect ground electrodes and ground conductors where concealed and where exposed, be bolted pressure type. Assemble bolted connectors wrench tight to manufacturer's requirements. Employ insulated grounding bushings for all grounding connections to steel conduits in switchboards, in motor control centers, in pullboxes, and elsewhere where conduits do not terminate at a hub or sheet metal enclosure. Where insulated bushings are required, fasten with double locknuts. Utilize copper binding jumpers to obtain a continuous metallic ground across non-conductive structural members. Within buildings, embed or install the grounding cable beneath the slabs, where possible.

D. **Installation:** Run grounding conductors in all power conduits. Fit galvanized rigid steel conduits stubbed-up from below a motor control center with insulated grounding bushings and connected to the motor control center ground bus. Size the grounding wire in accordance with Table 250-95 of the National Electrical Code, with the exception that a minimum No. 12 AWG must be used. Furnish bonding jumpers for liquid - tight flexible metal conduit in sizes 1-1/2 inches and larger. Provide external bonding jumpers which run parallel (not spiral), and are fastened with plastic tie wraps. Ground all equipment enclosures motor and transformer frames, conduit systems, cable armor, exposed structural steel, and similar items. Make exposed connections by means of approved grounding clamps. Seal exposed connections between different metals with No-Oxide Paint Grade A or approved equal. Make all buried connections by welding process equal to Cadweld. Lay slack all underground conductors and where exposed to mechanical injury, protect by pipes or other substantial guards. If guards are iron pipe or other

magnetic material, electrically connect conductors to both ends of the guard to prevent the inductive choke effect. Make connections as previously specified. Exercise care to insure good ground continuity, in particular between the conduit system and equipment frames and enclosures. Where necessary, install jumper wires. Locate bare copper grounding conductors in the bottom of all duct banks and extend and connect to the equipment ground bus at each MCC. At equipment not provided with a ground bus, directly connect the conductor to the equipment enclosures frame. The conductor size may be reduced from that included in the duct bank for connection to certain pieces of equipment where approved by the ENGINEER. Bond all metal hardware in manholes or pullboxes to the bare copper duct bank grounding conductors and to a driven ground rod in the manhole. At each building or structure, connect the bare copper duct bank conductor to the building structural steel and foundation reinforcing steel, to cold water piping and to at least one ¾ inch x 10 foot copperweld grounding electrode.

E. **Tests:** Test and document the ground resistance of the system. Provide all test equipment after approval by the ENGINEER. Do not allow dry season resistance of the system to exceed five ohms. If such resistance cannot be obtained with the system as shown, provide additional grounding as directed by the ENGINEER, without addition expense to the OWNER or ENGINEER. Tie the grounding system at each new structure into the existing plant grounding system as directed by the ENGINEER.

3.6 LIGHTING

A. **Lighting Fixtures:** Conduit mount lighting fixture in compliance with the manufacturer's installation instructions.

3.7 MANUAL TRANSFER SWITCHES

A. Install manual transfer switches installed in accordance with the general requirements of this section and the manufacturer's written recommendations.

3.8 ELECTRICAL TESTS

A. This section specifies the WORK necessary to test, commission and demonstrate that the electrical WORK satisfies the criteria of these Specifications and functions as required by the Contract Documents.

B. The WORK of this Section includes furnishing the labor, equipment and power required to support the testing specified in other Divisions of these Specifications. Complete electrical testing indicated herein, and functional testing of all power and controls not tested under Division 17 - Instrumentation, before startup of equipment. The scope may require the CONTRACTOR to activate circuits, shutdown circuits, and run equipment, make electrical measurements, replace blown fuses, install temporary jumpers,etc.

C. Ensure all major Electrical Equipment (i.e. switchgear, transformers, motor controllers, etc.) is in accordance with "Acceptance Testing Specifications for Electrical Power Equipment and Systems" (NETA-1999)

D. **Requirements**: The following test requirements supplement test and acceptance criteria that may be stated elsewhere.

1. **Cable Testing:** Test 480-volt circuits for insulation resistance with a 1000- volt megohm meter. Implement testing after the 480-volt equipment is terminated.. Submit test results for review 30 days prior to plant operation and any system testing. Disconnect equipment which may be damaged during this test. Perform tests with all other equipment connected to the circuit. In order to be acceptable, the cable must withstand the test high voltage without breakdown, have steady or decreasing leakage current during the high potential test, and have satisfactory comparable megger readings in each megger test. Submit test results to the ENGINEER and state equipment used and time of test. Test cable operating at more than 2,000 volts in accordance with ICEA publications S-68-61, S-61-402, S- 19-81, and S-68-516. Perform cable testing and report submittal by an organization sanctioned by the Manufacturer of the cable to be tested. Perform testing to verify the quality of cable terminations. Submit test results for medium and high voltage cable to the ENGINEER 30 days prior to the time schedule for equipment energization.

2. Test ground interrupter (GFI) receptacles and circuit breakers for proper operation by methods sanctioned by the receptacle Manufacturer.

3. A functional test and check of all electrical components is required prior to performing subsystem testing and commissioning. Clean compartments and equipment as required by other provisions of these Specifications before commencement of functional testing.

4. Complete ground testing of all grounding electrodes prior to operating the equipment.

5. Provide ground resistance tests in the presence of the ENGINEER and submit results. Utilize a ground resistance megger “Earth” tester with a maximum of 0-50 scale. Utilize the full of potential method or the three terminal method as described by Biddle or Neta.

- END OF SECTION -

SECTION 16201 – LOW VOLTAGE ELECTRIC MOTOR CONDITION ASSESSMENT

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. Assess, and if directed, repair low-voltage random-wound three-phase AC squirrel cage induction motors, which are designated for repair.

B. Remove both 54" pump motors and deliver each to the motor repair facility. After incoming assessment and dismantling of each, select one motor to repair and one motor to return to the OWNER. If repair of either motor is determined to not be feasible, return both motors to the OWNER at no additional cost to the OWNER.

C. The WORK to be performed will consist of several phases. In the first phase, inspect and test the AC motor as specified herein. In the second phase, fully dismantle and assess each motor to identify all problems. Submit an assessment report detailing this analysis for review by the OWNER. Subsequent phases will include repair work as mutually agreed upon by the OWNER and CONTRACTOR and as directed by the ENGINEER.

D. Employ an entity regularly engaged in the repair of low voltage alternating current motors of the horsepower of the motors in the project.

E. Inspect the motors at the project site prior to bidding.

1.2 REFERENCE STANDARDS

A. Underwriters Laboratories, Inc. (UL)

UL	UL674 Electric Motors and Generators for Use in Hazardous Locations

B. Electrical Apparatus Service Association (EASA)

EASA	AR100-1998 Recommended Practice for The Repair of Rotating Electrical Apparatus

C. Institute of Electrical and Electronics Engineers (IEEE)

IEEE	IEEE Std. 43, Recommended Practice for Testing Insulation Resistance of Rotating Machinery
	IEEE Std. 112, IEEE Standard Test Procedure for Polyphase Induction Motors and Generators

D. International Organization for Standardization (ISO)

ISO	ISO Sta. 1940-1, Mechanical Vibration-Balance Quality Requirements of Rigid Motors

E. National Electrical Manufacturer's Association (NEMA)

NEMA	NEMA Sta. MG-1, Motors and Generators

F. American Bearing Manufacturer's Association (ABMA)

ABMA	ANSI/ABMA Std. 7, Shaft and Housing Fits for Metric Radial Ball and Roller Bearings

1.3 QUALITY CONTROL

A. **Calibration:** Use calibrated equipment for the WORK of this section. Make calibration records available for inspection by the OWNER and ENGINEER upon request. Utilize equipment which is calibrated annually, except:

1. **Insulation Testers:** Use insulation resistance testers which are calibrated every six months to a known resistance;

2. **Dimension Meters:** Use micrometers, vernier calipers and other dimension measuring devices that are calibrated every six months against a minimum grade AA gauge block set; and,

3. **Bore Gauges.** Use bore gauges that are calibrated to a certified standard before and after each use.

B. **Storage:** Use measuring equipment which is stored in a clean dry environment.

1.4 SUBMITTALS

A. Submit in accordance with Section 01010 – General Requirements.

B. Following incoming inspection, dismantling, and winding removal, present to the ENGINEER a Motor Condition Assessment Report documenting the dismantling process and the results of all tests specified herein. Include a statement regarding the viability for the subject motor for repair and associated recommendations.

C. Following submittal of the Motor Condition Assessment Report, the OWNER and ENGINEER will review the report for each motor. If the results of the dismantling, inspection and tests indicate a given motor may be repaired, the OWNER and ENGINEER may elect to enter into negotiations with the CONTRACTOR for the repair of said motor under the Special Pay Item for motor repair. If the OWNER elects to proceed with a repaired motor in lieu of a new motor, the CONTRACTOR will not be paid for any new motor items which are superseded by a repaired motor.

D. Within the report, provide product information in sufficient detail for the ENGINEER to determine compliance with the specifications.

PART 2 -- PRODUCTS

2.1 MATERIALS

A. **Anti-Friction Bearings:** Replace all anti friction bearings with the same type as originally used, unless otherwise directed. Use bearings that have been stored in their factory packaging in a clean, dry, location which is isolated from any vibration strong enough to be felt by hand.

B. **Insulation Materials:** Use insulation containing, as a minimum, the following components:

1. **Turn Insulation:** Multiple build coating turn insulation of polyamide, polyimide or a combination of both over polyester, or equivalent;

2. **Slot Liner.** Slot liner extending at least one quarter inch past each end of the slot;

3. **Separator.** Center strip or separator between the top and bottom coil sides in a slot;

4. **Wedge.** A top piece to hold the coils in the slot (where needed, a bottom filling piece used to make up any extra space in the slot); and,

5. **Phase Barriers.** Phase barriers between end turns of different phases (trimmed to permit clear airflow).

C. **Solid Insulation:** Use insulating materials such as slot liners, tapes and phase insulation which meet or exceed the temperature class of the motor and which are be compatible with the resins used. Obtain specifications from the material supplier and continually check their suitability for the application. Use materials that have been stored in a clean, dry location. Keep material such as B stage tape that degrades with time at room temperature refrigerated.

D. **Resins and Varnishes:** Keep manufacturer's material specifications for resins and varnishes on file, to permit inspection for correct storage, handling and usage.

E. **Other Materials:** Use materials that are new, of current manufacture, and of good quality. Provide wires as follows:

1. **Lead Wires.** Use multi-stranded and flexible with insulation meeting or exceeding the temperature and voltage class of the motor.

2. **Magnet Wire.** Use wire for random-wound motors which is compatible with the other insulation system components and which is insulated with a polyamide, polyimide or a combination of both, over a polyester base coat, or equivalent. Do not use wire damaged in storage or working. Retain the manufacturer's specifications

for the insulation on file for inspection. Use inverter grade wire on any motor that OWNER advises is powered by a pulse-width modulated inverter.

PART 3 -- **EXECUTION**

3.1 **GENERAL**

A. During repair, actions and findings will be recorded. Keep records of all the work done, problems noted, checks and measurements taken during the work, repairs carried out and the final tests conducted prior to shipping. Requirements for the work, checks and tests are listed in the following sections.

3.2 INCOMING INSPECTION

A. On receipt of the motor, conduct the initial tests set out below, plus any other tests indicated specified below.

B. **Intent:** Conduct tests to determine and record the probable cause of failure, if any, to document certain pre-repair parameters, and to determine what work is required.

C. Make a visual to assess the general condition of the outside of the motor for cracks, broken welds and missing parts.

D. **Insulation to Ground:** Perform an insulation resistance test, at a voltage suitable for the motor's voltage rating and the apparent condition of the motor. Test the motor as follows:

1. Use an initial test voltage of 500 volts DC.

2. For motors where there is more than one winding, also test instulation between windings, at the test voltage appropriate to the lower voltage winding, with other windings grounded.

3. Use a test duration of at least one minute. Record the temperature.

E. **Bearings:** Manually rotate the shaft to check for any obvious problems with the bearings or shaft.

F. **No Load Run:** If possible, run the motor at no load at nameplate voltage and check for balanced currents and vibration. Note and record all readings.

3.3 DISMANTLING

A. **Identify Problem:** Following the incoming inspection, dismantle the motor to the extent necessary to identify the problem or to complete motor rehabilitation.

B. **Markings:** Clearly match mark end brackets and frames with numerals or letters.

C. **Parts Storage:** Store bolts and small parts in dedicated containers. Do not store parts from the same project in the same containers.

D. **Insulated Bearings:** If the motor has insulated bearings, note which, if any have the insulation deliberately bridged. The insulation resistance of each insulated bearing must be at least 10 megohms with a 500 volt DC test.

E. **Dowels:** If dowels or fitted bolts are used to ensure accurate fits, identify the location of these pieces.

F. **Explosion Proof:** Repairer must be certified by UL for repair of explosion-proof motors. For motors certified for hazardous locations, take extra care to ensure that joints and flame paths are not damaged during the work. If damage requiring other than normal repair is found, notify the OWNER before proceeding with repair.

G. **Rotor Removal:** For horizontal motors where the shaft rotor assembly is too heavy to be removed easily by hand, use a crane to move the shaft, with a close fitting pipe installed over one end of the shaft to act as a shaft extension. Pay close attention to the following:

1. Take care that the slings do not damage the bearing surfaces or the rotor.

2. Do not allow the stator windings to be touched by any of the parts being moved.

3.4 VERTICAL MOTORS

A. Dismantle vertical motors according to the manufacturer's instruction book if available. The assembly of vertical motors is critical. Pay particular attention to, and keep records of:

1. The amount of rotor lift (end play);

2. The make and types of bearings, particularly the thrust bearings including orientation of thrust bearings;

3. The arrangement of the thrust and guide bearings, including speciallyground mating surfaces;

4. The axial and radial clearances (fit) to the shaft and housing;

5. The method of lubrication of both upper and lower bearings;

6. The method of bearing insulation, if any; and

7. Any other particular features of the motor configuration.

3.5 WINDING REMOVAL

A. **General:** For motors that are to be rewound, strip, clean, test, and repair thecore.

B. **Take Data:** Record winding data so as to permit replicating originalconfiguration.

C. **Core Loss:** Conduct a core loss test on all stators both before and after stripping and iron repair, to check for damaged interlaminar insulation. Conduct the test at a flux density of 85,000 lines per square inch rms. Record exciting current and watts loss each time, and make a physical check carried out for hot spots. If data from previous tests are available, compare the tests to previous results. Testing at other flux densities may be done if previous data is available. If hot spots exceed 15°C above the average temperature after 10 minutes, or losses are excessive overall either before or after stripping, discuss with the OWNER and ENGINEER before proceeding further. For a core without any hot spots, the losses after stripping may not be more than 10% higher than the pre-strip losses. To avoid misleading results, the second core loss test should not be done until the core has been cleaned and dried.

D. **Burn Out:** Burn out the winding in a controlled temperature burnout oven where the part temperature is limited by means of fuel control and supplementary (water spray) cooling to 360°C (680°F) for organic (C3) or 400°C (750°F) for inorganic (C5) interlaminar insulation. If a higher temperature is deemed necessary, reference communication or documentation from the motor manufacturer indicating that the core iron can safely withstand the temperature. Aluminum frames may be chemically stripped if burnout facilities are not available.

- END OF SECTION –

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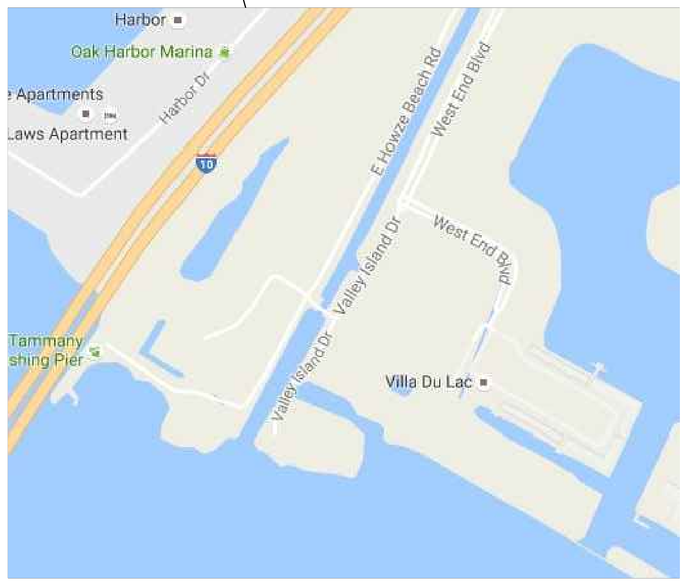
CONTRACT DRAWINGS FOR
LAKEFRONT PUMP STATION, PHASE 3
FEDERAL EMERGENCY MANAGEMENT AGENCY P.W. #00872-V1
ST. TAMMANY PARISH, LOUISIANA
PARISH PROJECT No. EN14000002
HDCA PROJECT NO. 2016-13

H. Davis Cole & Associates, LLC
Consulting Engineers

NEW ORLEANS OFFICE
1340 Poydras Street, Suite 1850
New Orleans, Louisiana 70112
Telephone: 504.836.2020
Facsimile: 504.836.2010

Website: www.hdaviscole.com
Email: info@hdaviscole.com

PROJECT LOCATION



PROJECT LOCATION

PROJECT AREA

PROJECT AERIAL

ST. TAMMANY PARISH GOVERNMENT
21454 KOOP DRIVE
MANDEVILLE, LA 70471

APPROXIMATE PROJECT SITE GPS COORDINATES
30° 12'42.05" N
89° 47'23.32" W

PREPARED FOR

ST. TAMMANY PARISH GOVERNMENT
DEPARTMENT OF PUBLIC WORKS
21454 KOOP DRIVE
MANDEVILLE, LA 70471

PARISH PRESIDENT
HON. MICHAEL COOPER

CHAIRMAN, PARISH COUNCIL
HON. MICHAEL LORINO, JR.

VICE-CHAIRMAN, PARISH COUNCIL
HON. RYKERT O. TOLEDANO, JR.

PARISH COUNCIL

HON. MARTY DEAN	DISTRICT 1
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HON. STEVE STEFANCIK	DISTRICT 11
HON. JERRY BINDER	DISTRICT 12
HON. JAKE A. AIREY	DISTRICT 13
HON. THOMAS J. '"T.J." SMITH	DISTRICT 14

RECOMMENDED FOR APPROVAL:

H. DAVIS COLE & ASSOCIATES, LLC

STATE OF LOUISIANA
DAVID ALAN MARTIN
License No. 37832
REGISTERED PROFESSIONAL ENGINEER

DAVID A. MARTIN, P.E.	37832	
VICE - PRESIDENT/PROJECT MANAGER	LICENSE No.	DATE

RELEASED FOR BIDS & CONSTRUCTION
DECEMBER, 2020

LIST OF DRAWINGS

COVER SHEET

CO-1 COVER SHEET

GENERAL

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G3 GENERAL NOTES AND SPECIFICATIONS
G4 DRAWINGS STANDARDS AND SYMBOLS
G5 ABBREVIATIONS
G6 PIPING SCHEDULE

DEMOLITION

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CIVIL

01-C1 EXISTING SITE PLAN
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STRUCTURAL

S1 STRUCTURAL DETAILS AND SECTIONS
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E3 CABLE AND CONDUIT SCHEDULE/RACK ELEVATIONS
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01-E1 REHABILITATED ELECTRICAL SITE PLAN

STATE OF LOUISIANA
DAVID ALAN MARTIN
License No. 37832
PROFESSIONAL ENGINEER

SUBMITTED BY:
DAVID A. MARTIN
PROJECT MANAGER
37832
LICENSE NO.

SUBMITTED BY:
H. DAVIS COLE
COMPANY OFFICER
30219
LICENSE NO.

H. Davis Cole & Associates, LLC
CONSULTING ENGINEERS
NEW ORLEANS, LA

MARK	DESCRIPTION	DATE	BY	CHKD
-	RELEASED FOR BIDS & CONSTRUCTION	MAR 2020	DAM	DAM

REVISION RECORD

DESIGNED BY: DAM
DRAWN BY: DAM
CHECKED BY: DAM
DATE: DEC, 2020
DETAILED BY: DAM
HDC PROJECT NO. 2016-13

LAKEFRONT PUMP STATION, PHASE 3
ST. TAMMY PARISH LOUISIANA

ST TAMMANY PARISH GOVERNMENT
21454 KOOP DRIVE
MANDEVILLE, LA 70471

LIST OF DRAWINGS

SHEET ID
G1

SHEET SET
2 OF 20

GENERAL

1) THESE NOTES AND SPECIFICATIONS ARE GENERAL AND APPLY TO THE ENTIRE PROJECT UNLESS THERE ARE SPECIFIC INDICATIONS OTHERWISE. NOTES AND SPECIFICATIONS ARE CONTINUED THROUGHOUT THE PLANS.

2) THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF CONSTRUCTION A MINIMUM OF ONE WEEK PRIOR TO THE BEGINNING OF CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER AT THE CONCLUSION OF CONSTRUCTION TO ALLOW FOR INSPECTION OF THE PROJECT.

3) IN THE EVENT OF DISCREPANCIES, CONFLICTS, OR OMISSIONS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND OBTAIN WRITTEN INSTRUCTIONS FROM THE ENGINEER PRIOR TO PROCEEDING WITH AFFECTED WORK.

4) THE CONTRACTOR SHALL HAVE THE COMPLETE AND SOLE RESPONSIBILITY FOR THE JOB SITE INCLUDING THE SAFETY OF PERSONS, PROPERTY, AND ADJACENT IMPROVEMENTS. ANY INSPECTION BY THE ENGINEER WILL BE SOLELY TO DETERMINE COMPLIANCE WITH THE PLANS AND SPECIFICATIONS AND WILL NOT INCLUDE ANY REVIEW OF THE ADEQUACY OF THE CONTRACTOR'S SAFETY MEASURES.

5) THESE DRAWINGS ARE SCALED FOR PRODUCTION ON 22" X 34" MEDIA (ANSI - D SHEET SIZE). PRINTS ON OTHER SIZED MEDIA SHALL BE SCALED ACCORDINGLY.

6) 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.

7) TEMPORARY UTILITIES SHALL BE OF 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.

8) 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.

9) 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.

10) 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.

11) THE CONTRACTOR SHALL PROVIDE A GENERAL, WEATHERPROOF, GROUNDED TEMPORARY LIGHTING SYSTEM IN EVERY AREA OF CONSTRUCTION WORK, 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.

12) 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.

13) 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.

14) 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.

15) THE CONTRACTOR SHALL MAKE ITS OWN ARRANGEMENTS FOR ANY NECESSARY OFF-SITE STORAGE OR SHOP AREAS NECESSARY FOR THE PROPER EXECUTION OF THE WORK.

16) 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.

17) 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.

18) 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.

19) 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.

20) 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.

21) 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.

22) 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.

23) 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.

24) 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.

PROJECT LAYOUT

1) THE CONTRACTOR SHALL BE RESPONSIBLE FOR LAYING OUT THE WORK AND VERIFYING ALL MEASUREMENTS PRIOR TO AND DURING THE ENTIRE PERIOD OF CONSTRUCTION. MEASUREMENTS SHALL BE CONTINUOUSLY VERIFIED.

2) THE MEASUREMENTS, EQUIPMENT ARRANGEMENTS, LINES, AND GRADES SHOWN ON THE PLANS MAY BE VARIED SLIGHTLY BY THE ENGINEER IN THE FIELD IF CONDITIONS JUSTIFY SUCH A VARIATION.

UTILITIES

1) IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY LOCATION AND DEPTH OF ALL EXISTING UTILITIES BEFORE STARTING CONSTRUCTION.

2) THE CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGE TO EXISTING UTILITIES WHICH OCCURS DURING CONSTRUCTION AND SHALL IMMEDIATELY REPORT ANY DAMAGE TO THE AFFECTED UTILITY OWNERS. ALL REPAIRS OF THE DAMAGED UTILITIES SHALL BE REPAIRED IN ACCORDANCE WITH THE INSTRUCTIONS OF THE AFFECTED UTILITY AND ALL COSTS ASSOCIATED THEREWITH SHALL BE BORNE BY THE CONTRACTOR.

METALS

1) 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.

2) UNLESS OTHERWISE INDICATED, FABRICATED STEEL METALWORK SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION.

3) UNLESS OTHERWISE INDICATED, STAINLESS STEEL METALWORK AND BOLTS SHALL BE OF TYPE 316 STAINLESS STEEL.

4) 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.

5) UNLESS OTHERWISE INDICATED, IRON CASTINGS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A 48, CLASS 50B OR BETTER.

