



ST. TAMMANY PARISH

MICHAEL B. COOPER
PARISH PRESIDENT

NOTICE TO BIDDERS

ST. TAMMANY PARISH

Sealed bids will be received by the Department of Procurement, until 2:00 p.m., **Wednesday, September 25, 2024**, and then opened and read publicly at that time by the Procurement Staff for the following project:

Bid # 24-43-2 – Brewster Road Sewer Consolidation

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 Bid Name and the Bid Number.

The project classification is:

Municipal & Public Work Construction

This bid package is available online at www.bidexpress.com or LaPAC <https://wwwcfprd.doa.louisiana.gov/osp/lapac/pubmain.cfm>. It is the Vendor's responsibility to check Bid Express, or LaPAC frequently for any possible addenda that may be issued. The Parish is not responsible for a Vendor's failure to download any addenda documents required to complete a submission.

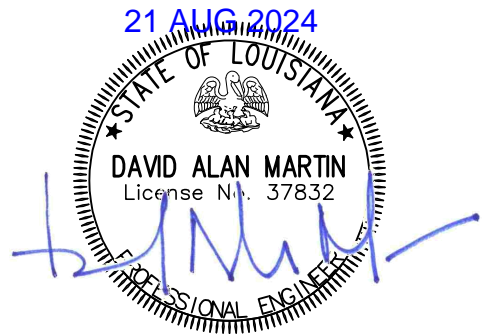
Bids will be received at 21454 Koop Dr., Suite 2F, Mandeville, LA 70471 from each bidder or his agent and given a written receipt, by certified mail with return receipt requested, or electronically at www.bidexpress.com.

A Non-Mandatory pre-bid meeting will be held at St. Tammany Parish Government Office Complex, Building "B" 21454 Koop Dr. Mandeville, LA 70471, 3rd Floor Staff Conference Room on Friday, September 6, 2024, from 10:00 to 12:00 PM. Attendance is strongly encouraged.

Procurement Department

BID PROPOSAL

ST. TAMMANY PARISH
GOVERNMENT



BID PACKAGE FOR

BREWSTER ROAD SEWER CONSOLIDATION

BID NO.: 24-43-2

AUGUST 21, 2024

Section 01

Table of Contents

Section 01	Table of Contents
Section 02	Instructions to Bidders
Section 03	Summary of Work
Section 04	LA Uniform Public Work Bid Form/ Unit Price Form
Section 05	Affidavits, Louisiana (Pursuant to LSA-R.S. 38:2224, 38:2227 and 38:2212.10)
Section 06	Insurance Requirements
Section 07	Project Sign
Section 08	General Conditions
Section 09	Sample Corporate Resolution
Section 10	Sample Certificate of Insurance
Section 11	Sample Contract
Section 12	Federal Clauses
Section 13	Construction Drawings
Section 14	Technical Specifications

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 **three hundred sixty (360) calendar 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. Contractor shall be liable without limitation to the Parish for any and all injury, death, damage, loss, destruction, damages, costs, fines, penalties, judgments, forfeitures, assessments, expenses (including attorney fees), obligations, and other liabilities of every name and description, which may occur or in any way arise out of any act or omission of Contractor, its owners, agents, employees, partners or subcontractors.
22. Upon notice of any claim, demand, suit, or cause of action against the Parish, alleged to arise out of or be related to this Contract, Contractor shall investigate, handle, respond to, provide defense for, and defend at its sole expense, even if the claim, demand, suit, or cause of action is groundless, false, or fraudulent. The Parish may, but is not required to, consult with or assist the Contractor, but this assistance shall not affect the Contractor's obligations, duties, and responsibilities under this section. Contractor shall obtain the Parish's written consent before entering into any settlement or dismissal.
23. It is understood and agreed that neither party can foresee the exigencies beyond the control of each party which arise by reason of an Act of God or force majeure; therefore, neither party shall be liable for any delay or failure in performance beyond its control resulting from an Act of God or force majeure. The Parish shall determine whether a delay or failure results from an Act of God or force majeure based on its review of all facts and circumstances. The parties shall use reasonable efforts, including but not limited to, use of continuation of operations plans (COOP), business continuity plans, and disaster recovery plans, to eliminate or minimize the effect of such events upon the performance of their respective duties under this Contract.
24. Contractor shall fully indemnify and hold harmless the Parish, without limitation, for any and all injury, death, damage, loss, destruction, damages, costs, fines, penalties, judgments, forfeitures, assessments, expenses (including attorney fees), obligations, and other liabilities of every name and description, which may occur or in any way arise out of any act or omission of Contractor, its owners, agents, employees, partners or subcontractors. The Contractor shall not indemnify for the portion of any loss or damage arising from the Parish's act or failure to act.
25. Contractor shall fully indemnify and hold harmless the Parish, without limitation, from and against damages, costs, fines, penalties, judgments, forfeitures, assessments, expenses (including attorney fees), obligations, and other liabilities in any action for infringement of any intellectual property right, including but not limited to, trademark, trade-secret, copyright, and patent rights.

When a dispute or claim arises relative to a real or anticipated infringement, the Contractor, at its sole expense, shall submit information and documentation, including formal patent attorney opinions, as required by the Parish.

If the use of the product, material, service, or any component thereof is enjoined for any reason or if the Contractor believes that it may be enjoined, Contractor, while ensuring appropriate migration and implementation, data integrity, and minimal delays of performance, shall at its sole expense and in the following order of precedence: (i) obtain for the Parish the right to continue using such product, material, service, or component thereof; (ii) modify the product, material, service, or component thereof so that it becomes a non-infringing product, material, or service of at least equal quality and performance; (iii) replace the product, material, service, or component thereof so that it becomes a non-infringing product, material, or service of at least equal quality and performance; or, (iv) provide the Parish monetary compensation for all payments made under the Contract related to the infringing product, material, service, or component, plus for all costs incurred to procure and implement a non-infringing product, material, or service of at least equal quality and performance. Until this obligation has been satisfied, the Contractor remains in default.

The Contractor shall not be obligated to indemnify that portion of a claim or dispute based upon the Parish's unauthorized: i) modification or alteration of the product, material or service; ii) use of the product, material or service in combination with other products not

furnished by Contractor; or, iii) use of the product, material or service in other than the specified operating conditions and environment.

26. 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.
27. 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.
28. 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.
29. 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.
30. 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.
31. In accordance with Louisiana Law, all Corporations (See LA R.S. 12:26.1) and Limited Liability Companies (See LA R.S. 12:1308.2) must be registered and in good standing with the Louisiana Secretary of State in order to hold a contract.
32. 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 ensure that bids are delivered in a timely fashion. **Late bids, regardless of reason, will not be considered, and will be returned to bidder.**
33. 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**

34. See Notice to Bidders for availability of Drawings, Specifications and Contract Documents via electronic methods.

35. The successful Bidder shall be required to post in each direction a public information sign, 4' x 4' in size, at the location of the project containing information required by the Owner. The Owner shall supply this information.
36. 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 and qualifications 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.
37. At least three days prior to the execution of the Contract, the Contractor shall deliver to the Owner the required Bonds.
38. Failure of the successful Bidder to execute the Contract and deliver the required Bonds within ten (10) 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.
39. 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.
40. 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.
41. 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.

42. 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.

43. 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.
44. 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.
45. 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.
46. 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.
47. Contractor authorizes Parish to deduct from any payment due herein costs and service fees for recordation of this Contract in full or an excerpt hereof, or any revisions or modifications thereof as required by law. Contractor agrees to execute an excerpt or extract of this agreement for recordation purposes. If Contractor fails to execute such an excerpt, then the Parish shall file and record the entire Contract and all attachments at the expense of Contractor and Parish is hereby authorized to deduct all related costs from any proceeds due to the Contractor.
48. 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.
49. 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.
50. 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.
51. Deductibles: Any and all deductibles in the described insurance policies shall be assumed by and be at the sole risk of the Contractor.

52. 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.
53. 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.

54. 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.
55. 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.
56. 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.
57. 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).
58. 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.

59. The last day to submit questions and/or verification on comparable products will be no later than 2:00 pm CST, fourteen (14) 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 Procurement@stpgov.org. Any questions or inquiries received after the required deadline to submit questions or inquiries will not be answered.

Schedule of Events

	<u>Date</u>	<u>Time (CT)</u>
Bid Due Date	September 25, 2024	2:00 PM
Inquiry Deadline	September 16, 2024	2:00 PM
Addendum Deadline	September 20, 2024	2:00 PM

NOTE: The Parish reserves the right to revise this schedule. Any such revision will be formalized by the issuance of an addendum to the Bid Request.

60. 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.
61. 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).
62. Failure to complete or deliver within the time specified or to provide the services as specified in the bid or response will constitute a default and may cause cancellation of the contract. Where the Parish has determined the contractor to be in default. The Parish reserves the right to purchase any or all products or services covered by the contract on the open market and to charge the contractor with the cost in excess of the contract price. Until

such assessed charges have been paid, no subsequent bid or response from the defaulting contractor will be considered.

63. 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.

Section 03

Summary of Work

I. Work to Include:

Construction of new sewer force mains, construction and startup of new sewerage pumping stations, and decommissioning and disposal of existing treatment facilities located in St. Tammany Parish.

II. Location of Work:

The WORK is located along Brewster Road in the general vicinity of Madisonville, LA.

III. Documents: Bid Documents dated August 2, 2024, and entitled:

Brewster Road Sewer Consolidation

Bid No.: 24-43-2

IV. OTHER REQUIREMENTS (as applicable)

Contractor must comply and assures compliance with Section 12 Federal Clauses.

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

This project is federally grant funded and therefore requires the Contractor to have a Unique Entity Identification number (UEI). The Contractor should submit with their response their UEI number. If the Contractor does not have a UEI already, then they must register at the below link before an award can be made.

<https://sam.gov/content/entity-registration>

Table 3.1

Liquidated Damages	
Original Contract Amount	Daily Charge
Dollars	Dollars
0 - 250,000	500
250,000 – 1 Million	1,000
> 1 Million – 5 Million	1,500
> 5 Million – 10 Million	2,000
> 10 Million	3,000

- Parish reserves the right to increase the Daily charge rate due to additional provisions required in order to complete the project as described in the specifications

Section 04

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: Brewster Road Sewerage Consolidation
Bid No. 24-43-2

(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: Fairway Consulting and Engineering, LLC and dated: August 2, 2024.