6) 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 500 GRADE B

7) UNLESS OTHERWISE INDICATED, BOLTS, ANCHOR BOLTS, WASHERS, AND NUTS SHALL BE STEEL AS INDICATED. THREADS ON GALVANIZED BOLTS AND NUTS SHALL BE FORMED WITH SUITABLE TAPS AND DIES SUCH THAT THEY RETAIN THEIR NORMAL CLEARANCE AFTER HOT-DIP GALVANIZING. EXCEPT AS OTHERWISE INDICATED, STEEL FOR BOLT MATERIAL, ANCHOR BOLTS, AND CAP SCREWS SHALL BE IN ACCORDANCE WITH THE FOLLOWING:

- STRUCTURAL CONNECTIONS: ASTM A 307, GRADE A OR B, HOT-DIP GALVANIZED.
- ANCHOR BOLTS: ASTM A 307, GRADE A OR B, OR ASTM A 36, HOT-DIP GALVANIZED.
- HIGH STRENGTH BOLTS WHERE INDICATED: ASTM A 325.
- PIPE AND EQUIPMENT FLANGE BOLTS: ASTM A 193, GRADE B-7.

8) BOLTS, NUTS, AND WASHERS IN THE LOCATIONS LISTED BELOW SHALL BE STAINLESS STEEL AS INDICATED.

- BURIED LOCATIONS.
- SUBMERGED LOCATIONS.
- LOCATIONS INDICATED BY THE CONTRACT DOCUMENTS OR DESIGNATED BY THE ENGINEER TO BE PROVIDED WITH STAINLESS STEEL BOLTS.

9) 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. ANTI - SEIZE LUBRICANT SHALL BE CLASSIFIED AS ACCEPTABLE FOR POTABLE WATER USE BY THE NSF.

10) BOLT AND NUT MATERIAL SHALL BE FREE-CUTTING STEEL.

11) 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.

12) 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.

13) 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.

14) ADHESIVE ANCHORS AND RODS: UNLESS OTHERWISE INDICATED, DRILLED CONCRETE OR MASONRY ANCHORS SHALL BE ADHESIVE ANCHOR AND ROD SYSTEMS AS SPECIFIED BELOW.

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BELOW GROUND PROTECTION CENTER
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CONTRACTOR SHALL CONTACT EACH AGENCY AND COMPANY RELATIVE TO THE EXACT LOCATION OF ITS UNDERGROUND INSTALLATION PRIOR TO ANY RELIANCE UPON THE ACCURACY OF SUCH LOCATION SHOWN. AT LEAST 72 HOURS PRIOR TO EXCAVATING, THE CONTRACTOR SHALL CALL LOUISIANA ONE CALL TO MARK THE UTILITIES THROUGH THE CONSTRUCTION AREA. EXISTING UTILITIES SHALL BE MARKED WITH SPRAY PAINT OR STAKES IN THE FIELD PRIOR TO EXCAVATION.

PROJECT CONTACTS

ENGINEER ..... H. DAVIS COLE & ASSOCIATES, LLC.
DAVID A. MARTIN, P.E.
(504) 836-2020
dmartin@hdaviscole.com

OWNER ..... ST. TAMMANY PARISH GOVERNMENT
CHRISTOPHER CORVERS
(985) 898-2552
cjcorvers@stpgov.org

DONNA O'DELL, pH.D., P.E.
(985) 898-2552
dodell@stpgov.org

RESIDENT PROJECT
REPRESENTATIVE ..... TBD

A. 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.

B. 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.

15) EXPANDING-TYPE ANCHORS (WEDGE ANCHORS) ARE PROHIBITED.

16) POWDER-DRIVEN PINS FOR INSTALLATION IN CONCRETE OR STEEL SHALL BE HEAT-TREATED STEEL ALLOY. IF THE PINS ARE NOT INHERENTLY SUFFICIENTLY CORROSION-RESISTANT FOR THE CONDITIONS TO WHICH THEY WILL BE EXPOSED, THEY SHALL BE PROTECTED IN AN ACCEPTABLE MANNER. PINS SHALL HAVE CAPPED OR THREADED HEADS CAPABLE OF TRANSMITTING THE LOADS THE SHANKS ARE REQUIRED TO SUPPORT. PINS THAT ARE CONNECTED TO STEEL SHALL HAVE LONGITUDINAL SERRATIONS AROUND THE CIRCUMFERENCE OF THE SHANK. POWDER-DRIVEN PINS SHALL BE INSTALLED BY A CRAFTSPERSON CERTIFIED BY THE MANUFACTURER AS BEING QUALIFIED TO INSTALL THE MANUFACTURER'S PINS. PINS SHALL BE DRIVEN IN ONE INITIAL MOVEMENT BY AN INSTANTANEOUS FORCE THAT HAS BEEN CAREFULLY SELECTED TO ATTAIN THE REQUIRED PENETRATION. DRIVEN PINS SHALL CONFORM TO THE FOLLOWING REQUIREMENTS WHERE "D" = PIN'S SHANK DIAMETER.

MATERIAL PENETRATED BY PIN	MATERIAL MINIMUM THICKNESS	PIN SHANK PENETRATION IN SUPPORTING MATERIAL	MINIMUM SPACE FROM PIN'S CL TO EDGE OF PENETRATED MATERIAL	MINIMUM PIN SPACING
CONCRETE	16D	6D MINIMUM	14D	20D
STEEL	¼"	STEEL THICKNESS	4D	7D

STATE OF LOUISIANA
DAVID ALAN MARTIN
License No. 37832
PROFESSIONAL ENGINEER

SUBMITTED BY:
DAVID A. MARTIN
PROJECT MANAGER
37832
LICENSE NO.

SUBMITTED BY:
H. DAVIS COLE
COMPANY OFFICER
30219
LICENSE NO.

H. Davis Cole & Associates, LLC
CONSULTING ENGINEERS
NEW ORLEANS, LA

MARK	DESCRIPTION	DATE	BY	CHK'D
-	RELEASED FOR BIDS & CONSTRUCTION	MAR 2020	DAM	DAM

REVISION RECORD

DESIGNED BY: DAM
DRAWN BY: DAM
CHECKED BY: DAM
DATE: DEC, 2020
DETAILED BY: DAM
HDC PROJECT NO: 2016-13

LAKEFRONT PUMP STATION, PHASE 3
ST. TAMMY PARISH LOUISIANA
ST TAMMANY PARISH GOVERNMENT
21454 KOOP DRIVE
MANDEVILLE, LA 70471
GENERAL NOTES AND SPECIFICATIONS

SHEET ID
G2

SHEET SET
3 OF **20**

METALS CON'T.

17) IMPACT ANCHORS SHALL BE AN EXPANSION TYPE ANCHOR IN WHICH A NAIL TYPE PIN IS DRIVEN TO PRODUCE THE EXPANSIVE FORCE. THE PIN SHALL HAVE A ZINC SLEEVE WITH A MUSHROOM STYLE HEAD AND STAINLESS STEEL NAIL PIN. ANCHORS SHALL BE METAL HIT ANCHORS, MANUFACTURED BY HILTI, INC., RAWL ZAMAC NAILIN, MANUFACTURED BY THE RAWLPLUG COMPANY; OR EQUAL.

18) 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. 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.

19) 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. 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.

20) 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. FIELD REPAIRS TO DAMAGED GALVANIZING SHALL BE MADE BY PREPARING THE SURFACE AND APPLYING A COATING. 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. 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.

21) 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.

STRUCTURAL CONCRETE AND REINFORCEMENT

1) ALL STRUCTURAL CONCRETE SHALL BE CAST IN PLACE AND SHALL BE PER SECTION 03901. REINFORCING STEEL FOR CONCRETE SHALL COMPLY WITH THE FOLLOWING UNLESS OTHERWISE SPECIFIED:

2) REINFORCING STEEL USED IN STRUCTURES SHALL BE GRADE 60. 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 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). RAIL-STEEL AND AXLE-STEEL DEFORMED AND PLAIN BARS SHALL COMPLY WITH ASTM A 996. 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. WELDED STEEL WIRE FABRIC SHALL CONFORM TO ASTM A 1064. EPOXY COATED REINFORCING STEEL AND PATCHING MATERIALS SHALL COMPLY WITH AASHTO M 284 AND SHALL BE LISTED ON THE LDOTD AML (FORMERLY QPL 51).

3) TOLERANCES IN PLACING REINFORCING SHALL BE:

   $\pm\frac{3}{8}$" FOR MEMBERS WITH THICKNESS </= 8"

   $\pm\frac{1}{2}$" FOR MEMBERS WITH THICKNESS > 8"

4) CONCRETE COVER SHALL BE AS FOLLOWS:

   FOR CONCRETE PLACED AGAINST EARTH - - - - - - - - - - - - - - - - - 3"

   FOR SURFACES IN CONTACT WITH WATER- - - - - - - - - - - - - - - - - $2\frac{1}{2}$"

   FOR FORMED SURFACES IN CONTACT WITH EARTH- - - - - - - - - 2"

   FOR UNDERSIDE OF SLABS OVER WATER, BEAMS,

   AND COLUMNS NOT IN CONTACT WITH WATER OR EARTH - - - 2"

   FOR ALL OTHER SURFACES- 2"

5) WALLS AND SLABS WITH A SINGLE LAYER OF REINFORCEMENT SHALL HAVE THAT REINFORCEMENT CENTERED, UNLESS NOTED OTHERWISE.

6) ALL JOINT SURFACES SHALL BE ROUGH AND THOROUGHLY CLEANED.

7) DOWELS, PIPES, WATERSTOPS, AND OTHER EMBEDDED MATERIALS SHALL BE HELD SECURELY IN POSITION WHILE CONCRETE IS BEING PLACED.

8) REINFORCING BARS AND ACCESSORIES SHALL NOT BE IN CONTACT WITH ANY PIPE, PIPE FLANGE, METAL CONDUIT, OR OTHER METAL PARTS EMBEDDED IN CONCRETE. A MINIMUM OF 2 INCHES CLEARANCE SHALL BE PROVIDED IN ALL CASES

9) ALL ITEMS EMBEDDED IN CONCRETE SHALL BE PLACED ON CENTER AT LEAST 4 TIMES THEIR OUTSIDE DIMENSION. THE OUTSIDE DIMENSION SHALL NOT EXCEED ONE THIRD OF THE MEMBER THICKNESS.

10) SLABS WITH SLOPING SURFACES SHALL HAVE THE INDICATED SLAB THICKNESS MAINTAINED AS THE MINIMUM. SLAB BOTTOMS CAN EITHER SLOPE WITH THE TOP SURFACE OR BE LEVEL. REINFORCEMENT IN SLAB WITH SLOPING SURFACES SHALL BE PLACED AT THE REQUIRED CLEARANCE FROM THE SLAB SURFACE.

11) ASIDE FROM NORMAL ACCESSORIES USED TO HOLD REINFORCING BARS FIRMLY IN POSITION. THE FOLLOWING SHALL BE ADDED WHERE TWO CURTAINS OF REINFORCEMENT ARE REQUIRED:

A. IN SLABS, #4 RISER OR Z SHAPE SPACER BARS AT 36 INCHES O.C MAXIMUM EACH WAY TO SUPPORT TOP BARS.

B. IN WALLS, #3 U OR Z SHAPE SPACERS AT 72 INCHES O.C. MAXIMUM EACH WAY

12) VERTICAL REINFORCEMENT FOR CONCRETE OR MASONRY SHALL BE SPLICED WITH DOWEL BARS OF THE SAME SIZE AND SPACING FROM THE FOUNDATION USING A STANDARD SPLICE LENGTH. HORIZONTAL CORNER BARS, WITH FULL TENSION LAPS, MATCHING CONTINUOUS BAR SIZE AND SPACING SHALL BE PROVIDED.

13) SEALANT SHALL BE PLACED AT THE TOP OF ALL JOINTS RECEIVING EXPANSION JOINT FILLER. SEALANT DEPTH SHALL NOT EXCEED JOINT FILLER THICKNESS.

14) ALL EXPOSED CONCRETE CORNERS SHALL HAVE A ¾" CHAMFER.

15) FABRICATIONS AND PLACING OF REINFORCING BARS SHALL CONFORM TO THE MANUAL OF STANDARDS PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES, ACI 315, LATEST EDITION.

16) ALL LAP SPLICES SHALL BE A MINIMUM OF 40 BARS DIAMETER UNLESS OTHERWISE NOTED. SPLICES SHALL BE STAGGERED SUCH THAT NOT MORE THAN 50% ARE SPLICED WITHIN THE LAP LENGTH.

17) SLAB SHALL BE GIVEN A SMOOTH TROWEL FINISH.

18) CONCRETE SHALL BE PLACED PER THE REQUIREMENTS OF ACI 350 (HOT WEATHER CONCRETE PLACEMENT) AND ACI 306 (COLD WEATHER CONCRETE PLACEMENT.)

19) CONCRETE SHALL BE CURED AND TESTED PER REQUIREMENTS OF ACI 318, LATEST EDITION.

20) CALCIUM CHLORIDE AND/OR CHLORIDE CONTAINING ADMIXTURES SHALL NOT BE USED

21) CONTRACTOR SHALL SUBMIT MIX DESIGN INCLUDING PROPORTIONS OF ALL COMPONENTS FOR REVIEW.

GROUT

1) UNLESS NOTED OTHERWISE, GROUT SHALL BE NON - SHRINK GROUT HAVING A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 5000 PSI WHEN MIXED AT A FLUID CONSISTENCY. NON NON-SHRINK GROUT SHALL MEET THE REQUIREMENTS OF ASTM C 1107, GRADE B OR C, WHEN MIXED TO FLUID, FLOWABLE, AND PLASTIC CONSISTENCIES. 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.

2) WHERE INDICATED, EPOXY GROUT SHALL BE UTILIZED. EPOXY GROUT SHALL BE A FLOWABLE, NON-SHRINK, 100 PERCENT SOLIDS SYSTEM. THE EPOXY GROUT SYSTEM SHALL HAVE 3 COMPONENTS: RESIN, HARDENER, AND SPECIALLY BLENDED AGGREGATE, EACH PRE-MEASURED AND PREPACKAGED. THE RESIN COMPONENT SHALL NOT CONTAIN ANY NON-REACTIVE DILUENTS. RESINS CONTAINING BUTYL GLYCIDYL ETHER (BGE) OR OTHER HIGHLY VOLATILE AND HAZARDOUS REACTIVE DILUENTS ARE NOT ACCEPTABLE. VARIATION OF COMPONENT RATIOS IS NOT PERMITTED UNLESS SPECIFICALLY RECOMMENDED BY THE MANUFACTURER. MANUFACTURER'S INSTRUCTIONS SHALL BE PRINTED ON EACH CONTAINER IN WHICH THE MATERIALS ARE PACKAGED. NON-SHRINK EPOXY GROUT SHALL BE FIVE STAR DP EPOXY GROUT BY FIVE STAR PRODUCTS, INC.; MASTERFLOW 648 CP PLUS BY MBT-CHEMREX; SIKADUR 42 GROUT-PAK BY SIKA CORPORATION; OR EQUAL.

EARTHWORK

1) THE CONTRACTOR SHALL PERFORM EARTHWORK INDICATED AND REQUIRED FOR CONSTRUCTION OF THE WORK, COMPLETE AND IN PLACE, IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. 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.

2) 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. 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).

3) THE CONTRACTOR SHALL REMOVE AND EXCLUDE WATER, INCLUDING STORMWATER, 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.

4) 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.

5) USABLE SOILS SHALL HAVE A MAXIMUM PI OF 25 AND A MAXIMUM ORGANIC CONTENT OF 5 PERCENT. SOILS WITH A SILT CONTENT OF 50 PERCENT OR GREATER AND ALSO A PI OF 10 OR LESS WILL NOT BE ALLOWED.

6) UNLESS NOTED OR SPECIFIED OTHERWISE, GEOTEXTILE FABRIC SHALL BE GEOTEXTILE CLASS A LISTED ON THE LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT APPROVED MATERIALS LIST.

7) GRANULAR 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. MATERIALS SHALL BE PLACED, PROPERLY SHAPED AND UNIFORMLY COMPACTED 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.

8) 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). 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.

9) WHERE AREAS ARE INDICATED TO BE OVER-EXCAVATED, EXCAVATION SHALL BE TO THE DEPTH INDICATED, AND BACKFILL SHALL BE INSTALLED TO THE GRADE 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 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.

10) 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 IF APPROVED BY THE OWNER OR OFF-SITE AT A LOCATION ARRANGED BY THE CONTRACTOR IN ACCORDANCE WITH LAWS AND REGULATIONS REGARDING DISPOSAL OF SUCH MATERIAL.

STATE OF LOUISIANA
DAVID ALAN MARTIN
License No. 37832
REGISTERED PROFESSIONAL ENGINEER

SUBMITTED BY:
DAVID A. MARTIN
PROJECT MANAGER
37832
LICENSE NO.

SUBMITTED BY:
H. DAVIS COLE
COMPANY OFFICER
30219
LICENSE NO.

H. Davis Cole & Associates, LLC
CONSULTING ENGINEERS
NEW ORLEANS, LA

MARK	DESCRIPTION	DATE	BY	CHKD
-	RELEASED FOR BIDS & CONSTRUCTION	MAR 2020	DAM	DAM

REVISION RECORD

DESIGNED BY: DAM
DRAWN BY: DAM
CHECKED BY: DAM

DATE: DEC, 2020
DETAILED BY: DAM
HDC PROJECT NO. 2016-13

LAKEFRONT PUMP STATION, PHASE 3
ST. TAMMY PARISH LOUISIANA

ST TAMMANY PARISH GOVERNMENT
21454 KOOP DRIVE
MANDEVILLE, LA 70471

GENERAL NOTES AND SPECIFICATIONS

SHEET ID
G3

SHEET SET
4 OF **20**

CONCRETE (PLAN AND SECTION)
GROUT OR SAND (PLAN OR SECTION)
BRICK (PLAN AND SECTION)
CMU (PLAN AND SECTION)
STEEL/ METAL/ FRP (SMALL SCALE SECTION)
STEEL/ GRATING/ FRP (SMALL SCALE SECTION)
CHECKERPLATE (SECTION)
GRATING (PLAN)
GRATING OR SOLID FRP GRATING (SECTION)
SAFETY GRATING (PLAN)
SAFETY GRATING (PLAN)
SAFETY GRATING (PLAN)
WOOD (ELEVATION OR PLAN)
LUMBER (NOMINAL)
LUMBER (TRIMMED)
GLULAM (SECTION)
GLULAM (ELEVATION)
PLYWOOD (SMALL SCALE)
STRUCTURE OR FACILITY
EXISTING STRUCTURE OR FACILITY
FUTURE STRUCTURE OR FACILITY
OPENING
SPAN ARROW
EARTH/ GRADE
GRAVEL/ LIMESTONE/ AGGREGATE BASE
CENTERLINE

CL — CENTERLINE
PL — PROPERTY LINE
R/W — RIGHT OF WAY
ESMT — EASEMENT
TEMP ESMT — TEMPORTRY EASEMENT
G — UTILITY LINE (SEE DIRECTORY BELOW)
G — GAS LINE (SIZE NOTED WHERE LARGER THAN 3")
HP GAS — HIGH PRESSURE GAS
2" W — WATER LINE (SIZE INDICATED)
TEL — UNDERGROUND TELEPHONE
HVAC — HIGH VOLTAGE AC POWER LINE
24" SS — SANITARY SEWER (SIZE INDICATED)
OHW — OVERHEAD WIRES
24" SD — STORM DRAIN (SIZE INDICATED)
FOC — FIBER OPTIC CABLE
COMM — COMMUNICATION CABLE
FENCE (NEW)
FENCE (EXISTING)
WATER COURSE
TRAIL OF DIRT ROAD
125 — MAJOR CONTOUR LINE (NEW)
125 — MAJOR CONTOUR LINE (NEW)
125 — MAJOR CONTOUR LINE (NEW)

SUPPLY OR OUTSIDE AIR DUCT (FIRST DIMENSION, DUCT WIDTH)
EXHAUST OR RETURN AIR DUCT (FIRST DIMESION, DUCT WIDTH)
SIZE / CFM — CEILING SUPPLY DIFFUSER (SIZE IN INCHES)
SIZE / CFM — CEILING RETURN OR EXHAUST AIR GRILLE OR REGISTER (SIZE IN INCHES, WIDTH X HEIGHT)
SIZE / CFM — EXHAUST OR AIR GRILLE OR REGISTER (SIZE IN INCHES, WIDTH X HEIGHT)
SIZE / CFM — SUPPLY GRILLE OR REGISTER (SIZE IN INCHES, WIDTH X HEIGHT)
AIR TURNING VANES IN DUCT
DD — DEFLECTING DAMPER
FHC — FIRE HOSE CABINET
FE — FIRE EXTINGUISHER
UNIT HEATER
BALL VALVE
DIAPHRAGM VALVE
CHECK VALVE
PRESSURE RELEASE VALVE
BACK PRESSURE VALVE
M / P — MOTOR OPERATOR FOR VALVE (M = ELECTRIC / P = PNEUMATIC)
T — TEMPERATURE CONTROL VALVE
S — SOLENOID VALVE
MULTIPORT VALVE - 3WAYS
MULTIPORT VALVE - 4WAYS
FLOAT OPERATED VALVE
NEEDLE VALVE
PRESSURE RELIEF VALVE
ANGLE VALVE
HOSE BIBB (H/B)
INJECTOR OR EDUCTOR
AIR VACUUM AND AIR RELEASE ASSEMBLY
PIPE ANCHOR
POWER POLE
PIPELINE (CIVIL SHEETS) 24" Ø AND LARGER
PIPELINE (CIVIL SHEETS) 12" Ø TO 20" Ø
PIPELINE (CIVIL SHEETS) 10" Ø AND SMALLER
FLOW — FLOW DIRECTION
VEGETATION

ISOLATION VAULT & MAJOR BLOWOFF VAULT (IN PLAN)
T — CATHODIC TEST STATION (IN PROFILE)
T — CATHODIC TEST STATION (IN PROFILE)

TYPES:

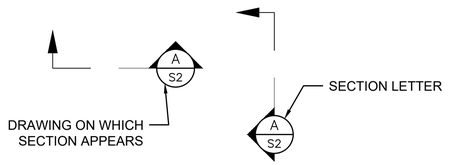
CTS	CORROSION TEST STATION
CATS	CASING TEST STATION
IJTS	INSULATING JOINT TEST STATION
FPTS	FOREIGN PIPELINE TEST STATION
CSTS	CURRENT SPAN TEST STATION

FH — FIRE HYDRANT
MANHOLE
PCOTG — PRESSURE CLEANOUT TO GRADE
CTOG / CTOG — CLEANOUT TO GRADE
REDUCER OR INCREASER (PROVIDED SIZE)
ETS — ELECTROLYSIS TEST STATION
WCO / WCO — WALL CLEANOUT
FCO / FCO — FLOOR CLEANOUT
HUB DRAIN
FLOOR DRAIN
FLOOR SINK
CHANGE IN PIPING MATERIAL
BACKWATER VALVE
BACKFLOW PREVENTER
STOP GATE
SLIDE GATE
SLUICE GATE
GATE VALVE, BURIED WITH VALVE BOX
BUTTERFLY VALVE, BURIED WITH VALVE BOX
ECCENTRIC PLUG VALVE, BURIED VALVE BOX
LUBRICATED PLUG VALVE, BURIED WITH VALVE BOX
GATE VALVE
BUTTERFLY VALVE OR DAMPER
ECCENTRIC PLUG VALVE
LUBRICATED PLUG VALVE
GLOBE VALVE
B — BUBLE LEVEL CONTROL
CENTRIFUGAL OR TURBINE PUMP OR FAN
METERING PUMP

PROGRESSIVE CAVITY, POSITIVE DISPLACEMENT PUMP
PROGRESSIVE CAVITY, POSITIVE DISPLACEMENT PUMP
G — PRESSURE GAUGE
G — PRESSURE GAUGE WITH DIAPHRAGM SEAL
S — PRESSURE SWITCH
S — PRESSURE SWITCH WITH DIAPHRAGM SEAL
FLANGED FITTING
MECHANICAL - TYPE FITTING (GROOVED)
SCREWED, WELDED, SOCKET-WELD, BELL & SPIGOT OR HUBLESS FITTING
SLEEVE TYPE COUPLING
FLANGED ADAPTER - SET SCREW TYPE
MECHANICAL - TYPE COUPLING
FLEXIBLE COUPLING
UNION
QUICK DISCONNECT COUPLING
CAPPED END OR PLUGGED END
BLIND FLANGE
REDUCER OR INCREASER
STRAINER OR 45° WYE
DRAIN
FLOW TUBE
M M — MAGNETIC METER
D M — DENSITY METER
P M — PROPELLER METER
U M — ULTRASONIC METER
ORIFACE PLATE FLANGES
ROTAMETER
T — CONDENSATE TRAP
PIPE SUPPORT ON PLAN
PULSATION DAMPENER
EXPANSION CHAMBER WITH RUPTURE DISC
RUPTURE DISC
FG — FLOW SIGHT GLASS

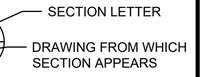
SECTION IDENTIFICATION

1) SECTION CUT ON DRAWING "S1"



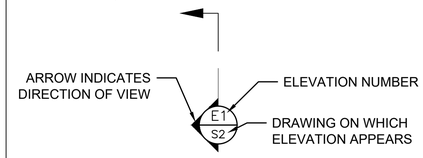
2) SECTION IDENTIFIED IN DRAWING "S2"

SECTION — SCALE: N.T.S.