(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 (\$)

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

N/A Dollars (\$)

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

N/A Dollars (\$)

NAME OF BIDDER:

ADDRESS OF BIDDER:

LOUISIANA CONTRACTOR'S LICENSE NUMBER:

NAME OF AUTHORIZED SIGNATORY OF BIDDER:

TITLE OF AUTHORIZED SIGNATORY OF BIDDER:

SIGNATURE OF AUTHORIZED SIGNATORY OF BIDDER **:

DATE:

THE FOLLOWING ITEMS ARE TO BE INCLUDED WITH THE SUBMISSION OF THIS LOUISIANA UNIFORM PUBLIC WORK BID FORM:

* The Unit Price Form shall be used if the contract includes unit prices. Otherwise it is not required and need not be included with the form. The number of unit prices that may be included is not limited and additional sheets may be included if needed.

** A CORPORATE RESOLUTION OR WRITTEN EVIDENCE of the authority of the person signing the bid for the public work as prescribed by LA R.S. 38:2212(B)(5).

BID SECURITY in the form of a bid bond, certified check or cashier's check as prescribed by LA R.S. 38:2218(A) attached to and made a part of this bid.

LOUISIANA UNIFORM PUBLIC WORK BID FORM UNIT PRICE FORM

TO:

St. Tammany Parish Government

21454 Koop Drive, Suite 2F

Mandeville, LA. 70471

(OWNER TO PROVIDE NAME AND ADDRESS OF OWNER)

BID FOR:

Brewster Road Sewer Consolidation

Bid Number 24-43-2

(OWNER TO PROVIDE PROJECT NAME & OTHER IDENTIFYING INFO)

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

REF NO.:	Description:	☑ BASE BID OR		☐ ALT #	BREWSTER ROAD FORCE MAIN - MOBILIZATION	
		QUANTITY	OR		UNIT OF MEASURE	UNIT PRICE
23000168-001		1		LUMP SUM		
	Description:	☑ BASE BID OR	☐ ALT #	BREWSTER ROAD FORCE MAIN - 12" SEWER FORCE MAIN BY HORIZONTAL DIRECTIONAL DRILL		
23000168-002		2,327		LINEAR FOOT		
	Description:	☑ BASE BID OR	☐ ALT #	BREWSTER ROAD FORCE MAIN - 12" DUCTILE IRON FITTINGS, ALL TYPES		
23000168-003		6		EACH		
	Description:	☑ BASE BID OR	☐ ALT #	BREWSTER ROAD SEWER FORCE MAIN - 14" DUCTILE IRON FITTINGS, ALL TYPES		
23000168-004		2		EACH		

Wordings for "description" is to be provided by the Owner. All Quantities Estimated. The Contractor will be paid based upon actual quantities as verified by the Owner.

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

Description:		<input checked="" type="checkbox"/> BASE BID	OR	<input type="checkbox"/> ALT #	BREWSTER ROAD SEWER FORCE MAIN - 14" SEWER FORCE MAIN BY HORIZONTAL DIRECTIONAL DRILL	
REF NO.:		QUANTITY		UNIT OF MEASURE	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times unit price)
23000168-005		4,250		LINEAR FOOT		
Description:		<input checked="" type="checkbox"/> BASE BID	OR	<input type="checkbox"/> ALT #	BREWSTER ROAD SEWER FORCE MAIN - 12" C900 FORCE MAIN BY OPEN CUT	
REF NO.:		QUANTITY		UNIT OF MEASURE	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times unit price)
23000168-006		84		LINEAR FOOT		
Description:		<input checked="" type="checkbox"/> BASE BID	OR	<input type="checkbox"/> ALT #	BREWSTER ROAD SEWER FORCE MAIN - 14" C900 FORCE MAIN BY OPEN CUT	
REF NO.:		QUANTITY		UNIT OF MEASURE	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times unit price)
23000168-007		20		LINEAR FOOT		
Description:		<input checked="" type="checkbox"/> BASE BID	OR	<input type="checkbox"/> ALT #	BREWSTER ROAD SEWER FORCE MAIN - 12" BURIED GATE VALVE	
REF NO.:		QUANTITY		UNIT OF MEASURE	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times unit price)
23000168-008		1		EACH		
Description:		<input checked="" type="checkbox"/> BASE BID	OR	<input type="checkbox"/> ALT #	BREWSTER ROAD SEWER FORCE MAIN - ARV AND VAULT	
REF NO.:		QUANTITY		UNIT OF MEASURE	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times unit price)
23000168-009		1		EACH		
Description:		<input checked="" type="checkbox"/> BASE BID	OR	<input type="checkbox"/> ALT #	FAIRFIELD OAKS SEWER CONSOLIDATION - MOBILIZATION	
REF NO.:		QUANTITY		UNIT OF MEASURE	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times unit price)
23000170-001		1		LUMP SUM		

Wordings for "description" is to be provided by the Owner. All Quantities Estimated. The Contractor will be paid based upon actual quantities as verified by the Owner.

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

Description:		<input checked="" type="checkbox"/> BASE BID	OR	<input type="checkbox"/> ALT #	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times unit price)
REF NO.:		QUANTITY		UNIT OF MEASURE		
23000170-002		1		LUMP SUM		
FAIRFIELD OAKS SEWER CONSOLIDATION - DEMOLITION AND DISPOSAL OF FAIRFIELD OAKS WWTP						
Description:		<input checked="" type="checkbox"/> BASE BID	OR	<input type="checkbox"/> ALT #	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times unit price)
REF NO.:		QUANTITY		UNIT OF MEASURE		
23000170-003		1,179		LINEAR FOOT		
FAIRFIELD OAKS SEWER CONSOLIDATION - 4" SEWER FORCE MAIN BY OPEN CUT						
Description:		<input checked="" type="checkbox"/> BASE BID	OR	<input type="checkbox"/> ALT #	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times unit price)
REF NO.:		QUANTITY		UNIT OF MEASURE		
23000170-004		11		EACH		
FAIRFIELD OAKS SEWER CONSOLIDATION - DUCTILE IRON FITTINGS, ALL TYPES						
Description:		<input checked="" type="checkbox"/> BASE BID	OR	<input type="checkbox"/> ALT #	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times unit price)
REF NO.:		QUANTITY		UNIT OF MEASURE		
23000170-005		100		LINEAR FOOT		
FAIRFIELD OAKS SEWER CONSOLIDATION - 4" SEWER FORCE MAIN BY HORIZONTAL DIRECTIONAL DRILL						
Description:		<input checked="" type="checkbox"/> BASE BID	OR	<input type="checkbox"/> ALT #	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times unit price)
REF NO.:		QUANTITY		UNIT OF MEASURE		
23000170-006		1		LUMP SUM		
FAIRFIELD OAKS SEWER CONSOLIDATION - CONSTRUCT FAIRFIELD OAKS PUMPING STATION						
Description:		<input checked="" type="checkbox"/> BASE BID	OR	<input type="checkbox"/> ALT #	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times unit price)
REF NO.:		QUANTITY		UNIT OF MEASURE		
23000170-007		1		EACH		
FAIRFIELD OAKS SEWER CONSOLIDATION - 4" BURIED GATE VALVE						
Description:		<input checked="" type="checkbox"/> BASE BID	OR	<input type="checkbox"/> ALT #	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times unit price)
REF NO.:		QUANTITY		UNIT OF MEASURE		
23000170-007		1		EACH		

Wordings for "description" is to be provided by the Owner. All Quantities Estimated. The Contractor will be paid based upon actual quantities as verified by the Owner.

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

Description:		<input checked="" type="checkbox"/> BASE BID	OR	<input type="checkbox"/> ALT #	FAIRFIELD OAKS SEWER CONSOLIDATION - ARV AND VAULT	
REF NO.:		QUANTITY		UNIT OF MEASURE	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times unit price)
23000170-008		1		EACH		
Description:		<input checked="" type="checkbox"/> BASE BID	OR	<input type="checkbox"/> ALT #	THREE RIVERS SEWER CONSOLIDATION - MOBILIZATION	
REF NO.:		QUANTITY		UNIT OF MEASURE	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times unit price)
23000177-001		1		LUMP SUM		
Description:		<input checked="" type="checkbox"/> BASE BID	OR	<input type="checkbox"/> ALT #	THREE RIVERS SEWER CONSOLIDATION - REMOVAL AND DISPOSAL OF THREE RIVERS TREATMENT PLANT	
REF NO.:		QUANTITY		UNIT OF MEASURE	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times unit price)
23000177-002		1		LUMP SUM		
Description:		<input checked="" type="checkbox"/> BASE BID	OR	<input type="checkbox"/> ALT #	THREE RIVERS SEWER CONSOLIDATION - 4" SEWER FORCE MAIN BY HORIZONTAL DIRECTIONAL DRILL	
REF NO.:		QUANTITY		UNIT OF MEASURE	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times unit price)
23000177-003		474		LINEAR FOOT		
Description:		<input checked="" type="checkbox"/> BASE BID	OR	<input type="checkbox"/> ALT #	THREE RIVERS SEWER CONSOLIDATION - 4" DUCTILE IRON FITTINGS, ALL TYPES	
REF NO.:		QUANTITY		UNIT OF MEASURE	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times unit price)
23000177-004		3		EACH		
Description:		<input checked="" type="checkbox"/> BASE BID	OR	<input type="checkbox"/> ALT #	THREE RIVERS SEWER CONSOLIDATION - 4" SEWER FORCE MAIN BY OPEN CUT	
REF NO.:		QUANTITY		UNIT OF MEASURE	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times unit price)
23000177-005		37		LINEAR FOOT		

Wordings for "description" is to be provided by the Owner. All Quantities Estimated. The Contractor will be paid based upon actual quantities as verified by the Owner.