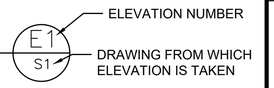
ELEVATION IDENTIFICATION

1) ELEVATION ON DRAWING "S1"



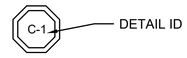
2) ELEVATION IDENTIFIED IN DRAWING "S2"

ELEVATION — SCALE: N.T.S.



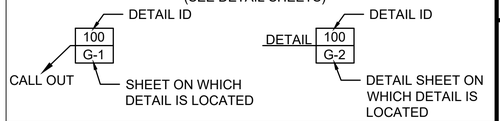
STANDARD DETAIL IDENTIFICATION

(SEE DETAIL SHEETS)



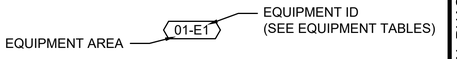
SPECIAL DETAIL IDENTIFICATION

(SEE DETAIL SHEETS)

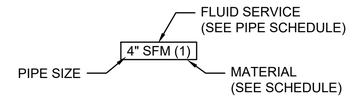


EQUIPMENT, PIPING & VALVE IDENTIFICATION

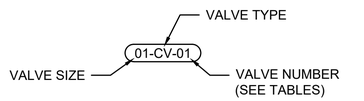
TYPICAL EQUIPMENT DESIGNATION



TYPICAL PIPE DESIGNATION



TYPICAL VALVE DESIGNATION



VALVE TYPES
CV - CHECK VALVE
PV - PLUG VALVE
GV - GATE VALVE
BV - BUTTERFLY VALVE
ARV - AIR RELEASE VALVE

EQUIPMENT/ VALVE AREAS
01- GENERAL

STATE OF LOUISIANA — DAVID ALAN MARTIN — License No. 37832 — PROFESSIONAL ENGINEER

SUBMITTED BY: DAVID A. MARTIN, PROJECT MANAGER — 37832 LICENSE NO.
SUBMITTED BY: H. DAVIS COLE, COMPANY OFFICER — 30219 LICENSE NO.

H. Davis Cole & Associates, LLC — Engineering Consultants — NEW ORLEANS, LA

MARK	DESCRIPTION	DATE	BY	CHK'D
-	RELEASED FOR BIDS & CONSTRUCTION	MAR 2020	DAM	DAM

REVISION RECORD

DESIGNED BY: DAM
DRAWN BY: DAM
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DETAILED BY: DAM
HDC PROJECT NO.: 2016-13

LAKEFRONT PUMP STATION, PHASE 3
ST. TAMMY PARISH, LOUISIANA
ST TAMMANY PARISH GOVERNMENT
21454 KOOP DRIVE
MANDEVILLE, LA 70471
DRAWINGS STANDARDS & SYMBOLS

SHEET ID: G4

SHEET SET: 5 OF 20

A	AIR
A/C	AIR CONDITIONING
AASHO	AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
AB	ANCHOR BOLTS
ABAN	ABANDON
ABAND	ABANDONED
ABBR	ABBREVIATION
ABS	ABSOLUTE TEMPERATURE
AC	ACTIVATED CARBON/ ASPHALTIC CONCRETE/ ALTERNATE CURRENT
ACI	AMERICAN CONCRETE INSTITUTION
ACOUS	ACOUSTIC/ ACOUSTICAL
ACP	ASBESTOS CEMENT PIPE/ ASPHALTIC CONCRETE PAVEMENT
ADD	ADDITION
ADH	ADHESIVE
ADJ	ADJUSTABLE
AER	AERATION
AFF	ABOVE FINISHED FLOOR
AFTS	AIR FLOW TEST STATION
AISC	AMERICAN INSTITUTION OF STEEL CONSTRUCTION
ALT	ALTERNATIVE
ALUM	ALUMINUM
AMB	AMBIENT
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
API	AMERICAN PETROLEUM INSTITUTE
APPD	APPROVED
APPROX	APPROXIMATE
APPURTS	APPURTENANCES
ARCH	ARCHITECTURE
AREA	AMERICAN RAILWAY ENGINEERING ASSOCIATION
ASME	AMERICAN SOCIETY OF MECHANICAL ENGINEERS
ASPH	ASPHALT
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
AT	ACOUSTICAL TILE
ATM	ATMOSPHERE
AV/RV	AIR VACUUM AND AIR RELEASE VACUUM
AVE	AVENUE
AWPA	AMERICAN WOOD PRESERVERS ASSOCIATION
AWS	AMERICAN WELDING SOCIETY
AWWA	AMERICAN WATER WORKS ASSOCIATION
B&S	BELL AND SPIGOT
B/W	BACK OF WALL/ BACK OF WALK
BC	BEGIN CURVE/ BOLT CIRCLE/ BETWEEN CENTERS
BCR	BEGIN CURB RETURN
BD	BOARD
BDRY	BOUNDARY
BF	BLIND FLANGE/ BOTTOM OF FOOTING
BFP	BACK FLOW PREVENTER
BHP	BRAKE HORSEPOWER
BLDG	BUILDING
BLK	BLACK/ BLOCK
BLKG	BLOCKING
BLVD	BOULEVARD
BM	BEAM/ BENCHMARK
BO	BLOW-OFF ASSEMBLY
BOD	BIOCHEMICAL OXYGEN DEMAND
BOP	BOTTOM OF PIPE
BOT	BOTTOM
BPV	BACK PRESSURE VALVE
BRK	BRICK/ BREAK
BSMT	BASEMENT
BT	BOLT
BTU	BRITISH THERMAL UNIT
BV	BUTTERFLY VALVE
BVC	BEGIN VERTICAL CURVE
BWV	BACK WATER VALVE
C	CENTIGRADE/ CHANNEL/ CEMENT
C&G	CURB AND GUTTER
CAB	CABINET/ CRUSHED AGGREGATE BASE
CAP	CAPACITY
CATS	CASING TEST STATION
CB	CATCH BASIN/ CHALK BOARD/ CURB
CC	CLOSED CIRCUIT TV/ CENTER TO CENTER
CD	CEILING DIFFUSER
CEM	CEMENT
CF	CURB FACE OR CUBIC FEET
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CFS	CUBIC FEET PER SECOND
CHEM	CHEMICAL
CHG	CHANGE
CHKD	CHECKED
CI	CAST IRON
CIP	CAST IRON PIPE/ CAST IN PLACE
CIPP	CAST IN PLACE PIPE
CJ	CONSTRUCTION JOINT
CL	CHLORINE GAS/ CHLORINATOR/ CENTERLINE
CLF	CHAIN LINK FENCE
CLG	CEILING
CLOS	CLOSET
CLR	CLEAR/ CLEARANCE
CM	CENTIMETER
CMB	CRUSHED MISCELLANEOUS BASE
CMC	CEMENT MORTAR-COATED
CML	CEMENT MORTAR-LINED
CML&C	CEMENT LINED AND COATED
CMP	CORRUGATED METAL PIPE
CMU	CONCRETE MASONRY UNIT
CO	CLEANOUT
COL	COLUMN
COMP	COMPRESSOR
CONC	CONCRETE/ CONCENTRIC
COND	CONDENSER/ CONDENSATE
CONN	CONNECTION
CONST	CONSTRUCT/ CONSTRUCTION
CONT	CONTINUED/ CONTINUOUS
CONTR	CONTRACTOR
COORD	COORDINATE
COR	CORNER
COTG	CLEANOUT TO GRADE
CPLG	COUPLING
CPVG	CHLORINATED POLYVINYL CHLORIDE
CS	CAUSTIC SODA/ CAST STEEL
CSP	CORRUGATED STEEL PIPE
CSTS	CURRENT SPAN TEST STATION
CT	CERAMIC TILE
CTR	CENTER
CTS	CORROSION TEST STATION
CTSK	COUNTERSUNK
CU	COPPER/ CUBIC
CULV	CULVERT
CV	CHECK VALVE
CY	CUBIC YARD
CYL	CYLINDER
d	PENNY
DAD	DOUBLE ACTING DOOR
DAFT	DISSOLVED AIR FLOATATION THICKENER
DB	DIRECT BURY
DBL	DOUBLE
DC	DIRECT CURRENT
DEG	DEGREE
DET	DUCTILE IRON
DF	DRINKING FOUNTAIN/ DOUGLAS FIR
DH	DOUBLE HUNG
DI	DUCTILE IRON
DIA	DIAMETER
DIAG	DIAGONAL
DIAPH	DIAPHRAGM
DIFF	DIFFUSER/ DIFFERENTIAL
DIP	DUCTILE IRON PIPE
DIR	DIRECTION
DISCH	DISCHARGE
DISP	DISPENSER
DL	DEAD LOAD
DMH	DROP MANHOLE
DN	DOWN
DO	DISSOLVED OXYGEN/ DITTO
DPW	DEPT. OF PUBLIC WORKS
DR	DOOR/ DRAIN
DS	DRENCH SHOWER AND EYE WASH
DT	DRAIN TILE
DWG	DRAWING
DWLS	DOWELS
DWY	DRIVEWAY
E	EAST
E/O	EAST OF
EA	EACH
EB	EXPANSION BOLT OR ANCHOR
EC	END CURVE
ECC	ECCENTRIC
ECR	END CURB RETURN
EF	EACH FACE/ EXHAUST FAN
EFF	EFFLUENT
EG	EXHAUST GRADE/ EDGE OF GUTTER/ EXHAUST GRILLE
EGL	ENERGY GRADE LINE
EL	ELEVATION
ELEC	ELECTRICAL/ ELECTRONIC
EN	EDGE NAILING
ENCL	ENCLOSURE
ENG	ENGINE
ENGR	ENGINEER
ENT	ENTRANCE
EP	EDGE OF PAVEMENT
EPT	ETHYLENE PROPYLENE
EQ	EQUAL
EQUIP	EQUIPMENT
ESMT	EASEMENT
ETB	EMULSION TREATED BASE
ETC	ET CETERA
EVAP	EVAPORATOR
EVC	END VERTICAL CURVE
EW	EACH WAY/ EYE WASH
EX	EXISTING
EXC	EXCAVATION
EXH	EXHAUST
EX-HY	EXTRA HEAVY
EXIST	EXISTING
EXP	EXPANSION
EXT	EXTERIOR/ EXTENSION
EXTR	EXTRUDE
F	FAHRENHEIT/ FINISH
F TO F	FACE TO FACE
F&C	FRAME AND COVER
F&I	FURNISH AND INSTALL
FA	FOUL AIR
FAB	FABRICATE/ FABRICATION
FAI	FRESH AIR INTAKE
FB	FLAT BAR/ FLOOR BEAM/ FIELD BOOK
FCO	FLOOR CLEANOUT
FD	FLOOR DRAIN
FDR	FEEDER
FE	FIRE EXTINGUISHER/ FINAL EFFLUENT
FEM	FEMALE (PIPE THREAD)
FF	FLAT FACE/ FAR FACE/ FINISHED FLOOR
FG	FINISHED GRADE
FH	FIRE HYDRANT/ FLAT HEAD
FIG	FIGURE
FIN	FINISHED
FIX	FIXTURE
FL	FLOWLINE/ FLOOR
FLEX	FLEXIBLE
FLG	FLANGED/ FLOORING
FLGD	FLANGED
FLOCC	FLOCCULATOR/ FLOCCULATION
FLR	FLOOR
FLSG	FLASHING
FM	FACTORY MUTUAL (LAB APPROVED)/ FORCE MAIN
FMH	FLEXIBLE METAL HOSE
FN	FIELD NAILING
FND	FOUNDATION
FOC	FACE TO CONCRETE/ FIBER OPTIC CABLE
FOM	FACE OF MASONRY
FOS	FACE OF STUD
FOW	FACE OF WALL
FPC	FLEXIBLE PIPE COUPLING
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FPTS	FOREIGN PIPE TEST STATION
FR	FRAME
FRP	FIBERGLASS REINFORCED PLASTIC
FS	FIBERGLASS SURFACE/ FARSIDE/ FLOOR SINK/ FORGED STEEL/ FROTH SPRAY
FT	FEET/ FOOT
FTG	FOOTING
FUR	FURRING
FUT	FUTURE
FV	FIELD VERIFY
FWD	FORWARD
G	GAS
GA	GAGE/ GAUGE
GAL	GALLON
GALV	GALVANIZED
GANC	GUY ANCHOR
GB	GRADE BREAK
GEN	GENERAL/ GENERATOR
GFA	GROOVED FLANGE ADAPTER
GI	GALVANIZED IRON
GIP	GALVANIZED IRON PIPE
GL	GLASS/ GROUND LINE/ GRADE LINE
GLB	GLUE LAMINATED BEAM
GLV	GLOBE VALVE
GM	GAS METER
GP	GUY POLE
GPD	GALLONS PER DAY
GPH	GALLONS PER HOUR
GPM	GALLONS HER MINUTE
GR	GRADE
GRD	GRADE/ GROUND
GRTG	GRATING
GSP	GALVANIZED STEEL PIPE
GV	GATE VALVE
GYP	GYPSUM
H	HIGH/ HEIGHT
H&V	HEATING AND VENTILATING
H/B	HOSE BIBB
HC	HOUSE CONNECTION
HDR	HEADER
HDW	HARDWARE
HDWL	HEADWALL
HEX	HEXAGONAL
Hg	MERCURY
HGL	HYDRAULIC GRADE LINE
HGR	HANGER
HM	HOLLOW METAL
HORZ	HORIZONTAL
HP	HIGH POINT/ HORSE POWER/ HIGH PRESSURE
HPG	HIGH PRESSURE GAS
HR	HEAT RETURN/ HOUR
HTG	HEATING
HTR	HEATER
HV	HORIZONTAL AND VERTICAL CONTROL POINT
HVAC	HEATING, VENTILATION AND AIR CONDITION/ HIGH VOLTAGE AC POWER LINE
HW	HOT WATER/ HEADWORK
HWD	HARDWOOD
HWL	HIGH WATER LEVEL
HWO	HAND WHEEL OPERATED
HYD	HYDRAULIC/ HYDRANT
I&O	INSIDE AND OUTSIDE
ID	INSIDE DIAMETER
IF	INSIDE FACE
IJTS	INSULATING JOINT TEST STATION
IN	INCH
INCL	INCLUDE/ INCLUDING
INFL	INFLUENT
INSL	INSULATION
INSP	INSPECTION
INST	INSTRUMENT
INT	INT
IP	IRON PIE
IPS	IRON PIPE SIZE
IRRG	IRRIGATION
JAN	JANITOR
JT	JOINT
K	KELVIN/ KILO/ KARAT
KG	KILOGRAM
KM	KILOMETER
KV	KILOVOLT
KW	KILOWATT
KWH	KILOWATT HOUR
L	LITER/ LENGTH/ ANGLE
LAB	LABORATORY
LAM	LAMINATED
LAT	LATERAL
LAV	LAVATORY
LB	POUND
LCP	LOCAL CONTROL PANEL
LD	LOCAL DEPRESSION
LDG	LANDING
LDOTD	LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
LF	LINEAR FEET
LG	LENGTH/ LONG
LH	LAMP HOLE/ LEFT HAND
LL	LIVE LOAD
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LOC	LOCATION
LOL	LAYOUT LINE
LONG	LONGITUDINAL
LP	LOW POINT/ LOW PRESSURE/ LAMP POST
LSSRB	LOUISIANA STANDARD SPECIFICATION FOR ROADS AND BRIDGES
LT	LEFT/ LIGHT
LTS	LIME TREATED SOIL
LW	LOW WATER
LWL	LOW WATER LEVEL
LWR	LOWER
M	METER/ MALE (PIPE THREAD)
MACH	MACHINE
MAG	MAGNETIC
MAINT	MAINTENANCE
MAN	MANUAL
MAS	MASONRY
MATL	MATERIAL
MAX	MAXIMUM
MB	MAIL BOX/ MACHINE BOLT
MCC	MOTOR CONTROL CENTER
MCR	MIDDLE OF CURB RETURN
MEAS	MEASURE
MECH	MECHANICAL
MED	MEDIUM
MEMB	MEMBER
MFRD	MANUFACTURED
MGD	MILLION GALLONS PER DAY
MH	MANHOLE
MHT	MEAN HIGH TIDE
MHW	MEAN HIGH WATER
MI	MALLEABLE IRON/ MILE
MICRON	1/ 1,000,000TH METER
MIL	MILITARY/ 1/1,000TH INCH
MIN	MINIMUM/ MINUTE
MIR	MIRROR
MISC	MISCELLANEOUS
MK	MARK
MLW	MEAN LOW WATER
mm	MILLIMETER
MO	MOTOR OPERATED/ MASONRY OPENING
MOD	MODEL/ MODIFICATION
MON	MONUMENT/ MONITOR
MOR	MORTAR
MS	MOP SINK
MSL	MEAN SEA LEVEL
MTC	MECHANICAL-TYPE COUPLING
MTD	MOUNTED
MTG	MOUNTING
MTL	METAL
MTR	MOTOR
N	NORTH
NaOCl	SODIUM HYPOCHLORITE
NaOH	SODIUM HYDROXIDE (CAUSTIC SODA)
NBS	NATION BUREAU OF STANDARDS
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRIC CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
NF	NEAR FACE
NFPA	NATION FIRE PROTECTION ASSOCIATION
NG	NATION GRADE/ NATURAL GAS
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NOM	NOMINAL
NPS	NOMINAL PIPE SIZE
NPT	NATIONAL PIPE THREAD
NRCP	NON-REINFORCED CONCRETE PIPE
NRS	NON-RAISING STEM
NS	NEAR SIDE
NTS	NOT TO SCALE
OBJ	OBJECT
OC	ON CENTER/ OVER-CROSSING
OD	OUTSIDE DIAMETER/ OVERALL DIMENSION
OE	OUTER EDGE
OF	OVERFLOW/ OUTSIDE FACE
OFD	OVERFLOW DRAIN
OFF	OFFICE
OH	OVERHEAD
OPER	OPERATOR/ OPERATING
OPNG	OPENING
OPP	OPPOSITE
ORIG	ORIGINAL
OS&Y	OUTSIDE SCREW & YORK
OSA	OUTSIDE AIR
OSHA	OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION
OWG	OIL, WATER, GAS
OZ	OUNCE
P	POLE/ PAGE/ PIPE
P/S	POLE AND SHELF
PA	PLANTING AREA
PART	PARTITION
PAVMT	PAVEMENT
PB	POLYBUTYLENE/ PULL BOX
PC	POINT OF CURVATURE/ PRIMARY CLARIFIER/ PORTLAND CEMENT
PCC	PORTLAND CEMENT CONCRETE/ POINT OF COMPOUND CURVE
PCCP	PRE-STRESSED CONCRETE CYLINDER PIPE
PCOTG	PRESSURE CLEANOUT TO GRADE
PCVC	POINT OF COMPOUND VERTICAL CURVE
PE	POLYETHYLENE/ PLANT EFFLUENT/ POLYELECTROLYTE POLYMER
PG	PRESSURE GAUGE
pH	HYDROGEN ION CONCENTRATION
PI	PLANT INFLUENT/ POINT OF INTERSECTION
PK	PARKING
PL	PLATE/ PROPERTY LINE/ PLACE
PLAS	PLASTER/ PLASTIC
PLT	PLANT
PLWD	PLYWOOD
PM	PRESSED METAL
PNEU	PNEUMATIC
PNL	PANEL
POB	POINT OF BEGINNING
POC	POINT OF CONNECTION
POT	POINT OF TANGENT
PP	POWER POLE/ POLYPROPYLENE
PPD	POUNDS PER DAY
PPH	POUNDS PER HOUR
PPM	POUNDS PER MINUTE
PR	PAIR
PRC	POINTS OF REVERSE CURVE
PRCT	PRECAST/ PERCENT
PREFAB	PREFABRICATED
PRESS	PRESSURE
PROF	PROFILE
PRV	PRESSURE REGULATING, RELIEF, OR REDUCING VALVE
PRVC	POINT OF REVERSE VERTICAL CURVE
PS	PRESSURE SWITCH
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PSIA	POUNDS PER SQUARE INCH ABSOLUTE
PSIG	POUNDS PER SQUARE INCH GAUGE
PT	POINT OF TANGENCY/ PAINT/ PRESSURE TREATED
PTFE	POLYTETRAFLUOROETHYLENE (TEFLON)
PV	PLUG VALVE
PVC	POLYVINYL CHLORIDE/ POLYVINYL CONDUIT (PIPE)
PVDF	POLYVINYLIDENE FLUORIDE (KYNAR)
QT	QUARRY TILE
QTY	QUANTITY
QUAD	QUADRANGLE/ QUADRANT
R	RADIUS/ RISER/ RATE OF SLOPE
R&O	ROCK AND OIL
R/W	RIGHT OF WAY
RAC	RECYCLED ASPHALT CONCRETE
RAG	RETURN AIR GRILLE
RAP	RECLAIMED ASPHALT PAVEMENT
RAS	RETURN ACTIVATED SLUDGE
RC	REINFORCED CONCRETE
RCP	REINFORCED CONCRETE PIPE
RD	ROAD/ ROOF DRAIN/ ROUND
RED	REDUCER/ REDUCING
REF	REFERENCE/ REFER/ REFRIGERATOR
REG	REGULATING
REINF	REINFORCE/ REINFORCED
REQD	REQUIRED
RESIL	RESILIENT
RET	RETAINING/ RETURN
REV	REVISION
RF	ROOF/ RAISED FOUNDATION/ ROUGH FACE
RFG	ROOFING
FGE	REGISTERED GEOTECHNICAL ENGINEER
RH	REDHEAD/ RIGHT HAND
RM	ROOM
RO	ROUGH OPENING
RPM	REVOLUTIONS PER MINUTE
RR	RAILROAD
RS	RAISING STEAM
RSL	RAW SLUDGE
RT	RIGHT
RTP	REINFORCED THERMOSETTING PLASTIC
RW	REDWOOD
RWL	RAINWATER LEADER
S	SOUTH/ SCUM/ SINK/ SECOND/ SLOPE/ SAND
S/O	SOUTH OF
SA	SAMPLE
SAN	SANITARY
SBR	STYRENE BUTADIENE (RUBBER)
SC	SPACE CHEMICAL/ SECONDARY CLARIFIER
SCCP	STEEL CYLINDER CONCRETE PIPE
SCD	SCREWED
SCFM	STANDARD CUBIC FEET PER MINUTE
SCH	SCHEDULE
SD	STORM DRAIN
SDR	STANDARD THERMOPLASTIC PIPE DIMENSION RATIO
SEC	SECONDARY/ SECTION
SER	SERIES
SETT	SETTING
SF	SQUARE FOOT
SH	SHOWER
SHELV	SHELVING
SHT	SHEET
SHTG	SHEATHING/ SHEETING
SIM	SIMILAR
SL	SLUDGE
SLDG	SLIDING
SLG	SLUICE GATE
SOG	SLAB ON GRADE
SOLN	SOLUTION
SP	STATIC PRESSURE
SPEC	SPECIFICATION
SPK	SPIKE
SQ	SQUARE
SST	STAINLESS STEEL
SSB	SELECT SUB-BASE
SSPWC	STANDARD SPECIFICATION FOR PUBLIC WORKS CONSTRUCTION
SSU	SECONDS SAYBOLT UNIVERSAL
ST	STREET/ STATE
STA	STATION
STC	SLEEVE-TYPE COUPLING
STD	STANDARD
STK	STAKE
STL	STEEL
STM	STEAM
STR	STRAIGHT/ STRUCTURAL
SUCT	SUCTION
SV	SOLENOID VALVE
SW	SIDEWALK
SWD	SIDEWALK DRAIN
SWGR	SWITCHGEAR
SWR	SIDEWALL REGISTER
SY	SQUARE YARD
SYM	SYMMETRICAL/ SYMBOL
SYS	SYSTEM
T	THERMOSTAT/ TREAD OF STAIR/ TANGENT/ TOP
T&B	TOP AND BOTTOM
T&G	TONGUE AND GROOVE
TAN	TANGENT
TB	TACK BOARD
TBE	THREAD BOTH ENDS
TBM	TEMPORARY BENCH MARK
TC	TOP OF CURB
TCV	TEMPERATURE CONTROL VALVE
TEL	TELEPHONE
TEMP	TEMPERATURE/ TEMPORARY
TF	TOP OF FOOTING
TH	TEST HOLE
THK	THICK/ THICKNESS
THR	THRESHOLD
THR'D	THREADED
TK	TANK/TACK
TL	TRAVERSE LINE
TOC	TOP OF CONCRETE
TOE	THREAD ONE END
TOL	TOILET
TOM	TOP OF MASONRY
TOP	TOP OF PIPE
TOPO	TOPOGRAPHIC
TOS	TOP OF STEEL
TOW	TOP OF WALL
TP	TELEPHONE POLE
TR	TRACT
TRANS	TRANSMITTER/ TRANSITION/ TRANSMISSION
TS	TRAFFIC SIGNAL
TSB	TOP SET BASE
TSC	TRAFFIC SIGNAL CONDUIT
TV	THERMOSTATIC VALVE/ TELEVISION
TW	THERMOMETER WELL/ TRAVELED WAY
TYP	TYPICAL
UB	UNION BONNET
UBC	UNIFORM BUILDING CODE
UC	UNDER-CROSSING
UG	UNDERGROUND
UGC	UNDERGROUND CONDUIT
UH	UNIT HEATER
UL	UNDERWRITER'S LABORATORIES
UNO	UNLESS NOTED OTHERWISE
UOI	UNLESS OTHERWISE INDICATED
UR	URINAL
USA	UNDERGROUND SERVICE ALERT
UDGS	UNITED STATES GEOLOGICAL SURVEY
V	VALVE/ VERTICAL/ VENT/ VOLT/ VOLUME
VAC	VACUUM
VAR	VARIES/ VARIABLE
VB	VALVE BOX
VC	VERTICAL CURVE
VCP	VITRIFIED CLAY PIPE
VERT	VERTICAL
VOL	VOLUME
VPI	VERTICAL POINT OF INSERTION
VTC	VENT TO CEILING
VTR	VENT THROUGH ROOF
VWC	VINYL WALL COVERING
VWM	VERIFY WITH MANUFACTURER
W	WEST/ WASTE/ WIDTH/ WIDE FLANGE
W/	WITH
W/0	WEST OF/ WITHOUT
WC	WATER COLUMN/ WATER CLOSET
WCO	WALL CLEANOUT
WD	WOOD
WDW	WINDOW
WH	WATER HEATER/ WALL HEATER
WI	WROUGHT IRON
WM	WATER METER
WOG	WATER, OIL OR GAS
WP	WATERPROOFING/ WORKING PRESSURE/ WEAK POINT
WPJ	WEAKEN PLANE JOINT
WS	WATER SURFACE
WSTP	WATER STOP
WT	WEIGHT
WWF	WELDED WIRE FABRIC
WWP	WATER WORKING PRESSURE
WWTP	WASTE WATER TREATMENT PLANT
XCONN	CROSS CONNECTION
XS	EXTRA STRONG
XSEC	CROSS SECTION
XSS	DOUBLE EXTRA STRONG
YD	YARD
YR	YEAR
Z	ZERO/ ZONE
ZN	ZINC
#	POUND
&	AND
@	AT

STATE OF LOUISIANA
DAVID ALAN MARTIN
License No. 37832
PROFESSIONAL ENGINEER

SUBMITTED BY:
DAVID A. MARTIN
PROJECT MANAGER
37832
LICENSE NO.

SUBMITTED BY:
H. DAVIS COLE
COMPANY OFFICER
30219
LICENSE NO.

H. Davis Cole & Associates, LLC
CIVIL ENGINEERING CONSULTANTS
NEW ORLEANS, LA

MARK	DESCRIPTION	DATE	BY	CHKD
-	RELEASED FOR BIDS & CONSTRUCTION	MAR 2020	DAM	DAM

REVISION RECORD

DESIGNED BY: DAM
DRAWN BY: DAM
CHECKED BY: DAM
DATE: DEC, 2020
DETAILED BY: DAM
HDC PROJECT NO. 2016-13

LAKEFRONT PUMP STATION, PHASE 3
ST. TAMMANY PARISH
LOUISIANA

ST TAMMANY PARISH GOVERNMENT
21454 KOOP DRIVE
MANDEVILLE, LA 70471

ABBREVIATIONS

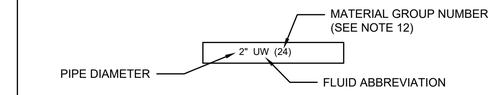
SHEET ID
G5

SHEET SET
6 OF 20

	FUNCTION	PIPING MATERIALS (SEE SCH AT RIGHT)				FIELD TEST REQUIREMENTS (SEE NOTE AND NOTE 4)					
		EXPOSED PIPING (SEE NOTE 14)		BURNED PIPING (SEE NOTE 13)							
	THIS LIST INCLUDES SOME LINES NOT USED IN THE PROJECT	2" DIA AND SMALLER	2 ½" DIA AND LARGER	2" DIA AND SMALLER	2 ½" DIA AND LARGER	MINIMUM TEST PRESSURE PSI	TEST MEDIUM	LEAKAGE ALLOWANCE (SEE NOTE 2)	PIPE COLOR (EXPOSED PIPE)	PIPE MARKER (EXPOSED PIPE)	LETTER COLOR (EXPOSED PIPE)
A	AERATION	1,16,18	5,11,16,18	1,16,18	5,11,16,18	25	AIR	(A)(D)	NOTE 17	BLUE	WHITE
AW	AERATED WATER	16	11	16	11,32	25	AIR	(A)(D)	AQUA	BLUE	WHITE
BD	BOTTOM DRAIN	--	26	--	26	50	WATER	(A)	NOTE 17	GREEN	WHITE
BP	BYPASS	--	8	--	8	25	WATER	(A)	NOTE 17	GREEN	WHITE
BW	FILTER BACKWASH	--	8	--	8	75	WATER	(A)	NOTE 17	GREEN	WHITE
C	CONDENSATE	29*	29*	29*	29*	125	WATER	(A)	NOTE 17	YELLOW	BLACK
CAW	CHANNEL AGITATION WATER	16	16	16	16	25	WATER	(A)	NOTE 17	YELLOW	BLACK
CD	CHEMICAL DRAIN AND VENT	13,17,23	13,17,23	13,17,23	13,17,23	NOTE 7	--	--	NOTE 17	YELLOW	BLACK
CL	CHLORINE (GAS OR LIQUID STATE)	10	--	10	--	300	DRY AIR	(A)(D)	YELLOW	YELLOW	BLACK
CLS	CHLORINE SOLLUTION	16	16	16	16	125	WATER	(A)	YELLOW	YELLOW	BLACK
CLV	CHLORINE GAS UNDER VACUUM	16	16	16	16	15 IN Hg	VACUUM	(A)(E)	YELLOW	YELLOW	BLACK
CN	CENTRATE	--	26	--	26	50	WATER	(A)	NOTE 17	GREEN	WHITE
CS	CAUSTIC SODA	6	6	6	6	125	WATER	(A)	YELLOW	YELLOW	BLACK
CSL	CIRCULATED SLUDGE	--	30	--	30	50	WATER	(A)	BROWN	YELLOW	BLACK
CV	CHLORINATOR VENT AND DETECTION LINE	16	16	16	16	NOTE 8	--	--	YELLOW	YELLOW	BLACK
DCS	DEFOAMING CHEMICAL SOLUTION	16	16	16	16	125	WATER	(A)	NOTE 17	GREEN	WHITE
DN	DECANT	--	26	--	26	50	WATER	(A)	NOTE 17	GREEN	WHITE
DSL	DIGESTED SLUDGE	--	30	--	30	50	WATER	(A)	BROWN	YELLOW	BLACK
DW	DEMINERALIZED WATER	16,18	16,18	16,18	16,18	125	WATER	(A)	NOTE 17	GREEN	WHITE
EE	ENGINE EXHAUST	14*	14*	14	14	NOTE 8	--	--	NOTE 17	YELLOW	BLACK
EWR	ENGINE COOLING WATER RETURN	1*	1*	1	1	125	WATER	(A)	NOTE 17	GREEN	WHITE
EWS	ENGINE COOLING WATER SUPPLY	1*	1*	1	1	125	WATER	(A)	NOTE 17	GREEN	WHITE
F	FROTH	30	30	30	30	50	WATER	(A)	NOTE 17	YELLOW	BLACK
FA	FOUL AIR	--	18	--	18	10	AIR	(A)(D)	NOTE 17	YELLOW	BLACK
FAW	FILTERED AIR WASH	16	11	16	11,32	25	AIR	(A)(D)	NOTE 17		
FE	FINAL EFFLUENT	--	8	--	8	50	WATER	(A)	NOTE 17	GREEN	WHITE
FIW	FINISHED WATER	16	11	16	11,32	25	WATER	(A)	BLUE	BLUE	WHITE
FLW	FILTERED WATER	16	11	16	11,32	25	WATER	(A)	AQUA	AQUA	WHITE
FM	FORCE MAIN	--	8,26	--	8,26	125	WATER	(A)	NOTE 17	YELLOW	BLACK
FOR	FUEL OIL RETURN	9	9	9	9	125	AIR	(A)(D)	NOTE 17	YELLOW	BLACK
FOS	FUEL OIL SUPPLY	9	9	9	9	125	AIR	(A)(D)	NOTE 17	YELLOW	BLACK
FS	FROTH SPRAY	2	2	2	2	125	WATER	(A)	NOTE 17	GREEN	WHITE
FSP	FIRE PROTECTION SPRINKLER SYSTEM	NOTE 10	NOTE 10	NOTE 10	NOTE 10	NOTE 9	WATER	--	RED	RED	WHITE
G	GRIT	--	26	--	26	50	WATER	(A)	BROWN	YELLOW	BLACK
H	HYPOCHLORITE	16	16	16	16	125	WATER	(A)	NOTE 17		
HR	HEATING WATER RETURN	1*	1*	1*	1*	125	WATER	(A)	NOTE 17	YELLOW	BLACK
HS	HEATING WATER SUPPLY	1*	1*	1*	1*	125	WATER	(A)	NOTE 17	YELLOW	BLACK
HWR	DOMESTIC HOT WATER RETURN	24*	2*	24*	2*	125	WATER	(A)	NOTE 17	YELLOW	BLACK
HWS	DOMESTIC HOT WATER SUPPLY	24*	2*	24*	2*	125	WATER	(A)	NOTE 17	YELLOW	BLACK
IA	INSTRUMENT AIR	24	2	24	2	125	AIR	(A)(D)	GREEN	BLUE	WHITE
IE	INTERMEDIATE EFFLUENT	--	8	--	8,28	50	WATER	8(A)28(B)	NOTE 17	GREEN	WHITE
LA	LIQUID ALUM	16	16	16	16	125	WATER	(A)	ORANGE	YELLOW	BLACK
LO	LUBE OIL	9	9	9	9	125	AIR	(A)(D)	RED	YELLOW	BLACK
LPG	LIQUEFIED PETROLEUM GAS	3	3	3	3	NOTE 7	AIR	--	RED	YELLOW	BLACK
LS	LIME SLURRY	NOTE 15	NOTE 15	NOTE 15	NOTE 15	NOTE 8	--	--	LIGHT GREEN	YELLOW	BLACK
LSP	LANDSCAPING SPRINKLER SYSTEM	2,16	2,16	2,16	2,16	NOTE 7	--	--	NOTE 17	GREEN	WHITE
ML	MIXED LIQUOR	2	2,8,26,28	2	2,8,26,28	50	WATER	2,3,26(A) 28(B)	BROWN	YELLOW	BLACK
MG	NATURAL GAS	9	9	9	9	NOTE 7	AIR	--	RED	YELLOW	BLACK
OF	OVERFLOW	--	8	--	8	25	WATER	2,8(A)12,28(B) 22(C)	NOTE 17	GREEN	WHITE
PA	PLANT AIR	7	7	7	7	300	AIR	(A)	GREEN	BLUE	WHITE
PD	PLANT DRAIN	2	8,12	2	8,12,22,28	NOTE 6	WATER	(A)	NOTE 17	GREEN	WHITE
PEA	POLYMER - ANIONIC	16	16	16	16	125	WATER	(A)	GREEN	GREEN	WHITE
PEC	POLYMER - CATIONIC	16	16	16	16	125	WATER	(A)	GREEN	GREEN	WHITE
PEF	PRIMARY EFFLUENT	--	8,26	--	8,26	25	WATER	(B)	NOTE 17	YELLOW	BLACK
PEN	POLYMER - NONIONIC	16	16	16	16	125	WATER	(A)	GREEN	GREEN	WHITE
PI	PLANT INFLUENT	--	21.26	--	21,26	NOTE 6	WATER	(B)	NOTE 17	YELLOW	BLACK
PO	PLANT OVERFLOW	2	8	2	8,28	NOTE 6	WATER	2,8(A) 28(B)	NOTE 17	GREEN	WHITE
PTW	PRE-TREATED WATER	16	11	16	11,32	25	WATER	(A)	AQUA		
PW	POTABLE WATER	2,24	2	2,24	2,11,19	125	WATER	2,11,24(A) 19(B)	BLUE	GREEN	WHITE
RAS	RETURN ACTIVATED SLUDGE	--	26	--	26	50	WATER	(A)	BROWN	YELLOW	BLACK
REW	RECLAIMED WATER	--	8	--	8	75	WATER	(A)	PURPLE	PURPLE	WHITE
RSL	RAW SLUDGE	--	30	--	30	50	WATER	(A)	BROWN	YELLOW	BLACK
RW	RAW WATER	2	8	2	8,28	125	WATER	2,8(A) 28(B)	GREEN	GREEN	WHITE
RWL	RAINWATER LEADER	4,12	4,12	12	12	NOTE 7	--	--	NOTE 17	GREEN	WHITE
S	SCUM	--	30	--	26	50	WATER	(A)	NOTE 17	YELLOW	BLACK
SA	SAMPLE LINE (SEE LIST AT RIGHT)	16,18,24	--	16,18,24	--	125	WATER	(A)	NOTE 17	YELLOW	BLACK
SC	SPARE CHEMICAL	16	16	16	16	125	WATER	(A)	NOTE 17	YELLOW	BLACK
SD	SANITARY DRAIN AND VENT	4,12	12	12	12,21	NOTE 7	--	--	BLACK	YELLOW	BLACK
SDR	STORM DRAIN	--	8	--	22,28	NOTE 6	WATER	8,(A)28(B)22(C)	BLACK	GREEN	WHITE
SE	SECONDARY EFFLUENT	--	8,26	--	8,26	50	WATER	(A)	NOTE 17	YELLOW	BLACK
SF	SLUDGE FILTRATE	--	26	--	26	50	WATER	(A)	BROWN	YELLOW	BLACK
SG	SLUDGE GAS	31	31	31	31	15	AIR	(A)(D)	BROWN	YELLOW	BLACK
SI	SODIUM SILICATE	6,16	6,16	6,16	6,16	125	WATER	(A)	NOTE 17	YELLOW	BLACK
SN	SUPERNATANT	--	26	--	26	50	WATER	(A)	NOTE 17	YELLOW	BLACK
SO	SULFUR DIOXIDE (GAS OR LIQUID STATE)	10	--	10	--	300	DRY AIR	(A)(D)	NOTE 17	YELLOW	BLACK
SOA	SULFURIC ACID	25	25	--	--	125	AIR	(A)(D)	YELLOW	RED	BLACK
SOS	SULFUR DIOXIDE SOLUTION	16	16	16	16	125	WATER	(A)	LIGHT GREEN	YELLOW	BLACK
SOV	SULFUR DIOXIDE GAS UNDER VACUUM	16	16	16	16	15 IN Hg	VACUUM	(A)(E)	LIGHT GREEN	YELLOW	BLACK
SPD	SUMP PUMP DISCHARGE	2	26	2	26	50	WATER	(A)	NOTE 17	GREEN	WHITE
SS	SANITARY SEWER	--	12	--	12,21	NOTE 7	00	--	BLACK	YELLOW	BLACK
ST	STEAM (LOW PRESSURE TO 10 PSI)	29*	29*	29*	29*	125	WATER	(A)	NOTE 17	YELLOW	BLACK
SU	STRUCTURE UNDERDRAIN	--	--	--	20	NO	TEST	REQUIRED	NOTE 17	GREEN	WHITE
SUC	STRUCTURE UNDERDRAIN COLLECTOR	--	12	--	12,21	NOTE 6	WATER	(C)	NOTE 17	GREEN	WHITE
SW	FILTER SURFACE WASHWATER	14,16,18	8,14,15,16, 18	2,16,18	2,8,15,16, 18	125	WATER	(A)	NOTE 17	GREEN	WHITE
TPR	THICKENER PRESSURIZED RECYCLE	--	26	--	26	50	WATER	(A)	NOTE 17	NOTE 17	NOTE 17
TS	THICKENER SUBNATANT	--	26	--	26	50	WATER	(A)	NOTE 17	NOTE 17	NOTE 17
TSL	THICKENED SLUDGE	--	30	--	30	50	WATER	(A)	BROWN	YELLOW	BLACK
TSO	THICKENER SUBNATANT OVERFLOW	--	26	--	26	50	WATER	(A)	NOTE 17	YELLOW	BLACK
UW	UTILITY WATER (NON-POTABLE WATER)	2,24	2,11	2,24	2,11,19	125	WATER	2,11,24(A) 19(B)	PURPLE	YELLOW	BLACK
V	VACUUM	24	2	24	2	15 IN Hg	VACUUM	(A)(E)	NOTE 17	BLUE	WHITE
WAS	WASTE ACTIVATED SLUDGE	--	26	--	26	50	WATER	(A)	BROWN	YELLOW	BLACK
WLO	WASTE LUBE OIL	9	9	9	9	50	AIR	(A)(D)	RED	YELLOW	BLACK
WW	FILTER WASTE WASHWATER	--	8	--	8	NOTE 6	WATER	(A)	NOTE17	YELLOW	BLACK

PIPING MATERIAL SCHEDULE (SEE NOTE 14)

GROUP No.	PIPING (SEE NOTE 13)	FITTINGS
1	STEEL, ASTM A53, SCH 40, BLACK WELDED	2 1/2" AND SMALLER, MALLEABLE IRON, ANSI B16.3, THREADED, BANDED, BLACK, 15 PSI OR STEEL, ANSI B116.9, BUTT-WELDED. 3"AND LARGER, CAST IRON, ANSI B16.1, 125 PSI FLGD OR MECH CPLG
2	STEEL, ASTM A53, SCH 40, BLACK WELDED, GALVANIZED	2 1/2" AND SMALLER, MALLEABLE IRON, ANSI B16.3, THREADED, BANDED, GALVANIZED 150 PSI. 3" AND LARGER, CAST IRON, ANSI B16.1, 125 PSI FLGD OR MECH CPLG
3	STEEL, ASTM A106 OR A53, SCH 80, SEAMLESS, BLACK	FORGED STEEL, ANSI B16.11, SOCKET WELDED OR THREADED, BLACK, 2000 PSI, OR STEEL, ANSI B16.9, BUTT-WELDED, SCH 80
4	SAME AS GROUP 1	CAST IRON, ASNI B16.12, THREADED, DRAINAGE PATTERN
5	WELDED STEEL, AWWA C200, UNLINED	WELDED STEEL, FABRICATED, AWWA C200, UNLINED
6	STEEL, ASTM A106, OR A53, SCH 40, SEAMLESS, BLACK	STEEL, ANSI B16.9, BUTT-WELDED. CAST IRON, ANSI B16.1, 125 PSI, FLGD. FORGED STEEL, SOCKET WELDED. ANSI B16.11, 2000 PSI OR STEEL, ANSI B16.5, 150 PSI FLGD
7	SAME AS GROUP NO. 2	MALLEABLE IRON, ANSI B16.3, THREADED, BANDED, GALVANIZED, 300 PSI
8	WELDED STEEL, AWWA C200	WELDED STEEL, AWWA C200, FABRICATED
9	SAME AS GROUP NO. 1	2 1/2" AND SMALLER, MALLEABLE IRON, ANSI B16.3, THREADED, BANDED, BLACK, 150 PSI. 3" AND LARGER, STEEL, ANSI B16.9, BUTT-WELDED
10	SAME AS GROUP NO. 3	1 1/4" AND SMALLER, FORGED STEEL, ANSI B16.11, THREADED OR SOCKET WELDED, BLACK, 3000 PSI, WITH FLGD AMMONIA UNIONS, 1 1/2" AND LARGER, STEEL, ANSI B16.9, BUTT-WELDED OR FLGD, SCH 80
11	DUCTILE IRON, ANSI A21.51, (AWWA C151), 150 PSI, BELL AND SPIGOT, MECH JTS. MECH CPLG, OR 125 PSI FLGD (TYPICAL SERVICE- WATER LINES)	DUCTILE IRON OR CAST IRON, ANSI A21.10, OR AWWA C110, BELL AND SPIGOT, MECH CPLG, FLGD OR MECH JTS, 250 PSI, (PRESSURE RATING)12" AND SMALLER, 150 PSI, (PRESSURE RATING)14" AND LARGER, WITH 125 PSI ANSI B16.1 FLANGES
12	CAST IRON SOIL, ANSI/ASTM A-74, SERVICE WEIGHT, BELL AND SPIGOT OR HUBLESS. AT THE OPTION OF THE CONTRACTOR, DUCTILE IRON (GROUP NO.11) MAY BE SUBSTITUTED	CAST IRON SOIL, ANSI/ASTM A-74, SERVICE WEIGHT, BELL AND SPIGOT OR HUBLESS. AT THE OPTION OF THE CONTRACTOR, DUCTILE IRON (GROUP NO 11) MAY BE SUBSTITUTED
13	CORROSION RESISTANT (HIGH SILICON CONTENT) CAST IRON, SERVICE WEIGHT, BELL AND SPIGOT OR HUBLESS	CORROSION RESISTANT (HIGH SILICON CONTENT) CAST IRON, SERVICE WEIGHT, BELL AND SPIGOT OR HUBLESS
14	STAINLESS STEEL, TYPE 316, ASTM A 312, SCH 40S	STAINLESS STEEL, TYPE 316 ANSI B16.3, SCREWED, 150 PSI ANSI B16.9, BUTT-WELDED, SCH 40S, OR 150 PSI FLGD
15	STAINLESS STEEL, TYPE 316, ASTM A 312, SCH 10S	STAINLESS STEEL, TYPE 316 ANSI B16.9 BUTT-WELDED SCH 150 PSI FLGD
16	POLYVINYL CHLORIDE, SCH 80, NORMAL IMPACT. ASTM D1785	POLYVINYL CHLORIDE, SCH 80, NORMAL IMPACT, SOCKET SOLVENT WELD JTS, ASTM D2467
17	POLYPROPYLENE, ASTM D2146, SCH 40, WITH HEAT FUSED JTS	POLYPROPYLENE, SCH 40, DRAINAGE TYPE WITH HEAT FUSED SOCKET JTS
18	FIBERGLASS REINFORCED PLASTIC, ASTM D2996, FILAMENT-WOUND, SOCKET AND SPIGOT ENDS, ADHESIVE BONDED. SEE SPECIFICATION 15860	FIBERGLASS REINFORCED PLASTIC, FILAMENT-WOUND, SOCKET ENDS, ADHESIVE BONDED, OR FIBERGLASS FLGD
19	POLYVINYL CHLORIDE PRESSURE PIPE ASTM D2241 WITH BELL AND SPIGOT JTS	CAST IRON, 150 PSI, FOR POLYVINYL CHLORIDE PIPE, AWWA C110 CEMENT MORTAR LINED, AWWA C104
20	VITRIFIED CLAY, PERFORATED, ASTM C 700, EXTRA STRENGTH, FLEXIBLE COMPRESSION JTS FOR BELL AND SPIGOT PIPE OR PLAIN END WITH MECH COMPRESSION JTS	VITRIFIED CLAY, ASTM C700, FLEXIBLE JTS FOR BELL AND SPIGOT PIPE OR PLAIN END WITH MECH COMPRESSION JTS
21	VITRIFIED CLAY, ASTM C700, EXTRA STRENGTH, FLEXIBLE COMPRESSION JTS FOR BELL AND SPIGOT PIPE OR PLAIN END WITH MECH COMPRESSION JTS	VITRIFIED CLAY, ASTM C700, FLEXIBLE JTS FOR BELL AND SPIGOT PIPE OR PLAIN END WITH MECH COMPRESSION JTS
22	REINFORCED CONCRETE, ASTM C76, T&G JTS. (TYPICAL SERVICE-CULVERTS)	SAME AS GROUP NO. 8
23	TEMPERED GLASS (ARMORED WHERE BURIED) ANSI/ASTM C599	TEMPERED GLASS DRAINAGE TYPE WITH COMPRESSION COUPLING & TEFLON JTS, ANSI/ASTM C599
24	COPPER, ASTM B88, TYPE K, SOFT TEMPERED WHERE BURIED, HARD TEMPERED WHERE EXPOSED	EXISTING
25	STEEL, ASTM A106 OR A53, SCH 40, SEAMLESS, BLACK, SARAN OR POLYPROPYLENE-LINED	STEEL, ANSI B16.5, 150 PSI FLGD, SARAN OR POLYPROPYLENE-LINED
26	SAME AS GROUP NO. 11 (TYPICAL SERVICE-SLUDGE AND SEWAGE LINES)	SAME AS GROUP NO. 11
27	POLYVINYL CHLORIDE GRAVITY SEWER PIPE, ASTM D3034, BELL AND SPIGOT	POLYVINYL CHLORIDE, ANSI/ASTM D3034, BELL AND/OR SPIGOT
28	REINFORCED CONCRETE, AWWA C302, CLASS-SEE DRAWINGS. (TYPICAL SERVICE-PRESSURE PIPELINES)	SAME AS GROUP NO. 8
29	SAME AS GROUP NO.1	2" AND SMALLER, MALLEABLE IRON, ANSI B16.3, THREADED, BANDED, BLACK, 150 PSI. 2 1/2" AND LARGER, STEEL ANSI B16.9, BUTT-WELDED
30	SAME AS GROUP NO. 11, GLASS-LINED OR STEEL ASTM A53, SCH 40, GLASS LINED	SAME AS GROUP NO. 11, GLASS-LINED OR STEEL, ANSI B16.9, SCH 40, GROOVED WITH MECH CPLG, GLASS-LINED
31	2-2/1" AND SMALLER, STEEL, ASTM A106 OR A53, SCH 80, SEAMLESS, BLACK. 3" AND LARGER DUCTILE IRON, ANSI A21.51 (AWWA C151), OR CAST IRON ANSI A21.6 OR 21.8 MECH CPLG OR 125 PSI FLGD	2 ½" AND SMALLER, FORGED STEEL, ANSI B16.11, SOCKET WELDED OR THREADED, BLACK 2000 PSI, OR STEEL ANSI B16.9 BUTT-WELDED SCH 80.3" AND LARGER, DUCTILE IRON OR CAST IRON, ANSI A21.20 AWWA C110, MECH COUPLING OR 125 PSI FLGD
32	12" AND SMALLER, AWWA C-900 WITH RESTRAINED JOINTS, DR 18. 14" AND LARGER, AWWA C-905 WITH RESTRAINED JOINTS, DR 25	SAME AS GROUP NO. 11
33	HIGH DENSITY POLYETHYLENE, DUCTILE IRON PIPE (DIPS), DR 11 AWWA C-906, FUSION BUTT WELDED JOINTS AND FULLY RESTRAINED FITTINGS	SAME AS GROUP NO. 11
34	POLYETHYLENE SERVICE TUBE, PE 4710, COPPER TUBE SIZE ASTM, D2737, PRESSURE CLASS 250, DR9	--
35	CHLORINATED POLYVINYL CHLORIDE PRESSURE PIPE, ASTM F441, SCHEDULE 40 WITH SOLVENT WELDED JOINTS PER ASTM F493, SCREWED OR FLANGED JOINTS	SOLVENT WELDED: ASTM F439, SCHEDULE 80. THREADED FITTINGS: ASTM F437, SCHEDULE 80. FLANGED FITTINGS: ANSI / ASME B16.5
36	REINFORCED CONCRETE PIPE ARCH, LDOTD AML, ASTM C506 AS MODIFIED, RUBBER GASKETED JOINTS	--
37	PLASTIC DRAINAGE PIPE, RIBBED POLYVINYL CHLORIDE DRAINAGE PIPE, ASTM F794 OR F949 SERIES 46 WITH UV INHIBITORS, RUBBER GASKETED JOINTS	--
38	BITUMINOUS COATED CORRUGATED STEEL PIPE AND PIPE ARCH, AASHTO M196, RUBBER GASKETED JOINTS WITH COUPLING BANDS	--
39	CORRUGATED ALUMINUM PIPE AND PIPE ARCH PER AASHTO M196, RUBBER GASKETED JOINTS WITH COUPLING BANDS	--
40	REINFORCED PRECAST CONCRETE BOX CULVERT PER STRUCTURAL CONCRETE SPECIFICATIONS	--