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

Description:		<input checked="" type="checkbox"/> BASE BID	OR	<input type="checkbox"/> ALT #	THREE RIVERS SEWER CONSOLIDATION - CONSTRUCT THREE RIVERS SEWER PUMPING STATION	
REF NO.:		QUANTITY	UNIT OF MEASURE	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times unit price)	
23000177-006		1	LUMP SUM			
Description:		<input checked="" type="checkbox"/> BASE BID	OR	<input type="checkbox"/> ALT #	THREE RIVERS SEWER CONSOLIDATION - 4" BURIED GATE VALVE	
REF NO.:		QUANTITY	UNIT OF MEASURE	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times unit price)	
23000177-007		1	EACH			
Description:		<input checked="" type="checkbox"/> BASE BID	OR	<input type="checkbox"/> ALT #	THREE RIVERS SEWER CONSOLIDATION - ARV AND VAULT	
REF NO.:		QUANTITY	UNIT OF MEASURE	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times unit price)	
23000177-008		1	EACH			
Description:		<input checked="" type="checkbox"/> BASE BID	OR	<input type="checkbox"/> ALT #	TCHEFUNCTE PARC SEWER CONSOLIDATION - MOBILIZATION	
REF NO.:		QUANTITY	UNIT OF MEASURE	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times unit price)	
23000176-001		1	LUMP SUM			
Description:		<input checked="" type="checkbox"/> BASE BID	OR	<input type="checkbox"/> ALT #	TCHEFUNCTE PARC SEWER CONSOLIDATION - DEMOLITION OF EXISTING TCHEFUNCTE PARC SEWER PUMPING STATION	
REF NO.:		QUANTITY	UNIT OF MEASURE	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times unit price)	
23000176-002		1	LUMP SUM			
Description:		<input checked="" type="checkbox"/> BASE BID	OR	<input type="checkbox"/> ALT #	TCHEFUNCTE PARC SEWER CONSOLIDATION - 12" DUCTILE IRON FITTINGS, ALL TYPES	
REF NO.:		QUANTITY	UNIT OF MEASURE	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times unit price)	
23000176-003		18	EACH			

Wordings for description" is to be provided by the Owner. All Quantities Estimated. The Contractor will be paid based upon actual quantities as verified by the Owner.

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

Description:		<input checked="" type="checkbox"/> BASE BID	OR	<input type="checkbox"/> ALT #	TCHEFUNCTE PARC SEWER CONSOLIDATION - 12" SEWER FORCE MAIN BY OPEN CUT	
REF NO.:		QUANTITY		UNIT OF MEASURE	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times unit price)
23000176-004		1,349		LINEAR FOOT		
Description:						
Description:		<input checked="" type="checkbox"/> BASE BID	OR	<input type="checkbox"/> ALT #	TCHEFUNCTE PARC SEWER CONSOLIDATION - 12" SEWER FORCE MAIN BY HORIZONTAL DIRECTIONAL DRILL	
REF NO.:		QUANTITY		UNIT OF MEASURE	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times unit price)
23000176-005		100		LINEAR FOOT		
Description:						
Description:		<input checked="" type="checkbox"/> BASE BID	OR	<input type="checkbox"/> ALT #	TCHEFUNCTE PARC SEWER CONSOLIDATION - CONSTRUCT NEW TCHEFUNCTE PARC SEWER PUMPING STATION	
REF NO.:		QUANTITY		UNIT OF MEASURE	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times unit price)
23000176-006		1		LUMP SUM		
Description:						
Description:		<input checked="" type="checkbox"/> BASE BID	OR	<input type="checkbox"/> ALT #	TCHEFUNCTE PARC SEWER CONSOLIDATION - 12" BURIED GATE VALVE	
REF NO.:		QUANTITY		UNIT OF MEASURE	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times unit price)
23000176-007		1		EACH		
Description:						
Description:		<input checked="" type="checkbox"/> BASE BID	OR	<input type="checkbox"/> ALT #	TCHEFUNCTE PARC SEWER CONSOLIDATION - ARV AND VAULT	
REF NO.:		QUANTITY		UNIT OF MEASURE	UNIT PRICE	UNIT PRICE EXTENSION (Quantity times unit price)
23000176-008		1		EACH		

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 other organization for soliciting the contract, other than the payment of their normal compensation to persons regularly employed by the affiant whose services in connection with the construction, alteration or demolition of the public building or project were in the regular course of their duties for 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: Brewster Road Sewer Consolidation

Project/Quote/Bid#: 24-43-2

*****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. 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 \$2,000,000 per Occurrence / \$4,000,000 General Aggregate and \$4,000,000 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 \$4,000,000 CSL each occurrence / \$4,000,000 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 as an "all-risk" policy providing coverage in an amount at or greater than one hundred percent (100%) of the completed value of the contracted project. 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 named as a Loss Payee 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 named as a Loss Payee 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**

Section 07

Project Signs

1. General

- a. Work to include providing and installing five (5) project sign(s), one by each station and two (2) along Brewster Road, at the locations to be determined by the Engineer in the field.

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" for each project.

Blank Template of Parish Project Sign:

PROGRESS



MICHAEL B. COOPER
Parish President

Councilmember Name
Council District X

\$XXX,XXX.XX

Total Dollar \$
amount specified here

Project Name

Description of
Project Work

Name of Street, Bridge,
Subdivision, etc. stated here

Short Description of Project stated here
(if deemed applicable by the Parish)

Example of a Completed Parish Project Sign:

PROGRESS



MICHAEL B. COOPER
Parish President

RYKERT O. TOLEDANO, JR
Council District 5

\$514,444.40

**Dove Park
Subdivision Drainage**
Drainage Improvements along
Swallow St., Sparrow St.,
Partridge St. and Egret St.

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

A.A.S.H.T.O	01.01
A.C.I.	01.02
ADDENDA	01.03, 01.05, 01.12, 02.13, 02.13, 06.02, 06.03
ADVERTISEMENT	01.04, 01.12, 02.21, 02.22, 02.23
AGREEMENT	01.05, 01.11, 01.12, 01.14, 01.15, 01.19, 03.02, 03.03, 03.04, 06.01, 06.02, 10.01, 11.03, 12.01, 14.02, 29.06, 32.01, 32.02, 33.06, 33.07
APPLICATION FOR PAYMENT	01.06, 29.07
A.S.T.M.	01.07
AWARD	03.00, 03.01, 03.04, 03.05
BID	01.08, 01.12, 01.26, 02.02, 02.04, 02.08, 02.09, 02.10, 02.13, 02.14, 02.17, 02.19, 02.21, 03.01, 03.04, 04.02, 14.03, 22.01, 23.01, 28.08
BIDDER	01.04, 01.08, 01.09, 01.26, 01.28, 02.02, 02.04, 02.06, 02.08, 02.09, 02.10, 02.12, 03.13, 02.14, 02.16, 02.17, 02.19, 02.20, 02.21, 02.24, 03.01, 03.04, 03.05, 23.01
BONDS	01.10, 01.12, 02.02, 02.09, 03.00, 03.03, 03.04, 03.05, 03.07, 03.08, 03.10, 03.12, 03.13, 27.06
CHANGE ORDER	01.11, 01.19, 04.01, 09.04, 11.07, 16.02, 16.06, 16.07, 21.06, 21.08, 21.10, 21.11, 29.06, 33.07
CLAIMS	02.15, 04.05, 09.05, 14.01, 16.04, 16.05, 21.16, 24.01
CLOSING ROADS COMMENCE WORK	16.06, 16.07, 16.15 04.04, 07.04, 09.02, 11.02, 14.02, 16.13, 24.02
COMPLETION OF WORK OR PROJECT	01.14, 02.15, 08.03, 09.01, 09.04, 11.00, 11.03, 12.01, 13.01, 13.11, 20.01, 25.01, 28.02, 29.04
CONDITIONS AT JOB SITE	16.17
CONTRACT DOCUMENTS	01.03, 01.03, 01.10, 01.12, 01.13, 01.16, 01.17, 01.18, 01.19, 01.29, 01.22, 01.25, 01.30, 01.33, 02.02, 02.05, 02.13, 02.17, 02.18, 02.23, 03.01, 03.02, 04.01, 04.02, 04.03, 04.04, 04.05, 06.00, 06.01, 06.02, 06.03, 07.02, 07.03, 07.05, 08.01, 10.06, 11.03, 13.01, 13.02, 21.01, 21.09, 21.10, 21.11, 28.01, 28.04, 33.01
CONTRACT PRICE	01.11, 01.13, 03.05, 04.01, 12.01, 14.02, 21.06, 21.10, 21.11, 27.05, 28.01, 28.02, 28.03, 28.08

CONTRACT TIME	01.11, 01.14, 01.22, 10.06, 11.01, 21.06, 29.04
CONTRACTOR - (Defined)	01.15
DAMAGE	02.15, 03.05, 03.12, 04.05, 09.05, 11.09, 13.11, 14.01, 14.02, 16.01, 16.02, 16.03, 16.04, 16.05, 19.01, 19.03, 20.01, 20.08, 23.03, 24.01, 24.07, 24.12, 26.03, 28.05, 28.01, 28.10, 33.07
DEFECTIVE WORK	01.16, 10.03, 21.00, 21.01, 21.07, 21.08, 21.09, 21.10, 28.03
DELAYS	07.02, 11.05, 11.09, 12.01, 16.07, 18.02, 19.01, 28.04
DRAWINGS	01.12, 01.17, 02.13, 02.17, 02.23, 06.01, 06.02, 06.03, 13.15, 22.02, 01.27, 01.33, 03.12, 04.01, 06.02, 09.01, 10.01, 10.02, 11.07, 13.00, 13.01, 13.03, 13.05, 13.11, 13.12, 13.15, 14.02, 14.07, 14.08, 14.09, 16.09, 16.13, 21.01, 21.06, 21.07, 21.14, 24.07, 27.05, 27.07, 28.01, 28.05, 28.10, 29.03, 13.00, 13.11
ENGINEER STATUS (NOT APPLICABLE)	15.00
EXTRA WORK	03.09, 14.00, 14.03, 14.04, 14.05, 14.08, 14.09, 14.10, 14.11, 14.12, 16.01, 22.02
FAILURE OF CONTRACTOR	03.10, 04.05, 06.02, 09.05, 10.01, 10.03, 13.10, 16.03, 20.01, 24.09, 27.02, 28.10
FAILURE OF OWNER	02.13
FAILURE OF SUCCESSFUL BIDDER	02.13, 02.17, 03.04
FIELD ORDER	01.18
FORCE ACCOUNT	14.04, 14.05, 14.11, 14.12
FUNDING	33.09
INDEMNIFY / HOLD HARMLESS	02.15, 03.05, 04.05, 13.11, 16.04, 16.05, 20.02, 24.06, 24.09
INDEMNIFYING INFRINGEMENT CLAUSE	02.15
INJURIES	16.00, 16.01, 16.02, 19.01, 19.03, 20.01, 24.02, 24.07
INSPECTION FEES	13.12
INSPECTIONS, GENERALLY	01.16, 13.05, 16.13, 21.00, 21.03, 21.04, 21.05, 21.06, 21.14, 21.15, 28.04, 29.02, 29.03
INSURANCE	01.05, 14.05, 16.13, 24.00 - 12, 27.07, 28.05
INTENTION OF CONTRACT DOCUMENTS	06.00, 06.01
INTENTION OF GENERAL CONDITIONS	31.00

LABOR	01.33, 03.12, 09.01, 13.00, 13.01, 13.02, 13.08, 13.10, 13.11, 13.12, 14.05, 16.06, 16.07, 21.06, 21.07, 21.15, 27.01, 28.10, 29.03
LAWS	01.10, 01.20, 02.06, 02.13, 02.14, 02.16, 02.20, 03.01, 03.10, 13.12, 16.06, 16.07, 20.02, 21.02, 21.09, 27.01, 29.06, 33.00, 33.01, 33.08
LIQUIDATED DAMAGES	11.03, 12.00, 12.01, 29.04
MATERIALS	01.33, 03.12, 04.01, 06.02, 07.01, 09.01, 10.01, 10.02, 13.00, 13.01, 13.03, 13.04, 13.05, 13.12, 13.13, 13.15, 14.01, 14.11, 20.01, 12.01, 21.07, 21.14, 21.15, 23.03, 27.01, 27.05, 27.07, 28.01, 28.05, 28.07, 28.08, 28.10
MODIFICATIONS	01.12, 01.19, 02.12, 02.13, 06.01, 06.02, 24.07, 32.02
NOTICE OF AWARD	01.20, 03.01, 03.04, 04.01
NOTICE OF DEFAULT	12.01, 33.08
NOTICE TO BIDDER	2.21
NOTICE TO CONTRACTOR	01.12, 01.21, 21.11, 30.01
NOTICE TO OWNER	13.07, 24.06, 27.07
NOTICE TO PROCEED	01.22, 09.02, 11.01, 11.03
OBSTRUCTIONS	16.09, 16.11, 16.15, 23.00, 23.01, 23.02
OCCUPANCY	25.00
ORAL INTERPRETATIONS	02.13
OWNER - (Defined)	01.23
PAYMENT	01.30, 03.10, 03.12, 03.13, 04.12, 09.03, 11.04, 11.09, 14.04, 14.12, 16.02, 16.16, 19.02, 21.07, 21.08, 21.09, 21.10, 21.11, 21.16, 24.02, 24.03, 24.12, 27.01, 27.07, 28.00, 28.01, 28.02, 28.03, 28.04, 28.05, 28.06, 28.08, 28.09, 28.10, 29.00, 29.03, 29.05, 29.07
PERMITS	13.00, 13.12, 16.13, 28.08
PRICE	02.05, 14.02, 14.03, 14.04, 14.05, 22.01
PROGRESS PAYMENT	01.06, 28.06
PROGRESS SCHEDULE	09.03, 09.05, 21.11
PROGRESS OF WORK	09.00, 11.09, 13.07, 16.01, 16.12, 21.11, 21.12, 22.02, 27.02
PROJECT	01.24, 01.29, 01.30, 02.04, 03.07, 06.01, 07.03, 10.02, 11.04, 11.06, 13.08, 13.13, 14.08, 14.11, 16.15, 24.07, 24.11, 28.07, 29.03, 29.07

PROJECT REPRESENTATIVE	01.23, 21.16
PROPERTY	16.00, 16.01, 16.02, 16.03, 16.12, 16.13, 16.17, 18.01, 19.00, 19.01, 19.02, 19.03, 23.03, 24.01, 24.07, 26.03, 28.10, 29.08, 33.05
PROPOSAL	01.26, 02.00, 02.01, 02.03, 02.05, 02.06, 02.07, 02.08, 02.09, 02.10, 02.11, 02.12, 02.14, 02.18, 02.21, 02.22, 11.03, 12.01, 14.01, 14.02, 14.03, 19.02, 23.02, 28.08
PROTESTS	33.10
PUNCH LIST	29.03, 29.04
QUANTITIES OF ESTIMATES	14.00, 14.01, 14.02, 14.04
RAILROADS	16.13, 19.01
RECORD DRAWINGS	08.00, 18.01, 18.02, 18.03
RECORDATION OF DOCUMENTS	03.13, 28.03, 29.05, 29.06
REJECTION OF BIDS	02.03, 02.07, 02.08, 02.10, 02.14, 03.01
RENTAL OF EQUIPMENT	14.07, 14.09
RIGHTS OF WAY	18.00
SAFETY	16.01, 16.07, 16.14, 16.17
SANITARY PROVISIONS	13.01, 17.00
SCHEDULE OF WORK	09.03, 09.04, 9.05, 11.06, 13.09
SEVERABILITY	32.01, 32.02
SHOP DRAWINGS	01.27, 06.03, 07.00, 07.01, 07.02, 07.03, 07.04, 07.05
SITE	02.17, 7.04, 13.05, 13.07, 13.11, 14.06, 16.09, 21.08, 21.09, 21.12, 22.02, 23.01, 24.07
SOLICITATION OF EMPLOYMENT	13.14
SPECIFICATIONS	01.01, 01.02, 01.05, 01.07, 01.12, 01.28, 02.13, 02.17, 02.23, 03.06, 03.09, 03.10, 03.13, 06.01, 06.02, 06.03, 07.04, 07.05, 11.03, 13.05, 13.15, 20.01, 21.12, 22.02, 28.01, 28.04, 32.01
SUBCONTRACTOR	01.27, 01.29, 04.01, 04.02, 04.03, 04.04, 04.05, 16.02, 16.04, 16.05, 20.01, 20.02, 21.07, 24.01, 24.07, 27.01, 28.07
SUBCONTRACTS	04.00, 13.09
SUBSURFACE CONDITIONS	02.17, 22.00, 22.01, 22.02
SUBSTANTIAL COMPLETION	01.30, 11.04, 21.09, 28.04, 29.01, 29.02, 29.03, 29.04, 29.06
SUPERINTENDENT	01.21, 01.31, 13.07, 14.05

SUPERVISION	13.01, 13.06
SURETY	01.05, 01.10, 02.09, 03.05, 03.06, 03.07, 03.08, 03.09, 03.11, 03.12, 04.05, 05.01, 14.03, 27.03, 27.05
SURVEY	13.02, 26.00, 26.01
TAXES	02.05, 13.00, 13.12, 13.13, 14.05, 28.07, 28.08, 28.10
TERMINATION OF CONTRACT	13.10, 24.09, 27.00, 27.01, 27.02, 27.03, 27.04, 27.05, 27.06, 27.07
TESTS, GENERALLY	21.00, 21.02, 21.03, 21.04, 21.05, 21.06
TIME	01.32
TRAFFIC	16.06, 16.07, 16.10, 16.15, 16.16
TRAFFIC HAZARDS	16.16
TREES AND SHRUBS	19.02
VERBAL INSTRUCTIONS	21.16
WAIVERS	24.06, 29.03, 33.08
WARNING DEVICES	16.13, 16.14, 16.15
WARRANTY	21.01, 21.08, 21.09, 33.04, 33.06
WORK	01.31, 20.01
WORK BY OTHERS	10.03, 10.04, 10.05
WORK BY OWNER	10.02, 10.04, 10.05
WORK FOR OTHER, RESTRICTIONS	16.12
WORK ORDER	28.01

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 Contractor with whom the Owner has executed the Agreement.
- 01.16 Defective Work When 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 in submitting 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 requested by 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 based on **Table 3.1** 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 per **Table 3.1** 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 Contractor, 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 at the 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 fourteen (14) working days prior to the opening of bids. Within ten (10) 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 unit 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 have 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/\$2,000,000 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 Office of Risk Management prior to execution of a contract for services.

For inquiries regarding insurance requirements, please contact:

St. Tammany Parish Government

Office of Risk Management

P. O. Box 628

Covington, LA 70434

Telephone: 985-898-5226

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 Public 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 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, fourteen (14) 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 Procurement@stpgov.org. Any questions or inquires received after the required deadline to submit questions or inquires will not be answered.

Section 09

CORPORATE RESOLUTION

EXCERPT FROM MINUTES OF MEETING OF THE BOARD OF DIRECTORS OF INCORPORATED.

AT THE MEETING OF DIRECTORS OF _____ INCORPORATED, DULY NOTICED AND HELD ON _____, A QUORUM BEING THERE PRESENT, ON MOTION DULY MADE AND SECONDED. IT WAS:

RESOLVED THAT _____, BE AND IS HEREBY APPOINTED, CONSTITUTED AND DESIGNATED AS AGENT AND ATTORNEY-IN-FACT OF THE CORPORATION WITH FULL POWER AND AUTHORITY TO ACT ON BEHALF OF THIS CORPORATION IN ALL NEGOTIATIONS, BIDDING, CONCERNS AND TRANSACTIONS WITH THE PARISH OF ST. TAMMANY OR ANY OF ITS AGENCIES, DEPARTMENTS, EMPLOYEES OR AGENTS, INCLUDING BUT NOT LIMITED TO, THE EXECUTION OF ALL BIDS, PAPERS, DOCUMENTS, AFFIDAVITS, BONDS, SURETIES, CONTRACTS AND ACTS AND TO RECEIVE ALL PURCHASE ORDERS AND NOTICES ISSUED PURSUANT TO THE PROVISIONS OF ANY SUCH BID OR CONTRACT, THIS CORPORATION HEREBY RATIFYING, APPROVING, CONFIRMING, AND ACCEPTING EACH AND EVERY SUCH ACT PERFORMED BY SAID AGENT AND ATTORNEY-IN-FACT.

I HEREBY CERTIFY THE FOREGOING TO BE A TRUE AND CORRECT COPY OF AN EXCERPT OF THE MINUTES OF THE ABOVE DATED MEETING OF THE BOARD OF DIRECTORS OF SAID CORPORATION, AND THE SAME HAS NOT BEEN REVOKED OR RESCINDED.

SECRETARY-TREASURER

DATE

Section 10

Certificate of Insurance Instructions

The below information is intended to guide Contractors on what information is needed to be listed on the Certificate of Insurance. All Insurance limit requirements can be found in Attachment D.