GENERAL NOTE
ALTHOUGH SEVERAL PIPE MATERIALS ARE SHOWN THAT MAY BE USED FOR A GIVEN FUNCTION, ONLY THE CALLED PIPING MATERIAL SHOWN ON THE CONSTRUCTION DRAWINGS & SPECIFICATIONS SHALL BE USED. THE CONTRACTOR DOES NOT HAVE THE OPTION TO USE A DIFFERENT MATERIAL.

NOTE 1
PROPRIETARY NAMES HAVE BEEN QUOTED FOR IDENTIFICATION PURPOSES ONLY. SUBSTITUTIONS WILL BE PERMITTED SUBJECT TO PROVISIONS OF THE SPECIFICATIONS. IF VALUES ARE NOT SPECIFIED IN SPECIFICATIONS, FOLLOW THE SCHEDULE.

NOTE 2
LEAKAGE ALLOWANCE IS A FOLLOWS:
(A) PIPES SO DESIGNATED SHALL SHOW ZERO LEAKAGE.

(B) PIPES SO DESIGNATED SHALL SHOW ZERO LEAKAGE FOR UNBURIED PIPE & NOT MORE THAN 0.02 GALLONS PER HOUR PER INCH DIAMETER PER 100' OF BURIED PIPE

(C) PIPES SO DESIGNATED SHALL NOT SHOW LEAKAGE OF MORE THAN 0.15 GALLON PER HOUR PER INCH OF DIAMETER PER 100' OF BURIED PIPE.

(D) PIPES SO DESIGNATED SHALL NOT SHOW A LOSS OF PRESSURE OF MORE THAN 5%.

(E) PIPES SO DESIGNATED SHALL NOT SHOW A LOSS OF VACUUM MORE THAT 4" MERCURY COLUMN.

NOTE 3
FOR FIELD TEST PROCEDURES AND ADDITIONAL TEST REQUIREMENTS, SEE PIPING SECTION OF SPECS.

NOTE 4
ANY DEVIATION FOR THE PIPING MATERIALS OR FIELD TEST REQUIREMENTS, SHOWN WILL BE NOTED IN THE SPECIFICATIONS OR ON THE DRAWINGS.

NOTE 5
PIPING GROUP NUMBER SHOWN THUS __ SHALL BE INSTALLED. SEE PIPING SECTION OF SPECIFICATIONS FOR INSULATING MATERIALS.

NOTE 6
STATIC WATER TEST WITH SURFACE 5' ABOVE HIGH POINT OF PIPE.

NOTE 7
INSPECTION & TESTING SHALL BE IN ACCORDANCE WITH APPLICABLE PLUMBING CODE.

NOTE 8
NO APPARENT LEAKS UNDER NORMAL OPERATING CONDITIONS.

NOTE 9
INSPECTION & TESTING SHALL BE IN ACCORDANCE WITH APPLICABLE NFPA STANDARDS.

NOTE 10
PIPING MATERIALS SHALL BE IN ACCORDANCE WITH NFPA STANDARDS.

NOTE 11
VALVES 8" & LARGER SEE VALVE SCH FOR SPECIAL VALVES SEE SPECS

NOTE 12
CHANGE IN PIPING MATERIAL GROUP NUMBERS IS INDICATED THUS:

NOTE 13
FOR PIPING LINING AND COATING, SEE SPECIFICATIONS.

NOTE 14
EXPOSED PIPING SHALL BE PAINTED IN ACCORDANCE WITH SPECIFICATIONS. COLORS TO BE SELECTED BY ENGINEER.

NOTE 15
PIPING MATERIAL SHALL BE NON-ABRASIVE FLEXIBLE RUBBER HOSE & QUICK CONNECTION CPLG WITH GROUP No. 1 AT EQUIPMENT.

NOTE 16
VALVES 2 ½" AND SMALLER MAY HAVE SCREWED ENDS. VALVES 3" AND LARGER SHALL HAVE FLGD ENDS UNLESS OTHERWISE INDICATED.

NOTE 17
PIPE COLOR AS DIRECTED BY OWNER OR ENGINEER.

STATE OF LOUISIANA
DAVID ALAN MARTIN
License No. 37832
PROFESSIONAL ENGINEER

SUBMITTED BY:
DAVID A. MARTIN
PROJECT MANAGER
37832
LICENSE NO.

SUBMITTED BY:
H. DAVIS COLE
COMPANY OFFICER
30219
LICENSE NO.

H. Davis Cole & Associates, LLC
CONSULTING ENGINEERS
NEW ORLEANS, LA

MARK	DESCRIPTION	DATE	BY	CHK'D
-	RELEASED FOR BIDS & CONSTRUCTION	MAR 2020	DAM	DAM

REVISION RECORD

DESIGNED BY: DAM
DRAWN BY: DAM
CHECKED BY: DAM
DATE: DEC, 2020
DETAILED BY: DAM
HDC PROJECT NO. 2016-13

LAKEFRONT PUMP STATION, PHASE 3
ST. TAMMY PARISH LOUISIANA
ST TAMMANY PARISH GOVERNMENT
21454 KOOP DRIVE
MANDEVILLE, LA 70471

PIPING SCHEDULE

SHEET ID
G6

SHEET SET
7 OF 20

DEMOLITION PHOTO "01-D1-01"

SCALE: N.T.S.

DEMOLITION PHOTO "01-D1-02"

SCALE: N.T.S.

DEMOLITION PHOTO "01-D1-03"

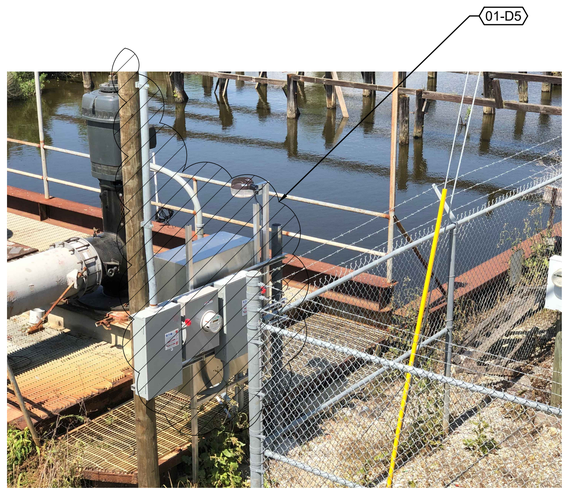
SCALE: N.T.S.

SCOPE OF WORK:

- 01-D1 REMOVE EXISTING PUMP MOTOR, JUNCTION BOX, CONDUIT, AND APPURTENANCES. RETAIN FOR RE-INSTALLATION.
- 01-D2 REMOVE EXISTING 54" DRAINAGE PUMP AND MOTOR. MODIFY AND REHABILITATE ONE PUMP AND ONE MOTOR AND RETURN UNREPAIRED ITEMS TO OWNER
- 01-D3 MODIFY 20" PUMP COLUMN PER MECHANICAL DRAWINGS AND RE-INSTALL.
- 01-D4 REMOVE EXISTING CONTROL PANEL, DISCONNECT, METER, AND SWITCH. RELOCATE AS ILLUSTRATED ON ELECTRICAL PLANS.
- 01-D5 DEMOLISH AND DISPOSE OF EXISTING CHECK VALVE AND FLANGE AND EXISTING 6" NPT CAP.

DEMOLITION PHOTO "01-D1-04"

SCALE: N.T.S.



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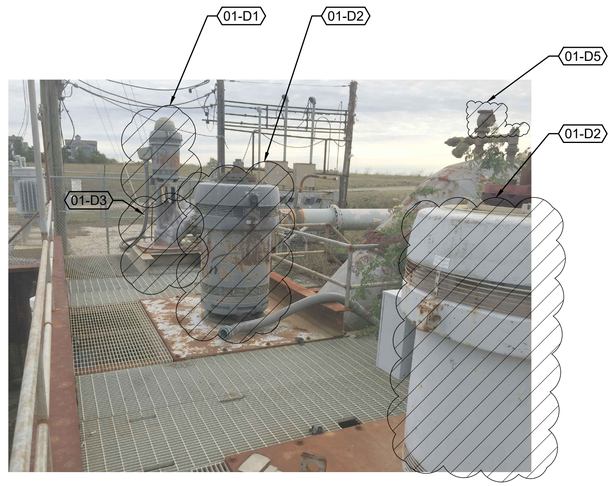

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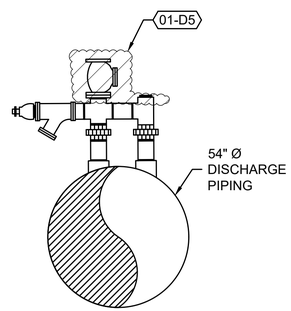

AIR RELEASE VALVE DEMOLITION

SCALE: N.T.S.

STATE OF LOUISIANA
DAVID ALAN MARTIN
License No. 37832
PROFESSIONAL ENGINEER

SUBMITTED BY:
DAVID A. MARTIN
PROJECT MANAGER
37832
LICENSE NO.

SUBMITTED BY:
H. DAVIS COLE
COMPANY OFFICER
30219
LICENSE NO.

H. Davis Cole & Associates, LLC
CONSULTING ENGINEERS
NEW ORLEANS, LA

REVISION RECORD

MARK	DESCRIPTION	DATE	BY	CHKD.
-	RELEASED FOR BIDS & CONSTRUCTION	MAR 2020	DAM	DAM

DESIGNED BY: DAM
DRAWN BY: DAM
CHECKED BY: DAM
DATE: DEC, 2020
DETAILED BY: DAM
HDC PROJECT NO. 2016-13

LAKEFRONT PUMP STATION, PHASE 3
ST. TAMMY PARISH LOUISIANA

ST TAMMANY PARISH GOVERNMENT
21454 KOOP DRIVE
MANDEVILLE, LA 70471

DEMOLITION DETAILS

SHEET ID
01-D1

SHEET SET
8 OF **20**

N

NOTES BY SYMBOL:

- A — EXISTING LAKEFRONT PUMP STATION (TO BE REHABILITATED)
- B — EXISTING CANAL (NO WORK - TO REMAIN)
- C — CLECO SUBSTATION (NO WORK - TO REMAIN)
- D — EXISTING SERVICE POINT AND CONTROL PANEL (EQUIPMENT TO BE RELOCATED TO ELEVATED PLATFORM)
- E — EXISTING ELEVATED PLATFORM

GENERAL NOTES:

1. AERIAL IMAGE COURTESY OF GOOGLE EARTH. AERIAL IS FOR REFERENCE OF GENERAL LOCATION ONLY. SURFACE AND BELOW SURFACE FEATURE LOCATIONS SHALL BE FIELD VERIFIED.

0 5' 10'
GRAPHIC SCALE

EXISTING SITE PLAN

SCALE : 1" = 10'-0" (22" x 34" SHEET)

STATE OF LOUISIANA
DAVID ALAN MARTIN
License No. 37832
REGISTERED PROFESSIONAL ENGINEER

SUBMITTED BY:
DAVID A. MARTIN
PROJECT MANAGER
37832
LICENSE NO.

SUBMITTED BY:
H. DAVIS COLE
COMPANY OFFICER
30219
LICENSE NO.

H. Davis Cole & Associates, LLC
CONSULTING ENGINEERS
NEW ORLEANS, LA

REVISION RECORD

MARK	DESCRIPTION	DATE	BY	CHKD
-	RELEASED FOR BIDS & CONSTRUCTION	MAR 2020	DAM	DAM

DESIGNED BY: DAM
DRAWN BY: DAM
CHECKED BY: DAM
DATE: DEC, 2020
DETAILED BY: DAM
HDC PROJECT NO.: 2016-13

LAKEFRONT PUMP STATION, PHASE 3
ST. TAMMY PARISH LOUISIANA
ST TAMMANY PARISH GOVERNMENT
21454 KOOP DRIVE
MANDEVILLE, LA 70471
EXISTING & PROPOSED SITE PLAN

SHEET ID
01-C1

SHEET SET
9 OF 20

REHABILITATED SITE PLAN

SCALE : 1" = 10'-0" (22" x 34" SHEET)

N

GENERAL NOTES:

1. AERIAL IMAGE COURTESY OF GOOGLE EARTH. AERIAL IS FOR REFERENCE OF GENERAL LOCATION ONLY. SURFACE AND BELOW SURFACE FEATURE LOCATIONS SHALL BE FIELD VERIFIED.

NOTES BY SYMBOL:

- A — EXISTING LAKEFRONT PUMP STATION (TO BE REHABILITATED)
- B — EXISTING CANAL (NO WORK - TO REMAIN)
- C — CLECO SUBSTATION (NO WORK - TO REMAIN)
- D — RELOCATED SERVICE POLE FOR 75HP PUMP
- E — CONTROL AND POWER DISTRIBUTION EQUIPMENT FOR 75HP PUMP (RELOCATE EXISTING CONTROL PANEL, LOAD BREAK DISCONNECT, LINE BREAK DISCONNECT, AND METER TO NEW RACK ON ELEVATED PLATFORM.
- F — NEW SERVICE POLE FOR 350 HP PUMP
- G — CONTROL AND POWER DISTRIBUTION EQUIPMENT FOR 350 HP PUMP (SEE ELECTRICAL FOR LOCATIONS AND REQUIRMENTS

0 5' 10'
GRAPHIC SCALE

STATE OF LOUISIANA
DAVID ALAN MARTIN
License No. 37832
PROFESSIONAL ENGINEER

SUBMITTED BY: DAVID A. MARTIN, PROJECT MANAGER — 37832 LICENSE NO.

SUBMITTED BY: H. DAVIS COLE, COMPANY OFFICER — 30219 LICENSE NO.

H. Davis Cole & Associates, LLC
CONSULTING ENGINEERS
NEW ORLEANS, LA

MARK	DESCRIPTION	DATE	BY	CHKD
-	RELEASED FOR BIDS & CONSTRUCTION	MAR 2020	DAM	DAM

REVISION RECORD

DESIGNED BY: DAM
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CHECKED BY: DAM
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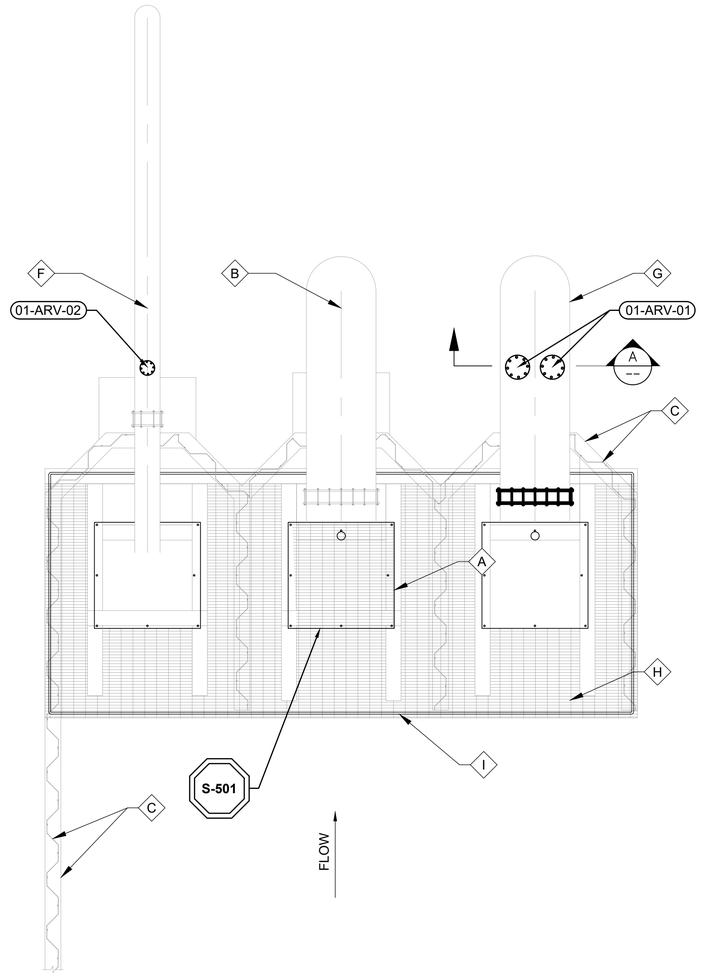
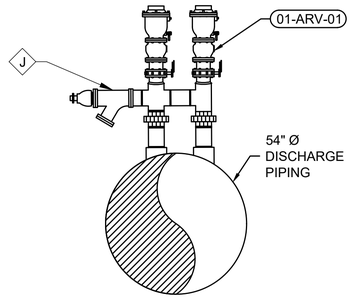
LAKEFRONT PUMP STATION, PHASE 3
ST. TAMMY PARISH LOUISIANA
ST TAMMANY PARISH GOVERNMENT
21454 KOOP DRIVE
MANDEVILLE, LA 70471
REHABILITATED SITE PLAN

SHEET ID
01-C2

SHEET SET
10 OF 20

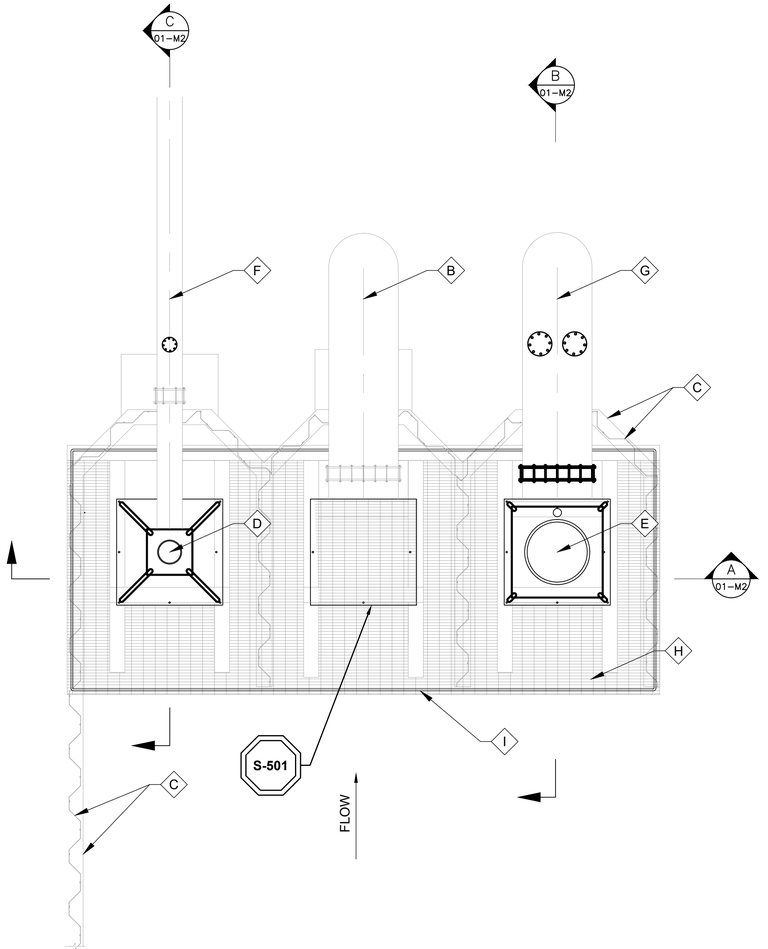




SECTION A
SCALE: N.T.S.

MECHANICAL PLAN @ EL 4.32 (ABOVE BASE PLATES)

SCALE: 1" = 5'-0" (22" x 34" SHEET)



MECHANICAL PLAN @ EL 13.00 (ABOVE ELEVATED MOTORS)

SCALE: 1" = 5'-0" (22" x 34" SHEET)

VALVE SCHEDULE

VALVE DESIGNATION	DESCRIPTION	AREA	QUANTITY	DIAMETER	SPECIFICATIONS SECTION	REMARKS
01-ARV-01	WELL SERVICE AIR RELEASE VALVE	LAKEFRONT PUMP STATION	2	8"	15200	PROVIDE TAPPED BLIND FLANGE AND SCHEDULE 40 STEEL NIPPLE TO CONNECT TO EXISTING NPT PIPING.
01-ARV-02	WELL SERVICE AIR RELEASE VALVE	LAKEFRONT PUMP STATION	1	4"	15200	PROVIDE TAPPED BLIND FLANGE AND SCHEDULE 40 STEEL NIPPLE TO CONNECT TO EXISTING NPT PIPING.