- **Certificate Holder** – STPG must be listed as the certificate holder, and it must include our address of: P.O. Box 628, Covington, LA 70434
 - Reason: the certificate holder is where cancellations of coverage, or updated certificates are mailed. If a vendor terminates a policy, we will be notified.
- **Additional Insured** – We must be named as an additional insured so that if there is a lawsuit against the vendor for a project, their coverage will cover STPG as well if we are named in the lawsuit.
 - We must be named in the Description of Operations box – reason: there could be other additional insureds, and we want to have no doubt that we are one of the additional insureds.
 - We must be named as additional insured on the following coverages: General liability, Auto Liability, Umbrella/Excess Liability, Environmental/Pollution Liability.
 - Professional Liability policies do not allow for an additional insured by most carriers.
- **Project Name & Contract #** - We need this listed in the Description of Operations, again so that if there is a lawsuit, we have proof that coverage was active for that project.
- **Waiver of Subrogation** – This can either be listed in the Description of Operations or checked off in the appropriate columns.

From the Insurance Requirement form:

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.

- **Owners Protective Liability (OPL) or (OCP)** – Certificate of Insurance for OCP names St. Tammany Parish Government as the Insured and the Certificate Holder.
- Sample of Certificate of Insurance (COI) can be found on page 2.
- Please refer to this section in the package labeled “Insurance Requirements” for limits required for this project

Any questions regarding insurance requirements please contact the Risk Department at 985-898-5226 or email riskman@stpgov.org



CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME:		
	PHONE (A/C, No. Ext):	FAX (A/C, No):	
	E-MAIL ADDRESS:		
	INSURER(S) AFFORDING COVERAGE		NAIC #
INSURED	INSURER A :		
	INSURER B :		
	INSURER C :		
	INSURER D :		
	INSURER E :		
	INSURER F :		

COVERAGES

CERTIFICATE NUMBER:

REVISION NUMBER:

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

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
	GENERAL LIABILITY						EACH OCCURRENCE \$
	<input type="checkbox"/> COMMERCIAL GENERAL LIABILITY						DAMAGE TO RENTED PREMISES (Ea occurrence) \$
	<input type="checkbox"/> CLAIMS-MADE <input type="checkbox"/> OCCUR						MED EXP (Any one person) \$
							PERSONAL & ADV INJURY \$
							GENERAL AGGREGATE \$
	GEN'L AGGREGATE LIMIT APPLIES PER:						PRODUCTS - COMP/OP AGG \$
	<input type="checkbox"/> POLICY <input type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC						\$
	AUTOMOBILE LIABILITY						COMBINED SINGLE LIMIT (Ea accident) \$
	<input type="checkbox"/> ANY AUTO						BODILY INJURY (Per person) \$
	<input type="checkbox"/> ALL OWNED AUTOS	<input type="checkbox"/>	<input type="checkbox"/>				BODILY INJURY (Per accident) \$
	<input type="checkbox"/> HIRED AUTOS	<input type="checkbox"/>	<input type="checkbox"/>				PROPERTY DAMAGE (Per accident) \$
							\$
	UMBRELLA LIAB						EACH OCCURRENCE \$
	<input type="checkbox"/> EXCESS LIAB						AGGREGATE \$
	<input type="checkbox"/> OCCUR						\$
	<input type="checkbox"/> CLAIMS-MADE						
	DED						
	RETENTION \$						
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY						WC STATUTORY LIMITS
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH)						OTHER
	If yes, describe under DESCRIPTION OF OPERATIONS below	<input type="checkbox"/> Y / N	<input type="checkbox"/> N / A				E.L. EACH ACCIDENT \$
							E.L. DISEASE - EA EMPLOYEE \$
							E.L. DISEASE - POLICY LIMIT \$

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

Project Name:
Contract #:

(Name St. Tammany Parish Government as an additional insured).

CERTIFICATE HOLDER**CANCELLATION**St. Tammany Parish Government
P.O. Box 628
Covington, LA 70434

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

1. SCOPE OF SERVICES

The Contractor shall furnish all labor and materials and perform all of the work required to build, construct and/or complete in a thorough and workmanlike manner:

«txtScopeSummary»

2. CONSTRUCTION DOCUMENTS

It is recognized by the Parties herein that said Construction Documents, including by way of example and not of limitation, the plans and Specifications, General Conditions, Supplementary General Conditions, any addenda thereto, the drawings (if any), and the bid, quote or other procurement documents impose duties and obligations upon the Parties herein, and said Parties thereby agree that they shall be bound by said duties and obligations. For these purposes, all of the provisions contained in the aforementioned Construction Documents are incorporated herein by reference with the same force and effect as though said Construction Documents were herein set out in full. Copies of the aforementioned Construction Documents are in the possession of both the Contractor and the Parish for reference.

3. TIME FOR COMPLETION

The work shall be commenced on a date to be specified in a written order of the Parish and shall be completed within «intCompletionTime» calendar days from and after said date.

4. COMPENSATION TO BE PAID TO THE CONTRACTOR

The Parish will pay and the Contractor will accept in full consideration for the performance of the Contract the sum of «curREQGrandTotal» dollars.

5. PERFORMANCE AND PAYMENT BOND

To these presents personally came and intervened _____,
(Name of Attorney in Fact)
herein acting for _____, a corporation organized
(Surety)
and existing under the laws of the State of _____, and duly authorized to transact business in the State of Louisiana, as surety, who declared that having taken cognizance of this Contract and of the Construction Documents mentioned herein, he hereby in his capacity as its Attorney in Fact obligates his company, as surety for the said Contractor, unto the said Parish, up to the sum of «curREQGrandTotal». The condition of this performance and payment bond

shall be that should the Contractor herein not perform the Contract in accordance with the terms and conditions hereof, or should said Contractor not fully indemnify and save harmless the Parish from all costs and damages which he may suffer by said Contractor's non-performance or should said Contractor not pay all persons who have fulfilled obligations to perform labor and/or furnish materials in the prosecution of the work provided for herein, including by way of example, workmen, laborers, mechanics, and furnishers of materials, machinery, equipment and fixtures, then said surety agrees and is bound to so perform the Contract and make said payment(s).

Contractor and Parish specifically agree to and recognize (1) the statutory employer relationship existing between the Parish and any employees performing work under this Contract as employees of the Contractor or employees of the "Sub-Contractor", and (2) that the work performed by the employees of the Contractor and the employees of the "Sub-Contractor" is part of the Parish's business, occupation or trade and is essential to the ability of the Parish to generate their products or services, all of which is in accordance with LSA-R.S. 23:1061, and as may be amended.

6. LIABILITY AND INDEMNIFICATION

A. Duty to Defend

Upon notice of any claim, demand, suit, or cause of action against the Parish, alleged to arise out of or be related to this Contract, Contractor shall investigate, handle, respond to, provide defense for, and defend at its sole expense, even if the claim, demand, suit, or cause of action is groundless, false, or fraudulent. The Parish may, but is not required to, consult with or assist the Contractor, but this assistance shall not affect the Contractor's obligations, duties, and responsibilities under this section. Contractor shall obtain the Parish's written consent before entering into any settlement or dismissal.

B. Contractor Liability

Contractor shall be liable without limitation to the Parish for any and all injury, death, damage, loss, destruction, damages, costs, fines, penalties, judgments, forfeitures, assessments, expenses (including attorney fees), obligations, and other liabilities of every name and description, which may occur or in any way arise out of any act or omission of Contractor, its owners, agents, employees, partners or subcontractors.

C. Force Majeure

It is understood and agreed that neither party can foresee the exigencies beyond the control of each party which arise by reason of an Act of God or force majeure; therefore, neither party shall be liable for any delay or failure in performance beyond its control resulting from an Act of God or force majeure. The Parish shall determine whether a delay or failure results from an Act of God or force majeure based on its review of all facts and circumstances. The parties shall use reasonable efforts, including but not limited to, use of continuation of operations plans (COOP), business continuity plans, and disaster recovery plans, to eliminate or minimize the effect of such events upon the performance of their respective duties under this Contract.

D. Indemnification

Contractor shall fully indemnify and hold harmless the Parish, without limitation, for any and all injury, death, damage, loss, destruction, damages, costs, fines, penalties, judgments, forfeitures, assessments, expenses (including attorney fees), obligations, and other liabilities of every name and description, which may occur or in any way arise out of any act or omission of Contractor, its owners, agents,

employees, partners or subcontractors. The Contractor shall not indemnify for the portion of any loss or damage arising from the Parish's act or failure to act.

E. Intellectual Property Indemnification

Contractor shall fully indemnify and hold harmless the Parish, without limitation, from and against damages, costs, fines, penalties, judgments, forfeitures, assessments, expenses (including attorney fees), obligations, and other liabilities in any action for infringement of any intellectual property right, including but not limited to, trademark, trade-secret, copyright, and patent rights.

When a dispute or claim arises relative to a real or anticipated infringement, the Contractor, at its sole expense, shall submit information and documentation, including formal patent attorney opinions, as required by the Parish.

If the use of the product, material, service, or any component thereof is enjoined for any reason or if the Contractor believes that it may be enjoined, Contractor, while ensuring appropriate migration and implementation, data integrity, and minimal delays of performance, shall at its sole expense and in the following

order of precedence: (i) obtain for the Parish the right to continue using such product, material, service, or component thereof; (ii) modify the product, material, service, or component thereof so that it becomes a non-infringing product, material, or service of at least equal quality and performance; (iii) replace the product, material, service, or component thereof so that it becomes a non-infringing product, material, or service of at least equal quality and performance; or, (iv) provide the Parish monetary compensation for all payments made under the Contract related to the infringing product, material, service, or component, plus for all costs incurred to procure and implement a non-infringing product, material, or service of at least equal quality and performance. Until this obligation has been satisfied, the Contractor remains in default.

The Contractor shall not be obligated to indemnify that portion of a claim or dispute based upon the Parish's unauthorized: i) modification or alteration of the product, material or service; ii) use of the product, material or service in combination with other products not furnished by Contractor; or, iii) use of the product, material or service in other than the specified operating conditions and environment.

7. MODIFICATION OF CONTRACT TERMS

Provided that any alterations which may be made in the terms of the Contract or in the work to be done under it, or the giving by the Parish of any extensions of time for the performance of the Contract, or any other forbearance on the part of either the Parish or the Contractor to the other shall not in any way release the Contractor or the Surety from their liability hereunder, notice to the Surety of any such alterations, extensions or other forbearance being hereby waived.

8. TERMINATION, CANCELLATION, AND SUSPENSION

A. Termination

The term of this Contract shall be binding upon the Parties hereto until the work has been completed by the Contractor and accepted by the Parish, and all payments required to be made to the Contractor have been made. But, this Contract may be terminated upon thirty (30) days written notice under any or all of the following conditions:

- 1) By mutual agreement and consent of the Parties hereto;

- 2) By the Parish as a consequence of the failure of the Contractor to comply with the terms, progress, or quality of the work in a satisfactory manner, proper allowances being made for circumstances beyond the control of the Contractor;
- 3) By either party upon failure of the other party to fulfill its obligations as set forth in this Contract;
- 4) By the Parish with less than thirty (30) days' notice due to budgetary reductions and changes in funding priorities by the Parish;
- 5) In the event of the abandonment of the project by the Parish.

Upon termination, the Contractor shall be paid for actual work performed prior to the Notice of Termination, either based upon the established hourly rate for services actually performed, or on a pro-rata share of the basic fee based upon the phase or percentage of work actually completed, depending on the type of compensation previously established under this Contract.

Upon Termination, the Contractor shall deliver to the Parish all original documents, notes, drawings, tracings, computer files, and other files pertaining to this Contract or the Work performed, except for the Contractor's personal and administrative files.

B. Cancellation

The continuation of this Contract is contingent upon the appropriation of funds to fulfill the requirements of the Contract by the Parish. If the Parish fails to appropriate sufficient monies to provide for the continuation of this or any other Contract, or if such appropriation is reduced by the veto of Parish President by any means provided in the appropriations Ordinance to prevent the total appropriation for the year from exceeding revenues for that year, or for any other lawful purpose, and the effect of such reduction is to provide insufficient monies for the continuation of the Contract, the Contract shall terminate on the date of the beginning of the first fiscal year for which funds are not appropriated. It is understood and agreed that paragraph (9)(C) below may preempt this paragraph, all at the exclusive and unilateral option of the Parish.

C. Suspension

Should the Parish desire to suspend the work, but not definitely terminate the Contract, the Parish shall supply the Contractor with thirty (30) days' notice. The Parish will also supply Contractor thirty (30) days' notice that the work is to be reinstated and resumed in full force. Contractor shall receive no additional compensation during the suspension period. The Parties may revisit the terms of this Contract during the suspension period.

The suspension shall not exceed six (6) months, unless mutually agreed upon between the Parties.

- D.** Failure to complete or deliver within the time specified or to provide the services as specified in the bid or response will constitute a default and may cause cancellation of the contract. Where the Parish has determined the contractor to be in default. The Parish reserves the right to purchase any or all products or services covered by the contract on the open market and to charge the contractor with the cost in excess of the contract price. Until such assessed charges have been paid, no subsequent bid or response from the defaulting contractor will be considered.
- E.** In the event of a default and/or breach of this agreement and this matter is forwarded to legal counsel, then the prevailing party may be entitled to collect a reasonable attorney fees and all costs associated therewith whether or not litigation is initiated. Attorney fees shall be based upon the current, reasonable prevailing rate for counsel in the private sector. The Parties agree to be responsible for such attorney fees, together for all with legal interest from date of agreement breach, plus all costs of collection.

- F. Termination or cancellation of this agreement will not affect any rights or duties arising under any term or condition herein.
- G. As to the filing of voluntary or involuntary bankruptcy by Contractor, Contractor agrees that if any execution or legal process is levied upon its interest in this Contract, or if any liens or privileges are filed against its interest, or if a petition in bankruptcy is filed against it, or if it is adjudicated bankrupt in involuntary proceedings, or if it should breach this Contract in any material respect, the Parish shall have the right, at its unilateral option, to immediately cancel and terminate this Contract. In the event that Contractor is placed in any chapter of bankruptcy, voluntarily or involuntarily, or otherwise triggers any provision of the preceding sentence herein, it is understood and agreed that all materials, goods and/or services provided shall be and remain the property of the Parish. All rights of Contractor as to goods, wares, products, services, materials and the like supplied to Parish shall be deemed forfeited.

9. RECORDATION OF CONTRACT

Contractor authorizes Parish to deduct from any payment due herein costs and service fees for recordation of this Contract in full or an excerpt hereof, or any revisions or modifications thereof as required by law.

10. AUTHORITY TO ENTER CONTRACT

The undersigned representative of Contractor warrants and personally guarantees that he/she has the requisite and necessary authority to enter and sign this Contract on behalf of the corporate entity, partnership, etc. The undersigned Parties warrant and represent that they each have the respective authority and permission to enter this Contract. In the event that Contractor is a member of a corporation, partnership, L.L.C., L.L.P., or any other juridical entity, the Parish requires, as an additional provision, that Contractor supply a certified copy of a corporate resolution authorizing the undersigned to enter and sign this Contract. Another option to fulfill this additional provision he/she can supply Louisiana Secretary of State Business filings confirming that he/she is a managing member of a corporation, partnership, L.L.C., L.L.P., or any other juridical entity which authorizes the undersigned to enter and sign this Contract.

Bond No.: _____

In Witness thereof, the Parties hereto on the day and year first above written have executed this Contract in **One (1)** counterpart, each of which shall, without proof or accountancy for the other counterparts, be deemed an original thereof.

WITNESSES:

Signature

Print Name

Signature

Print Name

CONTRACTOR:

Signature

Print Name

Title

Date

SAMPLE

Bond No.: _____

WITNESSES:

**ST. TAMMANY PARISH
GOVERNMENT:**

Signature

Print Name

Signature

Print Name

Michael B. Cooper
Parish President

Date

APPROVED BY:

Assistant District Attorney
Civil Division

Date

(Surety)

Signature

Print Name

SECTION 12

**Department of the Treasury (DOT) & American Rescue Plan Act (ARPA)
Federal Contract Clauses
WATER SECTOR PROGRAM
31 CFR Part 35 Subpart A**

1. EQUAL EMPLOYMENT OPPORTUNITY

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

(1) The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action shall include, but not be limited to the following:

Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

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

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

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

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

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

(7) In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(8) The contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (8) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance:

Provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency, the contractor may request the United States to enter into such litigation to protect the interests of the United States. The applicant further agrees that it will be bound by the above equal opportunity clause with respect to its own employment practices when it participates in federally assisted construction work: *Provided*, That if the applicant so participating is a State or local government, the above equal opportunity clause is not applicable to any agency, instrumentality or subdivision of such government which does not participate in work on or under the contract.

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

The applicant further agrees that it will refrain from entering into any contract or contract modification subject to Executive Order 11246 of September 24, 1965, with a contractor debarred from, or who has not demonstrated eligibility for, Government contracts and federally assisted construction contracts pursuant to the Executive Order and will carry out such sanctions and penalties for violation of the equal opportunity clause as may be imposed upon

contractors and subcontractors by the administering agency or the Secretary of Labor pursuant to Part II, Subpart D of the Executive Order. In addition, the applicant agrees that if it fails or refuses to comply with these undertakings, the administering agency may take any or all of the following actions: Cancel, terminate, or suspend in whole or in part this grant (contract, loan, insurance, guarantee); refrain from extending any further assistance to the applicant under the program with respect to which the failure or refund occurred until satisfactory assurance of future compliance has been received from such applicant; and refer the case to the Department of Justice for appropriate legal proceedings.

2. DAVIS-BACON ACT, as amended (40 U.S.C. 3141-3148). When required by Federal program legislation, all prime construction contracts in excess of \$2,000 awarded by non-Federal entities must include a provision for compliance with the Davis-Bacon Act (40 U.S.C. 3141-3144, and 3146-3148) as supplemented by Department of Labor regulations (29 CFR Part 5, "Labor Standards Provisions Applicable to Contracts Covering Federally Financed and Assisted Construction"). In accordance with the statute, contractors must be required to pay wages to laborers and mechanics at a rate not less than the prevailing wages specified in a wage determination made by the Secretary of Labor. In addition, contractors must be required to pay wages not less than once a week. The non-Federal entity must place a copy of the current prevailing wage determination issued by the Department of Labor in each solicitation. The decision to award a contract or subcontract must be conditioned upon the acceptance of the wage determination. The non-Federal entity must report all suspected or reported violations to the Federal awarding agency. The contracts must also include a provision for compliance with the Copeland "Anti-Kickback" Act (40 U.S.C. 3145), as supplemented by Department of Labor regulations (29 CFR Part 3, "Contractors and Subcontractors on Public Building or Public Work Financed in Whole or in Part by Loans or Grants from the United States"). The Act provides that each contractor or subrecipient must be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public work, to give up any part of the compensation to which he or she is otherwise entitled. The non-Federal entity must report all suspected or reported violations to the Federal awarding agency.

3. COMPLIANCE WITH THE CONTRACT WORK HOURS AND SAFETY STANDARDS ACT.

(1) *Overtime requirements.* No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less

than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

(2) *Violation; liability for unpaid wages; liquidated damages.* In the event of any violation of the clause set forth in paragraph (b)(1) of this section the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (b)(1) of this section, in the sum of \$27 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (b)(1) of this section.

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

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

4. RIGHTS TO INVENTIONS MADE UNDER A CONTRACT OR AGREEMENT

If the Federal award meets the definition of “funding agreement” under 37 CFR § 401.2 (a) and the recipient or subrecipient wishes to enter into a contract with a small business firm or nonprofit organization regarding the substitution of parties, assignment or performance of experimental, developmental, or research work under that “funding agreement,” the recipient or subrecipient must comply with the requirements of 37 CFR Part 401, “Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements,” and any implementing regulations issued by the awarding agency.

5. CLEAN AIR ACT

(1) The Contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act, as amended, 42 U.S.C. § 7401 *et seq.*

(2) The Contractor agrees to report each violation to the Parish and understands and agrees that the Parish will, in turn, report each violation as required to assure notification to the federal awarding agency, and the appropriate Environmental Protection Agency Regional Office.

(3) The Contractor agrees to include these requirements in each subcontract exceeding \$150,000 financed in whole or in part with Federal assistance provided by ARPA.