NOTES BY SYMBOL:

- A — PUMP REMOVED - EXISTING OPENING TO BE COVERED WITH GRATING (SEE STRUCTURAL DETAILS FOR GRATING DETAIL)
- B — EXISTING DISCHARGE PIPING TO REMAIN - WELD 54" BLIND FLANGE TO EXISTING PUMP DISCHARGE PER SECTION 11178.
- C — EXISTING STEEL SHEET PILE WALL AND CAP TO REMAIN. NO COATING REQUIRED.
- D — REHABILITATED ELEVATED PUMP MOTOR (75 HP) (PUMP MOTOR REHABILITATED IN PREVIOUS PROJECT), PUMP COLUMN AND SHAFT PER SECTION 11178 (01-E1).
- E — REHABILITATED ELEVATED PUMP MOTOR (350 HP), PUMP COLUMN AND SHAFT PER SECTION 11178 (01-E2). INSTALL NEW DISMANTLING JOINT ON PUMP DISCHARGE PER SECTION 11178.
- F — EXISTING DISCHARGE PIPE (TO REMAIN) (20" DIAMETER) TO BE COATED PER SECTION 09800.
- G — EXISTING DISCHARGE PIPE (TO REMAIN) (54" DIAMETER) TO BE COATED PER SECTION 09800.
- H — EXISTING GALVANIZED GRATING AND SUPPORT STEEL TO REMAIN. COAT ALL EXPOSED SURFACES PER SECTION 09800.
- I — EXISTING GALVANIZED STEEL HANDRAIL. COAT PER SECTION 09800.
- J — EXISTING MANUAL AIR RELEASE ASSEMBLY TO BE REMOVED AND REPLACED. (SEE VALVE SCHEDULE, THIS SHEET)

0 5' 10'
GRAPHIC SCALE

STATE OF LOUISIANA
DAVID ALAN MARTIN
License No. 37832
PROFESSIONAL ENGINEER

SUBMITTED BY: DAVID A. MARTIN, PROJECT MANAGER — 37832 LICENSE NO.
SUBMITTED BY: H. DAVIS COLE, COMPANY OFFICER — 30219 LICENSE NO.

H. Davis Cole & Associates, LLC
CONSULTING ENGINEERS
NEW ORLEANS, LA

MARK	DESCRIPTION	DATE	BY	CHKD.
-	RELEASED FOR BIDS & CONSTRUCTION	MAR 2020	DAM	DAM

REVISION RECORD

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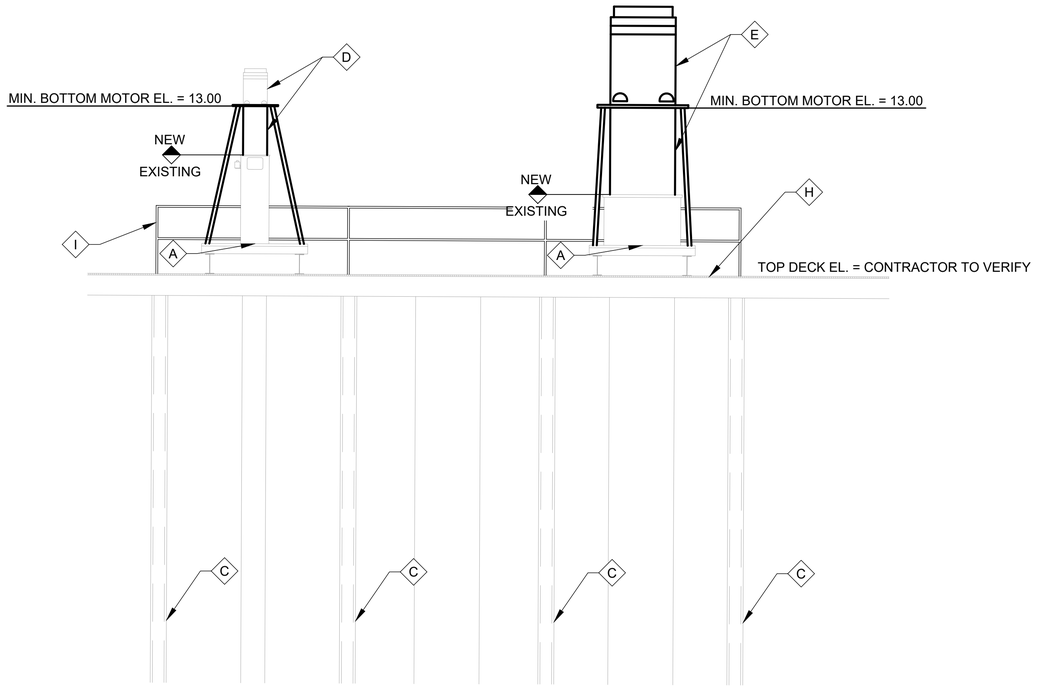
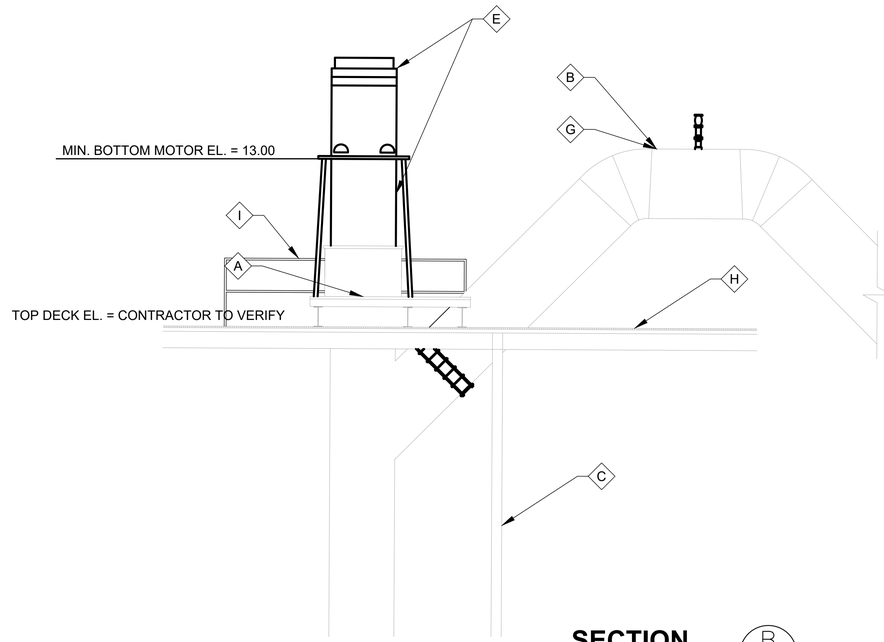
HDC PROJECT NO: 2016-13

LAKEFRONT PUMP STATION, PHASE 3
ST. TAMMY PARISH LOUISIANA
ST TAMMANY PARISH GOVERNMENT
21454 KOOP DRIVE
MANDEVILLE, LA 70471
MECHANICAL PLAN

SHEET ID: 01-M1
SHEET SET: 13 OF 20



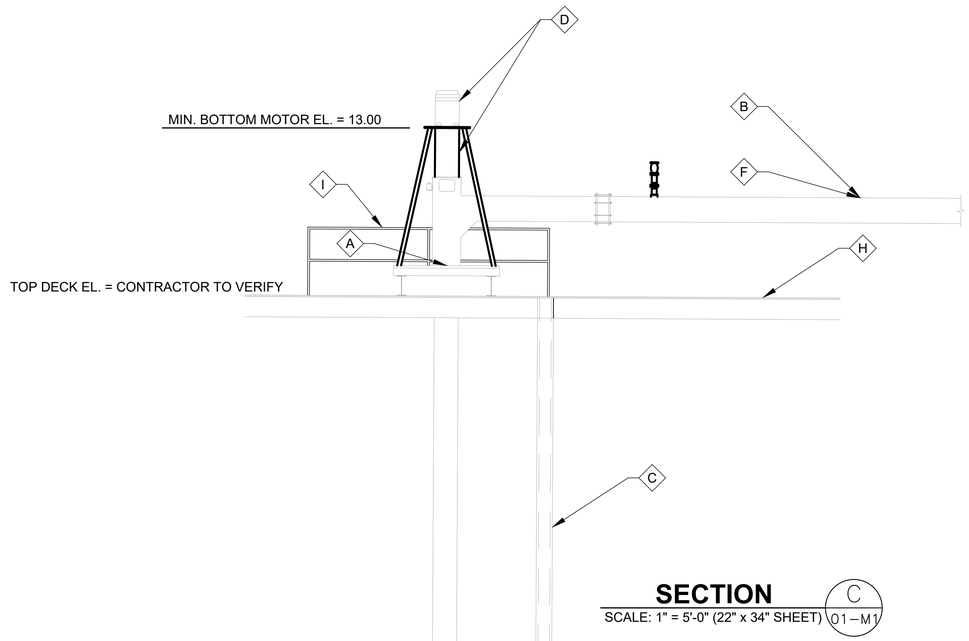
SECTION
SCALE: 1" = 5'-0" (22" x 34" SHEET) A 01–M1



SECTION
SCALE: 1" = 5'-0" (22" x 34" SHEET) B 01–M1

NOTES BY SYMBOL:

- A — EXISTING PUMP BASE PLATES TO BE BLASTED AND COATED PER SECTION 09800
- B — EXISTING DISCHARGE PIPING TO BE BLASTED AND COATED PER SECTION 09800
- C — EXISTING STEEL SHEET PILE WALL AND CAP TO REMAIN. NO COATING REQUIRED.
- D — REHABILITATED ELEVATED PUMP MOTOR (75 HP) (PUMP MOTOR REHABILITATED IN PREVIOUS PROJECT), PUMP COLUMN AND SHAFT PER SECTION 11178 (01-E1).
- E — REHABILITATED ELEVATED PUMP MOTOR (350 HP), PUMP COLUMN AND SHAFT PER SECTION 11178 (01-E2). PROVIDE NEW DISMANTLING JOINT PER SECTION 11178.
- F — EXISTING DISCHARGE PIPE (TO REMAIN) (20" DIAMETER) TO BE COATED PER SECTION 09800.
- G — EXISTING DISCHARGE PIPE (TO REMAIN) (54" DIAMETER) TO BE COATED PER SECTION 09800.
- H — EXISTING GALVANIZED GRATING AND SUPPORT STEEL TO REMAIN. COAT ALL EXPOSED SURFACES PER SECTION 09800.
- I — EXISTING GALVANIZED STEEL HANDRAIL. COAT PER SECTION 09800.



SECTION
SCALE: 1" = 5'-0" (22" x 34" SHEET) C 01–M1

STATE OF LOUISIANA
DAVID ALAN MARTIN
License No. 37832
PROFESSIONAL ENGINEER

SUBMITTED BY: DAVID A. MARTIN, PROJECT MANAGER — 37832 LICENSE NO.

SUBMITTED BY: H. DAVIS COLE, COMPANY OFFICER — 30219 LICENSE NO.

H. Davis Cole & Associates, LLC — CONSULTING ENGINEERS — NEW ORLEANS, LA

MARK	DESCRIPTION	DATE	BY	CHKD.
-	RELEASED FOR BIDS & CONSTRUCTION	MAR 2020	DAM	DAM

REVISION RECORD

DESIGNED BY: DAM
DRAWN BY: DAM
CHECKED BY: DAM
DATE: DEC, 2020
DETAILED BY: DAM
HDC PROJECT NO. 2016-13

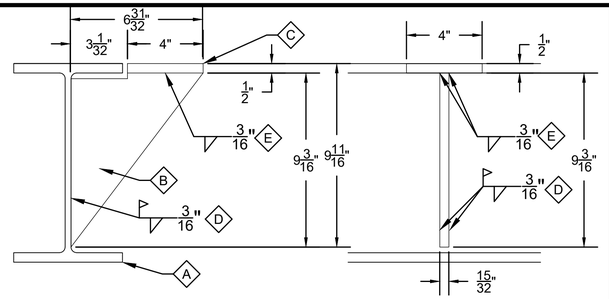
LAKEFRONT PUMP STATION, PHASE 3
ST. TAMMY PARISH LOUISIANA

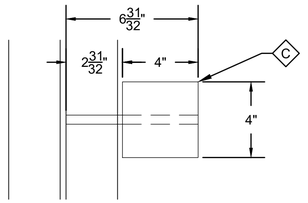
ST TAMMANY PARISH GOVERNMENT
21454 KOOP DRIVE
MANDEVILLE, LA 70471

MECHANICAL SECTIONS

SHEET ID
01-M2

SHEET SET
14 OF **20**





STANDOFF PLATE NOTES

1) FABRICATE PLATES FROM ASTM A36 STEEL PER SECTION 05500 - MISCELLANEOUS METALWORK. VERIFY DIMENSIONS PRIOR TO FABRICATION.

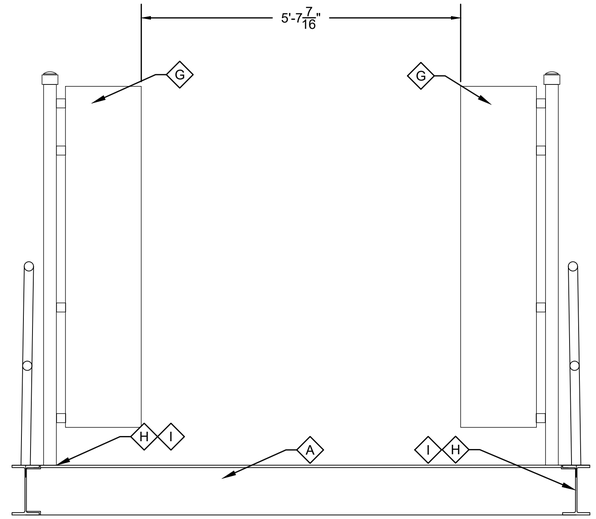
2) HOT DIP GALVANIZE AFTER FABRICATION PER SECTIONS 05500 - MISCELLANEOUS METALWORK AND SECTION 09800 - PROTECTIVE COATINGS.

3) REPAIR GALVANIZING DISTURBED BY FIELD WELDS.

EQUIPMENT RACK STANDOFF PLATE

SCALE: N.T.S.

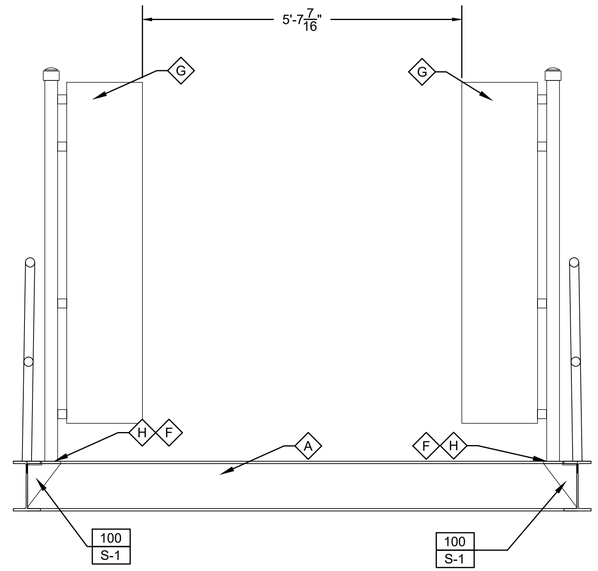
100 G-2



SECTION

SCALE: N.T.S.

A S1



SECTION

SCALE: N.T.S.

A S1

STRUCTURAL DETAILS GENERAL NOTES:

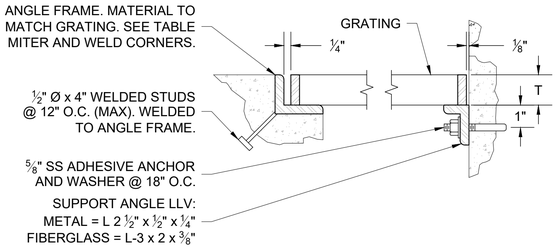
1) SEE SECTION 05500 - MISCELLANEOUS METALWORK AND SECTION 09800 FOR FABRICATION AND COATING REQUIREMENTS.

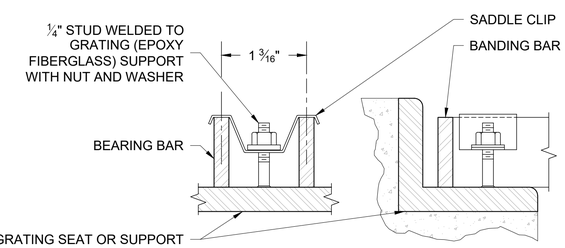
2) SEE MECHANICAL SHEETS FOR REQUIRED GRATING LOCATIONS.

3) SEE ELECTRICAL SHEETS FOR EQUIPMENT AND RACK DETAILS.

NOTES BY SYMBOL:

- A — EXISTING PLATFORM STRUCTURAL STEEL BEAM (TO REMAIN)
- B — FABRICATED STANDOFF PLATE (½" THICK)
- C — 4" X 4" X ½" THICK PLATE
- D — FIELD WELD BOTH SIDES OF STANDOFF PLATE TO EXISTING STEEL BEAM
- E — SHOP WELD 4 X 4 PLATE TO STANDOFF PLATE
- F — FIELD WELD ELECTRICAL RACK PIPE SUPPORTS TO STANDOFF PLATE. REPAIR GALVANIZING DAMAGED BY WELDING.
- G — ELECTRICAL EQUIPMENT AND RACK (SEE ELECTRICAL FOR EQUIPMENT AND RACK DETAILS)
- H — FIELD CUT EXISTING GRATING TO ALLOW FOR INSTALLATION OF ELECTRICAL RACK
- I — FIELD WELD ELECTRICAL RACK PIPE SUPPORTS TO EXISTING STEEL BEAM. REPAIR GALVANIZING DAMAGED BY WELDING.

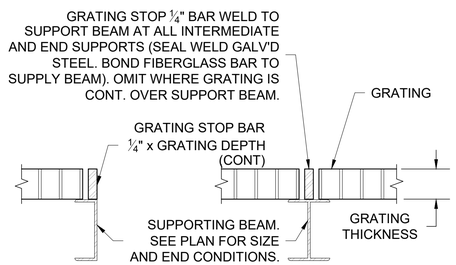




GRATING CLIP DETAIL

GRATING FRAME TABLE SIZED TO MATCH GRATING (FOR FIBERGLASS USE CONTINUOUS PURTRUDED FIBERGLASS SEAT & ANCHOR)	
GRATING DEPTH T	FRAME ANGLE (STEEL)
1"	1 ¾ x 1 ¼ x ¼ (1 ¼ x 1 ¼ x ¼)
1 ¼"	2 x 1 ½ x ¼ (1 ½ x 1 ½ x ¼)
1 1/2"	1 ¾ x 1 ¾ x ¼
1 ¾"	2 x 2 x ¼
2"	* 2 ½ x 2 ½ x ½
2 ¼"	2 ½ x 2 ½ x ¼
2 ½"	3 x 3 x ½

* OR USE 2 ½" X 2 ½" ¼" WITH ¼" SHIM PLATE WELDED TO BOTTOM.



GRATING STOP DETAIL

NOTES:
1. UNLESS INDICATED OTHERWISE, ALL GRATING SHALL BE ALUMINUM.
2. GRATING DEPTH TO BE DETERMINED BY MANUFACTURER AND APPROVED BY ENGINEER (UNO)
3. ALL ENDS AND OPENINGS SHALL BE BANDED.
4. WEIGHT OF GRATING SECTION SHALL NOT EXCEED 80 LBS.
5. METAL BEARING BARS SHALL BE DEPTH T X 3/16" AT 1 3/16" O.C., CROSS BARS SHALL BE AT 4" O.C.
6. PROVIDE A MINIMUM OF 4 PANEL CLIPS PER GRATING PANEL, APPROX. 4" FROM PANEL CORNERS. MAXIMUM CLIP SPACING AT 36" O.C.
7. MATERIALS:
   A. ALUMINUM GRATING - USE ALUMINUM ANGLE SUPPORTS AND STAINLESS STEEL BOLTS AND CLIPS.
   B. GALVANIZED STEEL GRATING - USE STEEL ANGLE SUPPORTS, BOLTS, AND CLIPS. GALVANIZED AFTER FABRICATION.
   C. STAINLESS STEEL GRATING - USE STAINLESS STEEL ANGLE SUPPORTS, BOLTS AND CLIPS.
   D. FIBERGLASS GRATING - USE FIBERGLASS FOR ALL COMPONENTS, EXCEPT DRILLED ANCHORS; ALL CUT EDGES SHALL BE SEALED WITH RESIN. BONDING: USE EPOXY ADHESIVE BONDING AGENT.

GRATING

SCALE: N.T.S. (22"x34" SHEET)

S-501

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30219 LICENSE NO.
SUBMITTED BY: H. DAVIS COLE COMPANY OFFICER

H. Davis Cole & Associates, LLC — NEW ORLEANS, LA

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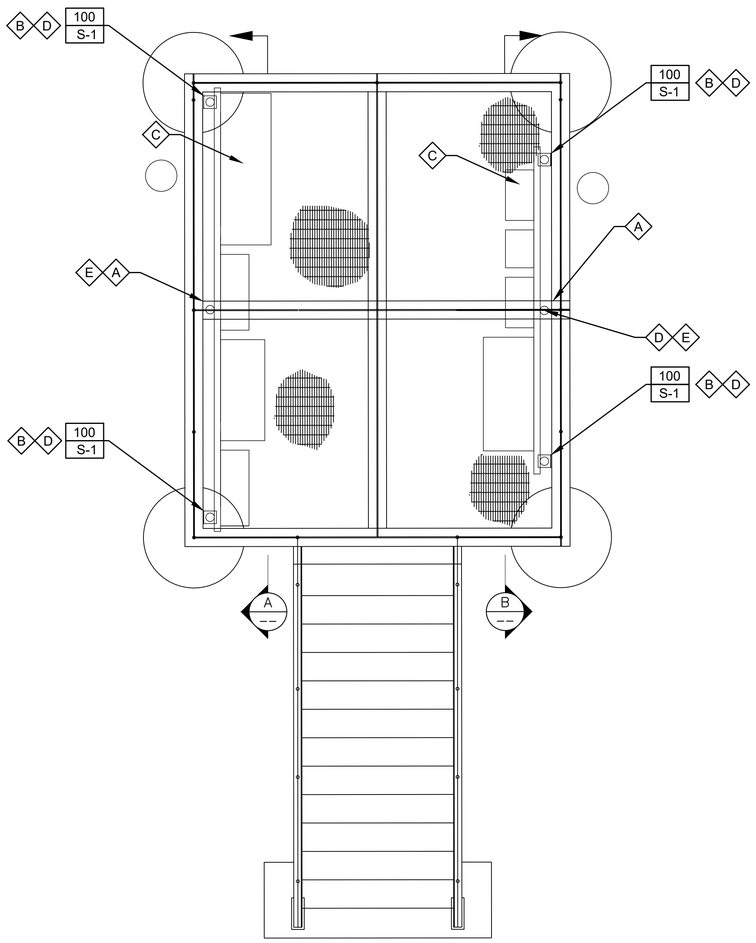
STRUCTURAL DETAILS AND SECTIONS

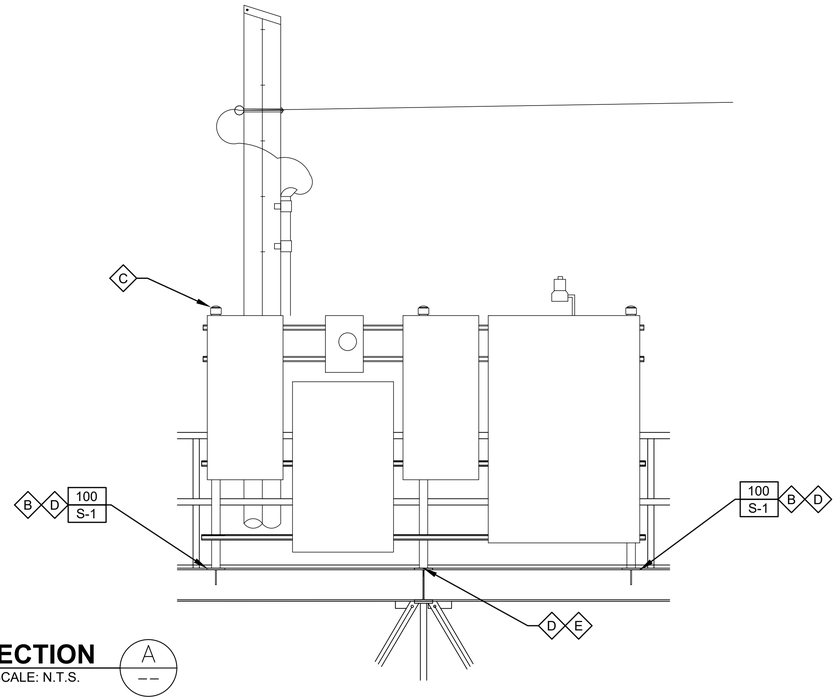
SHEET ID
S1

SHEET SET
11 OF **20**



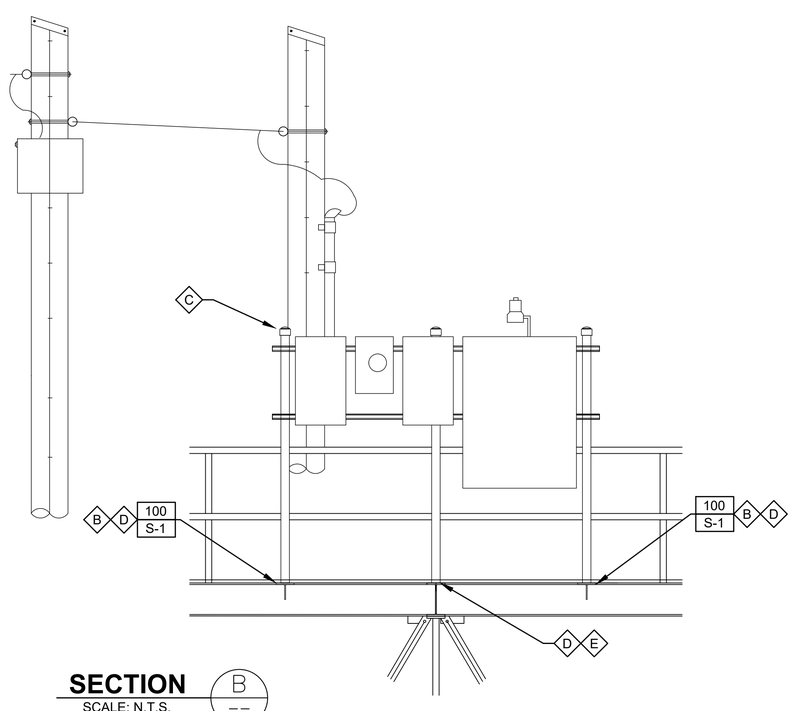
STRUCTURAL MODIFICATIONS PLAN

SCALE : 1" = 10'-0" (22" x 34" SHEET)



SECTION A

SCALE: N.T.S.



SECTION B

SCALE: N.T.S.

GENERAL NOTES:

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3) SEE ELECTRICAL SHEETS FOR EQUIPMENT AND RACK DETAILS.

NOTES BY SYMBOL:

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C. ELECTRICAL EQUIPMENT AND RACK (SEE ELECTRICAL FOR EQUIPMENT AND RACK DETAILS)

D. FIELD CUT EXISTING GRATING TO ALLOW FOR INSTALLATION OF ELECTRICAL RACK

E. FIELD WELD ELECTRICAL RACK PIPE SUPPORTS TO EXISTING STEEL BEAM. REPAIR GALVANIZING DAMAGED BY WELDING.

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ST. TAMMY PARISH LOUISIANA

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MANDEVILLE, LA 70471

STRUCTURAL PLAN AND SECTIONS

SHEET ID
01-S1

SHEET SET
12 OF **20**

ELECTRICAL SYMBOLS

PLAN VIEW / ONE LINE DIAGRAM

- GROUND BUS
- EXPOSED CONDUIT
- CONDUIT CONCEALED ABOVE FLOOR
- CONDUIT RUN UNDERGROUND OR IN CONCRETE
- EXPOSED CONDUIT RUN BEHIND OBSTRUCTION
- BARE COPPER GROUND TO GROUND WIRE IN SLAB, OR UNDERGROUND GROUND GRID, SIZE AS NOTED
- LP1-1, 3, 7 — HOME RUN TO PANEL "LP1", CIRCUITS #1, 3, 7. CONDUCTORS SHALL BE NOTED IN PANEL SCHEDULE MINIMUM CONDUIT SIZE SHALL BE 3/4" WITH 2#12 & 1#12 GROUND
- CONDUIT RUN-CHANGE IN ELEVATION
- CONDUIT BENDS TOWARD OBSERVER
- CONDUIT BENDS AWAY FROM OBSERVER
- CONDUIT CAPPED, OR SEALED
- FLEXIBLE LIQUID - TIGHT CONDUIT CONNECTION
- IM - 1 — INDICATES CONDUIT NUMBER FROM MCC OR PANEL "1M" CIRCUIT 1
- C — EXIT LIGHT, SHOWN WITH TWO ILLUMINATED SIDES, ARROWS INDICATE DIRECTION OF EXIT "C" INDICATES FIXTURE TYPE
- L 2 — CEILING OR PENDANT INCANDESCENT, "L" INDICATES FIXTURE TYPE. "2" INDICATES FIXTURE CONTROLLED BY SWITCH "2"
- B, TS — WALL BRACKET FLOOD, SPOTLIGHT, OR WALLPACK EXPOSED BACK AND CONCEALED CONDUIT "B" INDICATES FIXTURE TYPE. "TC" INDICATES FIXTURE CONTROLLED BY TIMER CONTROLLED SWITCH
- POLE MOUNTED FIXTURE DISTRIBUTION TYPE AS INDICATED ON PLAN
- 0 — FLUORESCENT LIGHTING FIXTURE UNSWITCHED (SWITCH AT LIGHTING PANEL ONLY)
- E — FLUORESCENT LIGHTING FIXTURE ON EMERGENCY CIRCUIT
- A 1 — FLUORESCENT LIGHTING FIXTURE ON NORMAL POWER
- D — BATTERY EMERGENCY TYPE "D" LIGHT FIXTURE
- S^a — SINGLE POLE SWITCH. "a" INDICATES CIRCUIT SWITCH NUMBER
- S_2 — DOUBLE POLE SWITCH, FLUSH MOUNT
- S_3 — THREE-WAY SWITCH, SURFACE MOUNT
- S_4 — FOUR-WAY SWITCH
- S_K — KEY-OPERATED SWITCH
- S_P — SWITCH AND PILOT LIGHT
- S_M — MANUAL MOTOR STARTER
- TRANSFER SWITCH * ATS = AUTOMATIC * MTS = MANUAL

WALL FLOOR

- 120V SINGLE RECEPTCLE, NEMA CONFIGURATION 5-20
- 120V DUPLEX RECEPTACLE, NEMA CONFIGURATION 5-20
- SINGLE SPECIAL-PURPOSE RECEPTACLE, 208V, 1 PHASE, ASTERISK INDICATES NUMBER SUCH AS AMPERAGE, UNLESS OTHERWISE NOTED
- WELDING RECEPTACLE, 480V, 3 PHASE, 60A
- SINGLE SPECIAL PURPOSE RECEPTACLE 480V.A.C. UNLESS OTHERWISE NOTED
- C — CLOCK HANGER RECEPTACLE
- FLOOR TYPE TELEPHONE OUTLET
- SOUND OR PACING SYSTEM DEVICE. * DENOTES NUMBER TO DIFFERENTIATE BETWEEN DIFFERENT DEVICES
- TELEPHONE SYSTEM OUTLET
- COMPUTER OUTLET WITH ?"C.O. STUB UP INTO SUSPENDED CEILING
- LIGHTING PANEL
- POWER PANEL
- GROUND CONNECTION - BOLTED TYPE
- GROUND CONNECTION - EXOTHERMIC TYPE
- 30A — NEMA 4X S.S. DISCONNECT SWITCH (CONTINUOUS RATING AS NOTED)
- J — JUNCTION BOX OR FITTING
- T — LINE VOLTAGE THERMOSTAT
- H — HEATER
- HORN
- BELL
- TIMER SWITCH CONTROL
- GROUND ROD 3/4" X 10'-0" (UNLESS OTHERWISE NOTED)
- G — GROUND WELL
- M — MOTOR OPERATED VALVE (STARTER NOT INTEGRAL)
- M — MOTOR OPERATED VALVE WITH INTEGRAL STARTER
- V — VARIABLE FREQUENCY DRIVE
- MOV — ELECTRICAL MOTOR OPERATED VALVE, WITH INTEGRAL REVERSING STARTER
- 60A — UNFUSED DISCONNECT SWITCH, SIZE AS NOTED "60A" (60 AMP) WHERE NOTED
- FUSE DISCONNECT SWITCH
- OVERHEAD POLE LINE FUSE CUTOUT

- II — COMBINATION ACROSS-THE-LINE, NON-REVERSING NEMA SIZE 2 MAGNETIC STARTER
- II REV. — COMBINATION ACROSS-THE-LINE, REVERSING NEMA SIZE 2 MAGNETIC STARTER
- III SS — COMBINATION NEMA SIZE 3 MAGNETIC STARTER: SS - SOLID STATE MOTOR STARTER WITH NEMA RATED BY-PASS CONTACTOR AND OVERLOAD RELAYS
- REDUCED VOLTAGE SOFT STARTER
- 50A — MOLDED CASE CIRCUIT BREAKER, 3 POLE UNLESS OTHERWISE NOTED. 50A TRIP RATING. * NA - NON-AUTOMATIC * MCP - MOTOR CIRCUIT PROTECTOR * TM - THERMAL MAGNETIC
- 50A — DRAW-OUT CIRCUIT BREAKER, 3 POLE UNLESS OTHERWISE NOTED. 50A TRIP RATING. * NA - NON-AUTOMATIC * MCP - MOTOR CIRCUIT PROTECTOR * TM - THERMAL MAGNETIC
- LA, 650V — LIGHTING ARRESTOR AND SURGE CAPACITOR
- 10 * — MOTOR; 10HP AS NOTED, * = FLA
- TRANSFORMER WITH GROUNDED SECONDARY, KVA SIZE & VOLTAGE RATIO AS NOTED
- 480/120V (2) — POTENTIAL TRANSFORMER RATIO AND NUMBER PT'S AS NOTED DRAW-OUT INDICATED
- CT 100:5 (3) — CURRENT TRANSFORMER, RATIO AND NUMBER OF CT'S AS NOTED
- GENERATOR
- LCP — LOCAL CONTROL PANEL
- TVSS — TRANSIENT VOLTAGE SURGE SUPPRESSOR
- PM — POWER MONITOR OR PHASE MONITOR
- AS — AMMETER SWITCH
- VS — VOLTAGE TRANSFER SWITCH
- CR — EXAMPLE { CONTROL RELAY OR COIL; TD2 TIME DELAY RELAY NO. 2; CR1 CONTROL RELAY; 1M STARTER NO. 1 MAIN CONTACTOR COIL }
- NORMALLY OPEN CONTACT
- NORMALLY CLOSED CONTACT
- NORMALLY OPEN LIMIT SWITCH
- NORMALLY CLOSED SWITCH
- FLOAT TYPE LIQUID LEVEL SWITCH, CLOSING ON RISING LEVEL
- FLOAT TYPE LIQUID LEVEL SWITCH, OPENING ON RISING LEVEL
- VACUUM OR PRESSURE SWITCH, CLOSING ON RISING PRESSURE
- VACUUM OR PRESSURE SWITCH, OPENING ON RISING PRESSURE
- NORMALLY OPEN PUSHBUTTON, MOMENTARY CLOSE
- NORMALLY CLOSE PUSHBUTTON, MOMENTARY OPEN

ONE LINE DIAGRAM

TIMED CONTACTS - CONTACT ACTION DELAYED AFTER COIL IS:

ENERGIZED
- NORMALLY OPEN WITH THE TIME DELAY CLOSING
- NORMALLY CLOSED WITH THE TIME DELAY OPENING

DE-ENERGIZED
- NORMALLY OPEN WITH INSTANT CLOSING AND AND TIME DELAY OPENING
- NORMALLY CLOSED WITH INSTANT OPENING AND TIME DELAY CLOSING

- XXXE — EXISTING CONDUIT/CABLE (SEE CONDUIT/CABLE SCHEDULE)

- NO/NC MAINTAINED PUSHBUTTON
- ON OFF — TWO-POSITION SELECTOR SWITCH: H-HAND, M-MANUAL, R-REMOTE, L-LOCAL, A-AUTOMATIC, O-OFF
- H O A — THREE-POSITION SELECTOR SWITCH (SAME AS ABOVE)
- THREE-POSITION SPRING RETURN-TO-CENTER MOMENTARY CONTACT SWITCH ("LATCH-UNLATCH," "ON-OFF," ETC.)
- XXX — NEW CONDUIT/CABLE (SEE CONDUIT/CABLE SCHEDULE)

ABBREVIATIONS

AA	ALARM ANNUNCIATOR
A/C	AIR CONDITIONING
AF	AMPERE FRAME SIZE OF CKT. BKR.
AMP	AMPERES, AMPERAGE
APPR	APPROVED
ARC	ALUMINUM RIGID CONDUIT
AT	AMPERE TRIP
ATS	AUTOMATIC TRANSFER SWITCH
AUTO	AUTOMATIC
AWG	AMERICAN WIRE GAUGE
BATT	BATTERY
BCW	BARE COPPER WIRE
BKR	BREAKER
BBL	BUBBLER
C	CONDUIT
CAB	CABINET
CC	CENTER TO CENTER
CD	CONTROL DEVICE
CHLOR	CHLORINE, CHLORINATION
CKT	CIRCUIT
CO	CONDUIT ONLY
COND	CONDUIT
COMPT	COMPARTMENT
COMPR	COMPRESSOR
CPT	CONTROL POWER TRANSFORMER (IN INDIVIDUAL STARTER CUBICLE)
CR	CONTROL RELAY (MAGNETICALLY HELD)
CT	CURRENT TRANSFORMER
CU	COPPER
DB	DUCTBANK
DISC	DISCONNECT
DISTR	DISTRIBUTION
DWG	DRAWING
EGC	EQUIPMENT GROUND CONDUCTOR
ELEV	ELEVATION
EMERG	EMERGENCY
ENCL	ENCLOSURE
EQPT	EQUIPMENT
EXH	EXHAUST
EXIST	EXISTING
FDR	FEEDER
FLEX	FLEXIBLE
FLUOR	FLUORESCENT
FUT	FUTURE
GALV	GALVANIZED
GEN	GENERATOR
GFI	GROUND FAULT INTERRUPTER
GRD	GROUND
HH	HAND HOLE
HOA	HAND-OFF-AUTOMATIC
HTR	HEATER
HLL	HIGH LIQUID LEVEL SWITCH
HZ	HERTZ
INCAND	INCANDESCENT
IND	INDICATION (SYSTEM)
INSTR	INSTRUMENT
ISC	SHORT CIRCUIT CURRENT, AMPS
J BOX	JUNCTION BOX
LOC	LOCAL
LOS	PUSHBUTTON W/"LOCK-OUT-STOP"
LCP	LOCAL CONTROL PANEL
LS	LIMIT SWITCH
LGHT	LIGHT, LIGHTS
LTG	LIGHTING
LTNG	LIGHTNING
MA	MILLIAMPS
MAN	MANUAL
MAG	MAGNETIC
MAX	MAXIMUM
MCC	MOTOR CONTROL CENTER
MCB	MAIN CONTROL BOARD
MCM	THOUSAND CIRCULAR MILS
MFM	MAGNETIC FLOW METER
MH	MANHOLE
MIN	MINUTES, MINIMUM
MOV	MOTOR OPERATED VALVE
MS	MANUAL MOTOR STARTER
MT, MTD	MOUNT, MOUNTED
NA	NON-AUTOMATIC
NF	NON-FUSED
NO, NOS	NUMBER, NUMBERS
NP	NAMEPLATE
NIC	NOT IN CONTRACT
NITS	NOT IN THIS SECTION
NTS	NOT TO SCALE
OC	ON CENTER
OL	OVERLOAD RELAY
PB	PUSHBUTTON
PLC	PROGRAMMABLE LOGIC CONTROLLER
PNL	PANEL
PNLBD	PANEL BOARD
POS	POSITION
POT	POTENTIOMETER
PRI	PRIMARY
PS	PRESSURE SWITCH
PVC	POLYVINYL CHLORIDE
PW	PART WINDING
PWR	POWER
REC, RECPTS	RECEPTACLE, RECEPTACLES
REQ'D	REQUIRED
RM	RUN CONTACTOR COIL
SA	STATUS ANNUNCIATOR
SCH	SCHEDULE
SEC	SECONDS, SECONDARY
SECT	SECTION
SEL SW	SELECTOR SWITCH
SEQ	SEQUENCE
SHLD	SHIELDED
SHT	SHEET
SIG	SIGNAL
SM	START CONTACTOR COIL
SPECS	SPECIFICATIONS
SP HTR	SPACE HEATER
S.S.	STAINLESS STEEL
ST	SHUNT TRIP
STA	STATION
STD	STANDARD
STL	STEEL
STR	STARTER
SV	SOLENOID VALVE
SW	SWITCH
SYS	SYSTEM
TACH	TACHOMETER
TEMP	TEMPERATURE
TERM	TERMINAL
THERM	THERMOSTAT
TR	TIME DELAY RELAY
TS	TIME SWITCH
TYP	TYPICAL
UG	UNDERGROUND
VP	VAPOR-PROOF
VFD	VARIABLE SPEED DRIVE
W	WATTS, WIRE
WP	WEATHERPROOF
XFMR	TRANSFORMER
XMTR	TRANSMITTER
XP	EXPLOSION-PROOF

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ST TAMMANY PARISH GOVERNMENT
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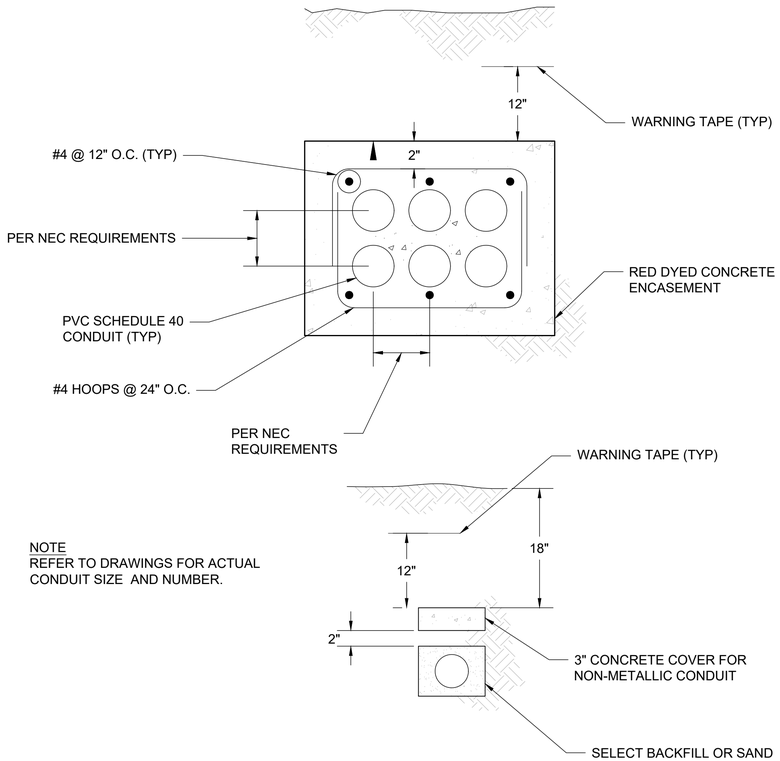
ELECTRICAL SYMBOLS AND ABBREVIATIONS

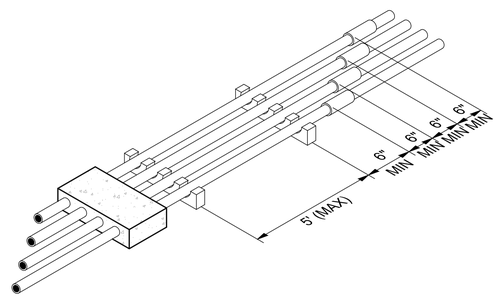
SHEET ID: E1

SHEET SET: 15 OF 20



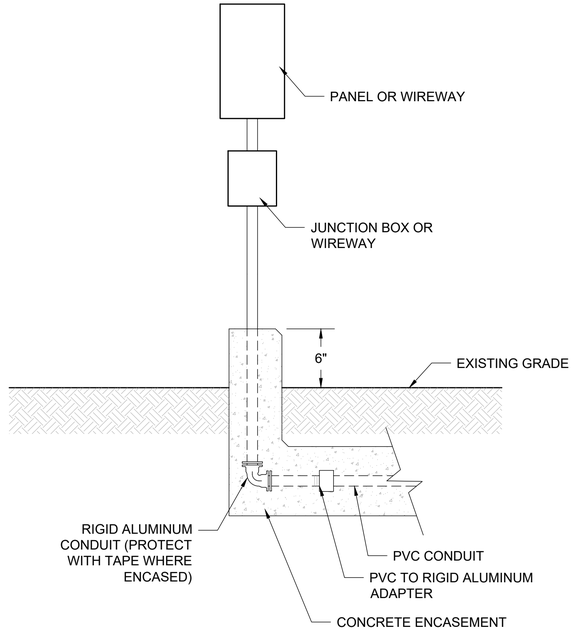
TYP. DUCT BANK ENCASEMENT/REINFORCEMENT

SCALE: N.T.S. (22"x34" SHEET) E-103



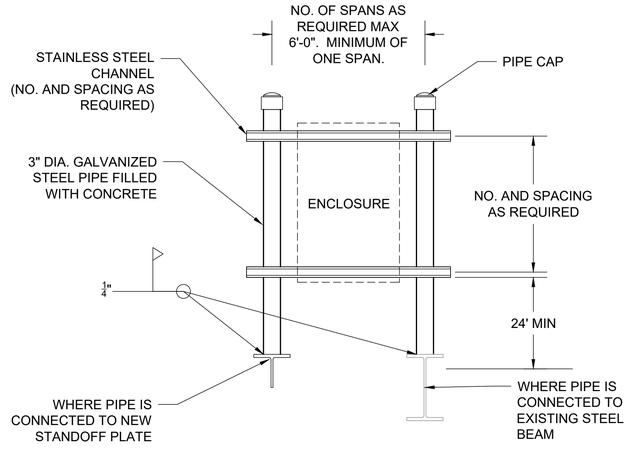
TYP. DUCT BANK JOINT/SUPPORT SPACING

SCALE: N.T.S. (22"x34" SHEET) E-108



ENTRANCE INTO PANEL

SCALE: N.T.S. (22"x34" SHEET) E-121



ENCLOSURE MOUNTING STAND

SCALE: N.T.S. (22"x34" SHEET) E-420

STATE OF LOUISIANA
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PROJECT MANAGER
37832
LICENSE NO.

SUBMITTED BY:
H. DAVIS COLE
COMPANY OFFICER
30219
LICENSE NO.