6. FEDERAL WATER POLLUTION CONTROL ACT

(1) The Contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Federal Water Pollution Control Act, as amended, 33 U.S.C. § 7401 *et seq.*

(2) The Contractor agrees to report each violation to the Parish and understands and agrees that the Parish will, in turn, report each violation as required to assure notification to the Federal awarding agency, and the appropriate Environmental Protection Agency Regional Office.

(3) The Contractor agrees to include these requirements in each subcontract exceeding \$150,000 financed in whole or in part with Federal assistance provided by ARPA.

7. SUSPENSION AND DEBARMENT

(1) This contract is a covered transaction for purposes of 2 C.F.R. pt. 180 and 2 C.F.R. pt. 3000. As such, the contractor is required to verify that none of the contractor's principals (defined at 2 C.F.R. § 180.995) or its affiliates (defined at 2 C.F.R. § 180.905) are excluded (defined at 2 C.F.R. § 180.940) or disqualified (defined at 2 C.F.R. § 180.935).

(2) The contractor must comply with 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C, and must include a requirement to comply with these regulations in any lower tier covered transaction it enters into.

(3) This certification is a material representation of fact relied upon by the Parish. If it is later determined that the contractor did not comply with 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C, in addition to remedies available to the Parish, the Federal Government may pursue available remedies, including but not limited to suspension and/or debarment.

(4) The bidder or proposer agrees to comply with the requirements of 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C while this offer is valid and throughout the period of any contract that may arise from this offer. The bidder or proposer further agrees to include a provision requiring such compliance in its lower tier covered transactions.

8. BYRD ANTI-LOBBYING ACT

The Contractor will be expected to comply with Federal statutes required in the Anti-Lobbying Act. Contractors who apply or bid for an award of more than \$100,000 shall file the required certification. Each tier certifies to the tier above that it will not and has not used federally appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant, or any other award covered by 31 U.S.C. § 1352. Each tier shall also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any federal award. Such disclosures are forwarded from tier to tier up to the recipient who in turn will forward the certification(s) to the federal awarding agency.

9. PROCUREMENT OF RECOVERED MATERIALS

In the performance of this Contract, the Contractor shall make maximum use of products containing recovered materials that are EPA-designated items unless the product cannot be acquired—

- i. Competitively within a timeframe providing for compliance with the Contract performance schedule;
- ii. Meeting Contract performance requirements; or
- iii. At a reasonable price.

Information about this requirement, along with the list of EPA-designate items, is available at EPA's Comprehensive Procurement Guidelines web site, <https://www.epa.gov/smm/comprehensive-procurement-guideline-cpg-program>.

10. PROHIBITION ON CONTRACTING FOR COVERED TELECOMMUNICATIONS EQUIPMENT OR SERVICES.

(a) *Definitions.* As used in this clause, the terms backhaul; covered foreign country; covered telecommunications equipment or services; interconnection arrangements; roaming; substantial or essential component; and telecommunications equipment or services have the meaning as defined in Public Law 115-232, section 889, Prohibitions on Expending ARPA Award Funds for Covered Telecommunications Equipment or Services (Interim), as used in this clause—

(b) *Prohibitions.*

(1) Section 889(b) of the John S. McCain National Defense Authorization Act for Fiscal Year 2019, Pub. L. No. 115-232, and 2 C.F.R. § 200.216 prohibit the head of an executive agency on or after Aug. 13, 2020, from obligating or expending grant, cooperative agreement, loan, or loan guarantee funds on certain telecommunications products or from certain entities for national security reasons.

(2) Unless an exception in paragraph (c) of this clause applies, the contractor and its subcontractors may not use grant, cooperative agreement, loan, or loan guarantee funds from a federal Agency to:

- (i) Procure or obtain any equipment, system, or service that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology of any system;
- (ii) Enter into, extend, or renew a contract to procure or obtain any equipment, system, or service that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology of any system;
- (iii) Enter into, extend, or renew contracts with entities that use covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system as described in Public Law 115-232, section 889, covered telecommunications equipment is telecommunications equipment produced by Huawei Technologies Company or ZTE Corporation (or any subsidiary or affiliate of such entities). (a) For the purpose of public safety, security of government facilities, physical security surveillance of critical infrastructure, and other national security purposes, video surveillance and telecommunications equipment produced by Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company (or any subsidiary or affiliate of such entities). (b) Telecommunications or video surveillance services provided by such entities or using such equipment. (c) Telecommunications or video surveillance equipment or services produced or provided by an entity that the Secretary of Defense, in consultation with the Director of the National Intelligence or the Director of the Federal Bureau of Investigation, reasonably believes to be an entity owned or controlled by, or otherwise connected to, the government of a covered foreign country;
- (iv) Provide, as part of its performance of this contract, subcontract, or other contractual instrument, any equipment, system, or service that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system.

(3) In implementing the prohibition under Public Law 115-232, section 889, subsection (f), paragraph (1), heads of executive agencies administering loan, grant, or subsidy programs shall prioritize available funding and technical support to assist affected businesses, institutions and organizations as is reasonably necessary for those affected entities to transition from covered communications equipment and services, to procure replacement equipment and services, and to ensure that communications service to users and customers is sustained.

(4) See Public Law 115-232, section 889 for additional information.

(5) See also § 200.471.

(c) *Exceptions.*

(1) This clause does not prohibit contractors from providing—

- (i) A service that connects to the facilities of a third-party, such as backhaul, roaming, or interconnection arrangements; or
- (ii) Telecommunications equipment that cannot route or redirect user data traffic or permit visibility into any user data or packets that such equipment transmits or otherwise handles.

(2) By necessary implication and regulation, the prohibitions also do not apply to:

- (i) Covered telecommunications equipment or services that:
 - i. Are *not used* as a substantial or essential component of any system; *and*
 - ii. Are *not used* as critical technology of any system.
- (ii) Other telecommunications equipment or services that are not considered covered telecommunications equipment or services.

(d) *Reporting requirement.*

(1) In the event the contractor identifies covered telecommunications equipment or services used as a substantial or essential component of any system, or as critical technology as part of any system, during contract performance, or the contractor is notified of such by a subcontractor at any tier or by any other source, the contractor shall report the information in paragraph (d)(2) of this clause to the recipient or subrecipient, unless elsewhere in this contract are established procedures for reporting the information.

(2) The Contractor shall report the following information pursuant to paragraph (d)(1) of this clause:

(i) Within one business day from the date of such identification or notification: The contract number; the order number(s), if applicable; supplier name; supplier unique entity identifier (if known); supplier Commercial and Government Entity (CAGE) code (if known); brand; model number (original equipment manufacturer number, manufacturer part number, or wholesaler number); item description; and any readily available information about mitigation actions undertaken or recommended.

(ii) Within 10 business days of submitting the information in paragraph (d)(2)(i) of this clause: Any further available information about mitigation actions undertaken or recommended. In addition, the contractor shall describe the efforts it undertook to prevent use or submission of covered telecommunications equipment or services, and any additional efforts that will be incorporated to prevent future use or submission of covered telecommunications equipment or services.

(e) *Subcontracts*. The Contractor shall insert the substance of this clause, including this paragraph (e), in all subcontracts and other contractual instruments.

11. DOMESTIC PREFERENCES FOR PROCUREMENTS.

As appropriate, and to the extent consistent with law, the contractor should, to the greatest extent practicable, provide a preference for the purchase, acquisition, or use of goods, products, or materials produced in the United States. This includes, but is not limited to iron, aluminum, steel, cement, and other manufactured products.

For purposes of this clause:

Produced in the United States means, for iron and steel products, that all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States.

Manufactured products mean items and construction materials composed in whole or in part of non-ferrous metals such as aluminum; plastics and polymer-based products such as polyvinyl chloride pipe; aggregates such as concrete; glass, including optical fiber; and lumber.

12. COMPLIANCE WITH FEDERAL EXECUTIVE ORDERS

This is an acknowledgement that American Rescue Plan Act will be used to fund the Contract only. The Contractor will comply with all applicable federal law, regulations, executive orders, policies, procedures, and directives.

13. NO OBLIGATION BY THE FEDERAL GOVERNMENT

The Federal Government is not a party to this Contract and is not subject to any obligations or liabilities to the non-Federal entity, Contractor, or any other party pertaining to any matter resulting from the Contract.

14. PROGRAM FRAUD AND FALSE OR FRAUDULENT STATEMENTS OR RELATED ACTS

The Contractor acknowledges that 31 U.S.C. Chap. 38 (Administrative Remedies for False Claims and Statements) applies to the Contractor's actions pertaining to this contract.

15. CONTRACTING WITH SMALL AND MINORITY BUSINESSES, WOMEN'S BUSINESS ENTERPRISES, AND LABOR SURPLUS AREA FIRMS.

(a) Any party to this contract must take all necessary affirmative steps to assure that minority businesses, women's business enterprises, and labor surplus area firms are used when possible. These steps are also required for the hiring of any subcontractors under this contract.

(b) Affirmative steps must include:

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

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

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

- (4) Establishing delivery schedules, where the requirement permits, which encourage participation by small and minority businesses, and women's business enterprises; and
- (5) Using the services and assistance, as appropriate, of such organizations as the Small Business Administration and the Minority Business Development Agency of the Department of Commerce.

16. COPYRIGHT AND DATA RIGHTS

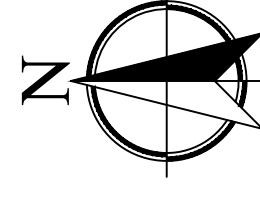
The Contractor grants to the Parish, a paid-up, royalty-free, nonexclusive, irrevocable, worldwide license in data first produced in the performance of this contract to reproduce, publish, or otherwise use, including prepare derivative works, distribute copies to the public, and perform publicly and display publicly such data. For data required by the contract but not first produced in the performance of this contract, the Contractor will identify such data and grant to the Parish or acquires on its behalf a license of the same scope as for data first produced in the performance of this contract. Data, as used herein, shall include any work subject to copyright under 17 U.S.C. § 102, for example, any written reports or literary works, software and/or source code, music, choreography, pictures or images, graphics, sculptures, videos, motion pictures or other audiovisual works, sound and/or video recordings, and architectural works. Upon or before the completion of this contract, the Contractor will deliver to the Parish data first produced in the performance of this contract and data required by the contract but not first produced in the performance of this contract in formats acceptable by the Parish.

Note:

Davis-Bacon Act is NOT applicable to this project.