H. Davis Cole & Associates, LLC
CONSULTING ENGINEERS
NEW ORLEANS, LA

MARK	DESCRIPTION	DATE	BY	CHKD
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ST TAMMANY PARISH GOVERNMENT
21454 KOOP DRIVE
MANDEVILLE, LA 70471

ELECTRICAL DETAILS

SHEET ID
E2

SHEET SET
16 OF 20

CABLE AND CONDUIT SCHEDULE

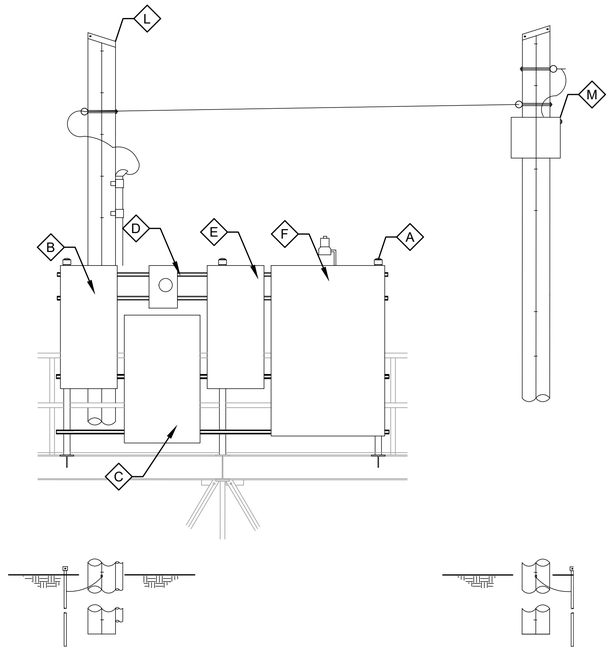
CONDUIT/CABLE TAG	CONDUIT SIZE	CABLE	TERMINATION (FROM)	TERMINATION (TO)	REMARKS
101	N/A	3 1/0 AWG, NO. 6 AWG G	SERVING TRANSFORMER	WEATHERHEAD	A
102	1-1/2" C	3 1/0 AWG, NO. 6 AWG G	WEATHERHEAD	SAFETY SWITCH (LOAD BREAK DISCONNECT)	--
103	1-1/2" C	3 1/0 AWG, NO. 6 AWG G	SAFETY SWITCH (LOAD BREAK DISCONNECT)	SELF - CONTAINED METER	--
104	1-1/2" C	3 1/0 AWG, NO. 6 AWG G	SELF - CONTAINED METER	SAFETY SWITCH (LOAD BREAK DISCONNECT)	--
105	1-1/2" C	3 1/0 AWG, NO. 6 AWG G	SAFETY SWITCH (LOAD BREAK DISCONNECT)	PUMP CONTROL PANEL	--
106	½"C	2 NO. 8 AWG, 1 NO. 12 AWG G	PUMP CONTROL PANEL LOW VOLTAGE SECTION	PUMP OILER SOLENOID VALVE	B C
107	½"C	2 NO. 8 AWG, 1 NO. 12 AWG G	PUMP CONTROL PANEL LOW VOLTAGE SECTION	PUMP MOTOR TERMINATION BOX (HEATER)	D
108	½"C	2 NO. 8 AWG, 1 NO. 12 AWG G	PUMP CONTROL PANEL REDUCED VOLTAGE SOFT START	PUMP MOTOR TERMINATION BOX	E
109	½"C	2 NO. 8 AWG, 1 NO. 12 AWG G	PUMP CONTROL PANEL LOW VOLTAGE SECTION	AREA LIGHT	F
110	½"C	FACTORY CABLE	PUMP CONTROL PANEL LOW VOLTAGE SECTION	FLOATS	G
350 HORSEPOWER PUMP POWER RISER					
201	N/A	6 EA. 500 MCM, 1 3/0 AWG G	SERVING TRANSFORMER	WEATHERHEAD	A J
202	2 EA 3"C	6 EA. 500 MCM, 1 3/0 AWG G	WEATHERHEAD	SAFETY SWITCH (LOAD BREAK DISCONNECT)	--
203	4"C	6 EA. 500 MCM, 1 3/0 AWG G	SAFETY SWITCH (LOAD BREAK DISCONNECT)	CURRENT TRANSFORMER CABINET	--
204	4"C	6 EA. 500 MCM, 1 3/0 AWG G	CURRENT TRANSFORMER CABINET	SAFETY SWITCH (LINE BREAK DISCONNECT)	--
205	4"C	6 EA. 500 MCM, 1 3/0 AWG G	SAFETY SWITCH (LINE BREAK DISCONNECT)	PUMP CONTROL PANEL	--
206	½"C	2 NO. 8 AWG, 1 NO. 12 AWG G	PUMP CONTROL PANEL LOW VOLTAGE SECTION	PUMP OILER SOLENOID VALVE	H
207	½"C	2 NO. 8 AWG, 1 NO. 12 AWG G	PUMP CONTROL PANEL LOW VOLTAGE SECTION	PUMP MOTOR TERMINATION BOX (HEATER)	--
208	4"C	6 EA. 500 MCM, 1. 3/0 AWG G	PUMP CONTROL PANEL REDUCED VOLTAGE SOFT START	PUMP MOTOR TERMINATION BOX	--
209	½"C	2 NO. 8 AWG, 1 NO. 12 AWG G	PUMP CONTROL PANEL LOW VOLTAGE SECTION	AREA LIGHT	--
210	MIN ½" C	FACTORY CABLE	PUMP CONTROL PANEL LOW VOLTAGE SECTION	FLOATS	I A
211	3" C	3 EACH 500 MCM	CURRENT TRANSFORMERS	SELF CONTAINED METER ENCLOSURE	

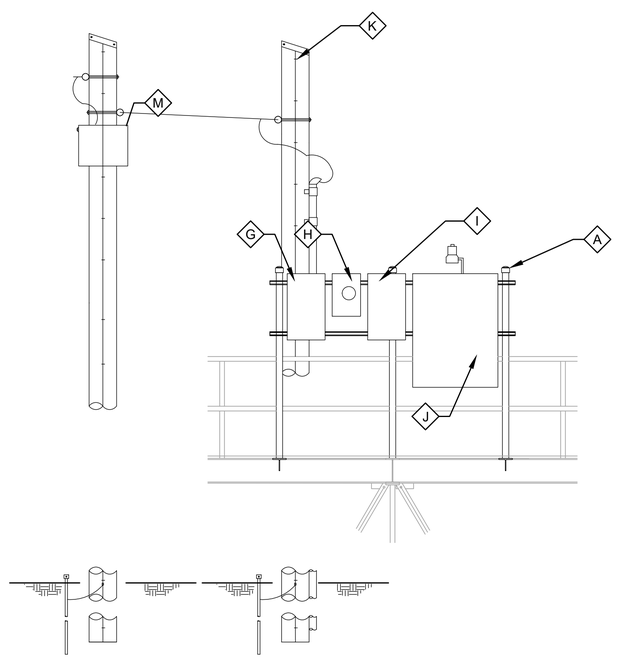
CABLE AND CONDUIT SCHEDULE GENERAL NOTES:

1) SEE SECTION 16100 FOR ADDITIONAL REQUIREMENTS

CABLE AND CONDUIT SCHEDULE NOTES BY SYMBOL:

- A VERIFY SIZE OF CABLE WITH SERVING UTILITY
- B VERIFY CABLE SIZING WITH SOLENOID MANUFACTURER
- C RE - FEED EXISTING SOLENOID VALVE
- D RE - FEED EXISTING MOTOR HEATER
- E RE - FEED MOTOR IN ELEVATED LOCATION
- F RE - FEED AREA LIGHT IN NEW LOCATION
- G RE - FEED FLOATS. VERIFY CONDUIT SIZE WITH FLOAT MANUFACTURER
- H VERIFY CABLE SIZING WITH SOLENOID MANUFACTURER
- I VERIFY CONDUIT SIZE WITH FLOAT SUPPLIER
- J PROVIDE TWO WEATHERHEADS TO ACCOMODATE ALL CONDUCTORS





CONTROL PANEL RACK ELEVATIONS

SCALE: N.T.S.

RACK ELEVATION GENERAL NOTES:

1) SEE ELECTRICAL PLAN FOR LOCATIONS.

2) SEE O NE LINE DIAGRAMS AND RISER DIAGRAMS FOR EQUIPMENT AND PANEL DETAILS.

3) SEE SECTION 16100 - GENERAL ELECTRICAL REQUIREMENTS FOR ADDITIONAL REQUIREMENTS.

RACK ELEVATION NOTES BY SYMBOL:

- A EQUIPMENT RACK PER DETAIL E-420
- B 600 AMP SAFETY SWITCH PER SECTION 16100 LOAD SIDE DISCONNECT)
- C CURRENT TRANSFORMER CABINET PER SERVING UTILITY REQUIREMENTS (CT'S BY SERVING UTILITY)
- D SELF - CONTAINED METER SOCKET PER SERVING UTILITY REQUIREMENTS (TO BE COMPATIBLE WITH CURRENT TRANSFORMERS PROVIDED BY SERVING UTILITY)
- E 600 AMP SAFETY SWITCH PER SECTION 16100 (LINE SIDE DISCONNECT/MANUAL TRANSFER SWITCH)
- F NEW CONTROL PANEL PER SECTION 16100
- G RELOCATED 200 AMP SAFETY SWITCH (LINE SIDE DISCONNECT)
- H RELOCATED SELF - CONTAINED METER AND METER SOCKET
- I RELOCATED 200 AMP SAFETY SWITCH (LOAD SIDE DISCONNECT)
- J RELOCATED PUMP CONTROL PANEL
- K RELOCATED SERVICE POLE
- L NEW SERVICE POLE
- M COMPANY TRANSFORMER AND POLE (FOR ILLUSTRATIVE PURPOSES ONLY)

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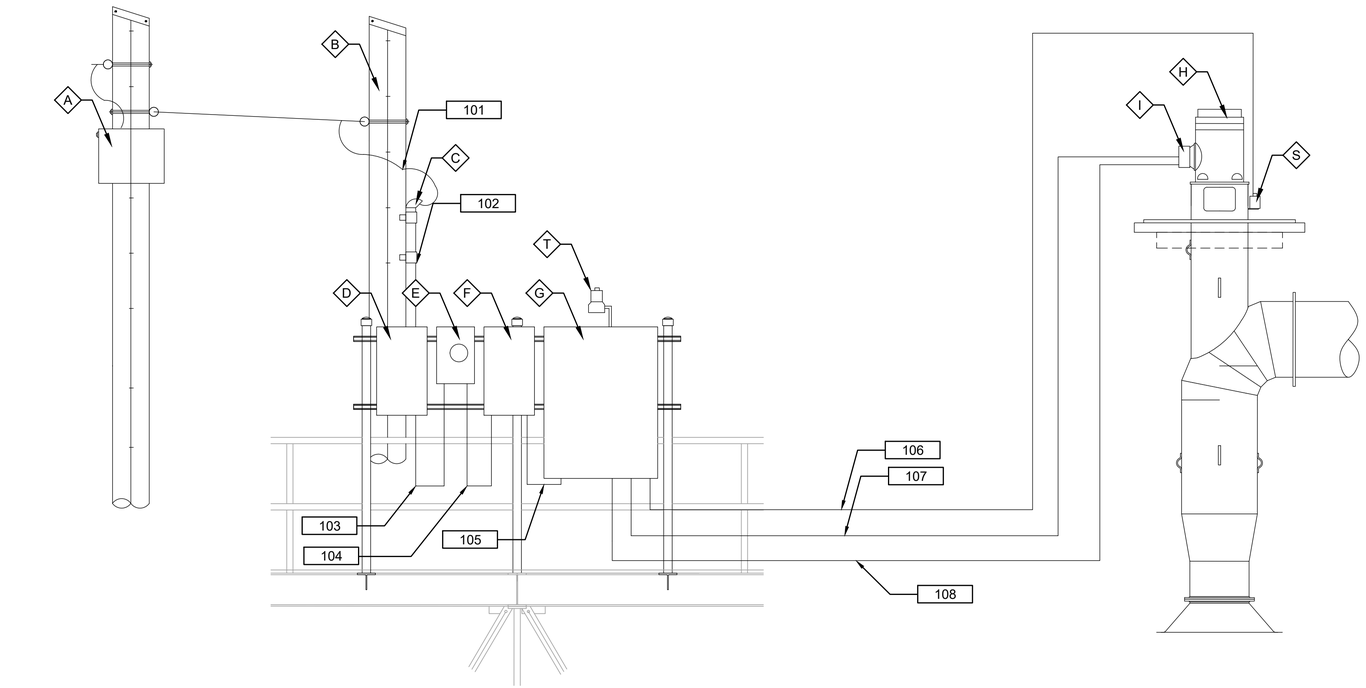
CABLE AND CONDUIT SCHEDULE

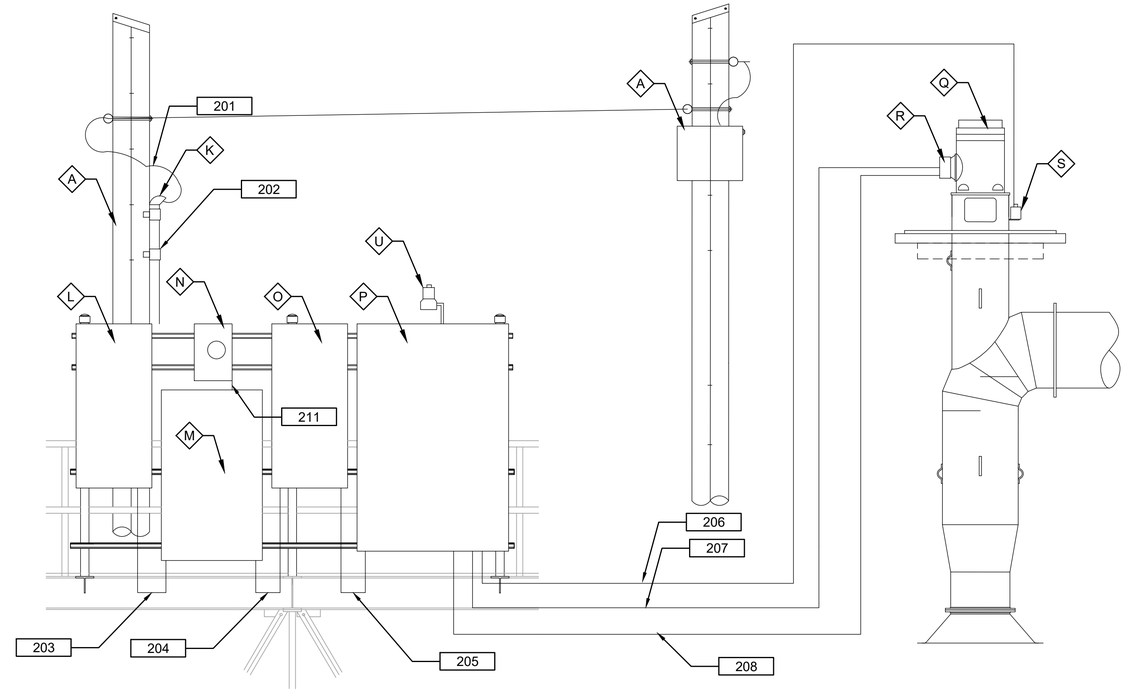
SHEET ID
E3

SHEET SET
17 OF 20



75 HP PUMP RISER DIAGRAM

SCALE: N.T.S.



350 HP PUMP RISER DIAGRAM

SCALE: N.T.S.

RISER DIAGRAM GENERAL NOTES:

1) SEE SECTION 16100 FOR ADDITIONAL REQUIREMENTS
2) SEE SHEET E2 FOR CONDUIT AND CABLE SCHEDULE
3) SEE ONE LINE DIAGRAM, SHEET E4, FOR ADDITIONAL REQUIREMENTS

NOTES BY SYMBOL:

- A — POWER COMPANY POLE AND TRANSFORMER (FOR ILLUSTRATIVE PURPOSES ONLY)
- B — RELOCATED SERVICE POLE
- C — RELOCATED WEATHERHEAD
- D — RELOCATED LOAD SIDE DISCONNECT
- E — RELOCATED SELF - CONTAINED METER AND METER SOCKET
- F — RELOCATED LOAD SIDE DISCONNECT
- G — RELOCATED CONTROL PANEL
- H — 75 HP PUMP
- I — 75 HP PUMP MOTOR TERMINATION BOX
- J — NEW SERVICE POLE
- K — NEW WEATHERHEAD
- L — NEW LINE SIDE DISCONNECT
- M — NEW CURRENT TRANSFORMER CABINET
- N — NEW SELF CONTAINED METER SOCKET
- O — NEW LOAD SIDE DISCONNECT
- P — NEW PUMP CONTROL PANEL
- Q — 350 HP PUMP
- R — 350 HP PUMP MOTOR TERMINATION BOX
- S — OILER AND OILER SOLENOID
- T — RELOCATED LIGHT
- U — NEW LIGHT WITH PHOTOCELL PER SECTION 16100

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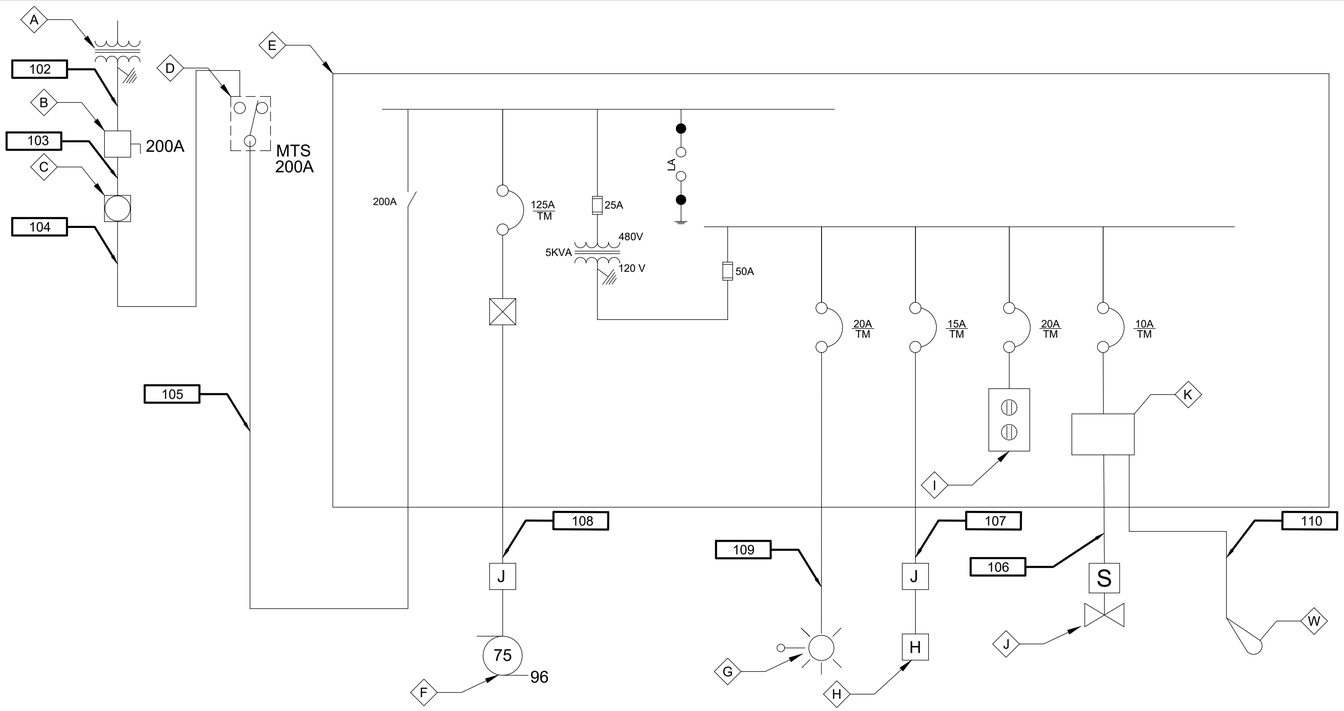
RISER DIAGRAMS

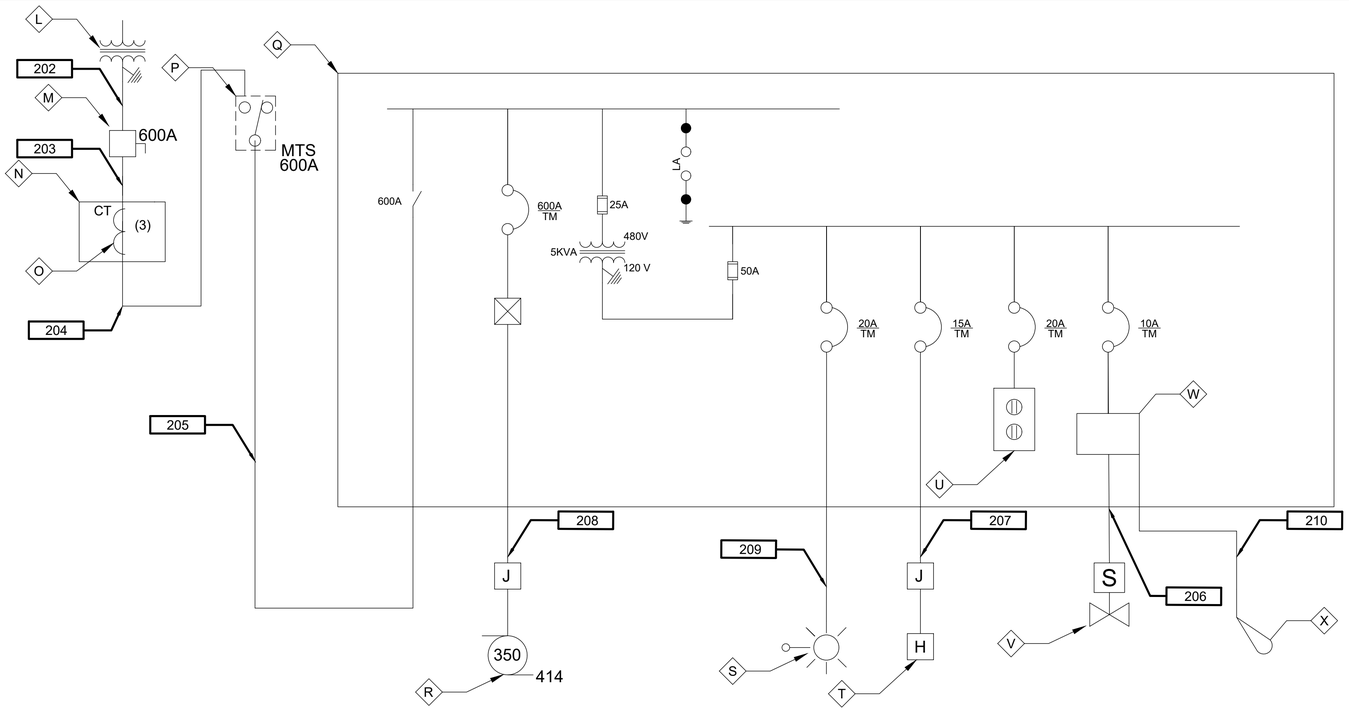
SHEET ID
E4

SHEET SET
18 OF **20**



ONE LINE DIAGRAM FOR 75 HP PUMP

SCALE: N.T.S.



ONE LINE DIAGRAM FOR 350 HP PUMP

SCALE: N.T.S.

CABLE AND CONDUIT SCHEDULE GENERAL NOTES:

1) SEE SECTION 16100 FOR ADDITIONAL REQUIREMENTS.

2) SEE CONDUIT AND CABLE SCHEDULE FOR ADDITIONAL REQUIREMENTS.

CABLE AND CONDUIT SCHEDULE NOTES BY SYMBOL:

- A — POWER COMPANY TRANSFORMER
- B — RELOCATED SAFETY SWITCH (LINE SIDE DISCONNECT)
- C — RELOCATED SELF - CONTAINED METER AND METER SOCKET
- D — RELOCATED SAFETY SWITCH (LOAD SIDE DISCONNECT)
- E — RELOCATED CONTROL PANEL
- F — EXISTING 75 HP MOTOR
- G — RELOCATED LIGHT
- H — EXISTING 75 HP MOTOR HEATER
- I — EXISTING CONVENIENCE OUTLET
- J — EXISTING 75 HP OILER AND SOLENOID VALVE
- K — CONTROLS SECTION AND CIRCUITS - 75 HP PUMP
- L — SERVING UTILITY TRANSFORMER
- M — NEW SAFETY SWITCH (LINE SIDE DISCONNECT)
- N — NEW CT CABINET (BY CONTRACTOR)
- O — NEW CURRENT TRANSFORMERS (BY SERVING UTILITY)
- P — NEW SAFETY SWITCH (LOAD SIDE DISCONNECT)
- Q — NEW 350 HP PUMP CONTROL PANEL
- R — 350 HP PUMP MOTOR
- S — NEW AREA LIGHT
- T — 350 HP PUMP MOTOR HEATER
- U — CONVENIENCE OUTLET
- V — 350 HP PUMP OILER AND SOLENOID VALVE
- W — RE-FED FLOATS
- X — NEW FLOATS

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MANDEVILLE, LA 70471

ONE LINE DIAGRAM

SHEET ID
E5

SHEET SET
19 OF **20**

REHABILITATED ELECTRICAL SITE PLAN

SCALE : 1" = 10'-0" (22" x 34" SHEET)

N

GENERAL NOTES:

1. AERIAL IMAGE COURTESY OF GOOGLE EARTH. AERIAL IS FOR REFERENCE OF GENERAL LOCATION ONLY. SURFACE AND BELOW SURFACE FEATURE LOCATIONS SHALL BE FIELD VERIFIED.

NOTES BY SYMBOL:

A. EXISTING LAKEFRONT PUMP STATION (TO BE REHABILITATED)

B. EXISTING CANAL (NO WORK)

C. CONTROL AND POWER DISTRIBUTION EQUIPMENT FOR 75 HP PUMP (RELOCATE EXISTING CONTROL PANEL, LOAD BREAK DISCONNECT, LINE BREAK DISCONNECT, AND METER TO NEW RACK ON ELEVATED PLATFORM. CONSTRUCT RACK PER ELEVATIONS AND DETAIL E-420

D. CONTROL AND POWER DISTRIBUTION EQUIPMENT FOR 350 HP PUMP. CONSTRUCT RACK PER ELEVATIONS AND DETAIL E-420

E. CONCRETE ENCASED DUCT BANK PER DETAIL E-103

F. PROVIDE CONDUIT SUPPORT PER DETAIL E-108

G. NEW SERVICE POLE FOR 350 HP PUMP (VERIFY LOCATION IN FIELD WITH SERVING UTILITY)

H. NEW SERVICE POLE FOR 75 HP PUMP (VERIFY LOCATION IN FIELD WITH SERVING UTILITY)

I. ENTER CONTROL AND POWER DISTRIBUTION EQUIPMENT PER DETAIL E-121

0 5' 10'
GRAPHIC SCALE

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REHABILITATED ELECTRICAL SITE PLAN

SHEET ID
01-E1

SHEET SET
20 OF 20