DEPARTMENT OF UTILITIES BREWSTER ROAD SEWER CONSOLIDATION

LIFT STATION AND FORCE MAIN CONSTRUCTION
ALONG BREWSTER RD. FROM POWER LINE RD. TO LOUISIANA 1077
MADISONVILLE, ST. TAMMANY PARISH, LOUISIANA
PROJECT No.: TU23000168, TU23000170, TU23000175, TU23000177
BID NO.: 24-43-2



LOCATION MAP

(NOT TO SCALE)

LDH/IOPH PERMIT NO.: P-24-09-103-137

LICENSE CLASSIFICATION:
MUNICIPAL & PUBLIC WORKS CONSTRUCTION

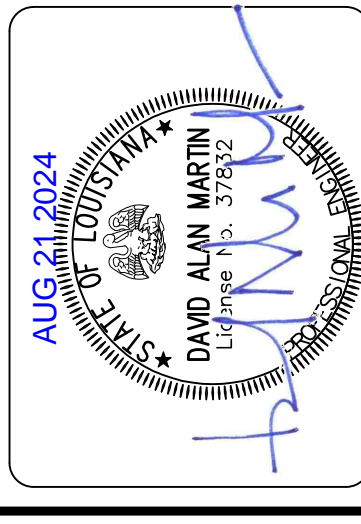
CONSTRUCTION TYPE:
SANITARY SEWERAGE SYSTEMS INCLUSIVE OF FORCED MAINS, GRAVITY SEWERAGE PIPING, SEWERAGE PUMPING STATIONS, AND DECOMMISSIONING AND DEMOLITION OF EXISTING SEWERAGE TREATMENT PLANTS AND PUMPING STATIONS.



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

No.	DESCRIPTION OF REVISION	DATE:
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2		
3		
4		
5		
6		
7		

DESIGNED BY:	M. LOKER
DRAWN BY:	J. HITT
CHECKED BY:	J. CATALANOTTO
PROJECT No.:	DU 168,170.
ISSUE DATE:	08/19/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED



BREWSTER ROAD SEWER
CONSOLIDATION
TITLE SHEET

SHEET NO.
G-01

PARISH PRESIDENT

MICHAEL B. COOPER

PARISH COUNCIL

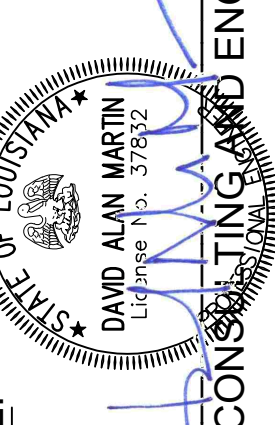
ARTHUR LAUGHLIN
COUNCIL CHAIRMAN
DISTRICT 11

JOE IMPASTATO
COUNCIL VICE-CHAIRMAN
DISTRICT 7

COUNCIL MEMBERS

- | | |
|----------------------|-------------|
| RICK SMITH | DISTRICT 1 |
| LARRY ROLLING | DISTRICT 2 |
| MARTHA J. CAZAUBON | DISTRICT 3 |
| KATHY SEIDEN | DISTRICT 4 |
| PAT PHILLIPS | DISTRICT 5 |
| CHERYL TANNER | DISTRICT 6 |
| JOE IMPASATO | DISTRICT 7 |
| PAT BURKE | DISTRICT 8 |
| DAVID COUGLE | DISTRICT 9 |
| MAUREEN "MO" O'BRIEN | DISTRICT 10 |
| ARTHUR LAUGHLIN | DISTRICT 11 |
| JERRY BINDER | DISTRICT 12 |
| JEFF CORBIN | DISTRICT 13 |
| JIMMY STRICKLAND | DISTRICT 14 |

PLANS PREPARED BY AND RECOMMEND FOR
APPROVAL:



DAVID ALAN MARTIN
FAIRWAY CONSULTING AND ENGINEERING
EF 6211
DAVID ALAN MARTIN, P.E.

APPROVED BY:

Christopher Tissue 08/20/2024
ST. TAMMANY PARISH GOVERNMENT
DEPARTMENT OF UTILITIES
CHRISTOPHER P. TISSUE, P.E., DIRECTOR

GENERAL NOTES:

- THE WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS.
- SUBMIT SHOP DRAWINGS OF ALL PIPING, VALVES, ETC. TO THE ENGINEER FOR APPROVAL PRIOR TO COMMENCING WORK.
- THE WORK SHALL BE CONFINED TO LIMITS OF CONSTRUCTIONS AS SHOWN ON THE PLANS. THE CONTRACTOR'S STAGING AND STORAGE AREAS SHALL BE LOCATED WITHIN THE LIMITS OF CONSTRUCTION IF THE CONTRACTOR REQUIRES ADDITIONAL STAGING OR STORAGE SPACE. THE CONTRACTOR SHALL MAKE HIS OWN ARRANGEMENTS FOR REQUIRED STORAGE AND STAGING AREAS.
- THE CONTRACTOR SHALL NOT DISTURB ANY WETLANDS.
- CONTRACTOR OPERATIONS SHALL NOT INTERFERE OR RESTRICT THE OWNER'S ACCESS AND OPERATION OF THE FACILITY. EXISTING FACILITIES OR FACILITIES ALONG THE PIPELINE ALIGNMENTS.
- ALL MATERIALS AND COMPONENTS OF THE SEWER SYSTEM, WITH THE EXCEPTION OF PUMPS NAMED WITH THE SPECIFICATIONS, SHALL BE MANUFACTURED, PRODUCED OR OTHERWISE BE OF DOMESTIC ORIGIN, HAVING BEEN MANUFACTURED WITHIN THE UNITED STATES OF AMERICA.
- CONSTRUCTION PLANS ARE IN LOUISIANA STATE PLANE SOUTH COORDINATE SYSTEM. THE VERTICAL DATUM FOR ALL ELEVATIONS ARE REFERENCED TO NORTH AMERICAN VERTICAL DATUM 1988 (NAVD88).
- TEMPORARY BENCHMARKS HAVE BEEN ESTABLISHED. THE HORIZONTAL AND VERTICAL LOCATION OF THE TEMPORARY BENCHMARKS ARE AS SHOWN ON SHEET G-10.
- THE CONTRACTOR SHALL USE THE HORIZONTAL AND VERTICAL CONTROLS ESTABLISHED FOR PROJECT.
- THE CONTRACTOR SHALL FIELD VERIFY ALL ELEVATIONS, GRADES AND MEASUREMENTS PRIOR TO STARTING ANY CONSTRUCTION.
- TO ENSURE THE CONSTRUCTION OPERATIONS REMAIN IN THE RIGHT-OF-WAY OR UTILITY SERVITUDE, THE CONTRACTOR SHALL STAKE THE RIGHT-OF-WAY AND/OR SERVITUDE LINE PRIOR TO COMMENCING WORK.
- NEW SEWER FORCE MAINS SHALL BE INSTALLED USING OPEN-CUT METHODS UNLESS WHERE SPECIFIED ON THE PLANS.
- MINIMUM COVER OVER THE NEW SEWER FORCE MAIN SHALL BE AT LEAST 3 FEET UNLESS OTHERWISE STATED IN THE PLANS OR AS APPROVED BY THE DEPARTMENT OF UTILITIES IN WRITING.
- THE CONTRACTOR SHALL PROVIDE RED-LINE DRAWINGS TO BE USED BY THE ENGINEER OF RECORD FOR THE PROJECT IN THE PREPARATION OF RECORD DRAWINGS / DRAWINGS. RECORD DRAWINGS / DRAWINGS SHALL BE SUBMITTED AS PART OF THE PROJECT CLOSE-OUT DOCUMENTS.
- EXISTING UTILITY LOCATIONS AS SHOWN ON THE PLANS ARE APPROXIMATE. THE CONTRACTOR SHALL CONTACT LOUISIANA ONE CALL TO LOCATE AND MARK SUBSURFACE UTILITIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING AND RESOLVING CONFLICTS WITH THE RESPECTIVE UTILITY OWNERS. A LIST OF UTILITY OWNERS AND POINTS OF CONTACT ARE PROVIDED ON THE UTILITY DISPOSITION TABLE ON THIS SHEET.
- THE CONTRACTOR SHALL VERIFY THE REQUIRED HORIZONTAL AND VERTICAL CLEARANCES WITH THE RESPECTIVE UTILITY OWNER PRIOR TO BEGINNING WORK.
- CONCERNS REGARDING THE DEPARTMENT OF UTILITIES FACILITIES SHALL BE DIRECTED TO THE FOLLOWING PERSON:
FIELD OPERATIONS SUPERVISOR
(985) 893-1717
- THE CONTRACTOR SHALL PROTECT SURROUNDING FACILITIES, INCLUDING BUT NOT LIMITED TO BUILDINGS, PAVEMENT, LANDSCAPING AND UTILITIES FROM DAMAGE. THE CONTRACTOR SHALL REPAIR OR REPLACE DAMAGED FACILITIES AT NO ADDITIONAL COST TO THE OWNER. THE CONTRACTOR SHALL REPAIR OR REPLACE DAMAGED FACILITIES TO THE OWNERS SATISFACTION.
- LOCATIONS OF UTILITIES IDENTIFIED BY DEPARTMENT OF UTILITIES ARE APPROXIMATE. CONTRACTOR SHALL FIELD VERIFY ALL AFFECTED UTILITIES (IE. WATER, SEWER, GAS, ETC.) PRIOR TO DIGGING AND/OR BORING. ANY DAMAGE SHALL BE REPAIRED IMMEDIATELY BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
- SERVICE INTERRUPTIONS ASSOCIATED WITH FINAL CONNECTIONS SHALL BE APPROVED BY THE DEPARTMENT OF UTILITIES PRIOR TO COMMENCING THE TIE-IN WORK. THE CONTRACTOR SHALL CONTACT THE DEPARTMENT AT LEAST 5 DAYS PRIOR TO HIS PROPOSED SERVICE INTERRUPTION DATE.
- THE CONTRACTOR SHALL RESTORE THE GROUND IN AND AROUND THE WORK AREA TO THE SATISFACTION OF THE OWNER. THE WORK AREA SHALL BE CLEANED AND MADE READY FOR RE-OCCUPANCY BY THE OWNER UPON COMPLETING ALL CONSTRUCTION ACTIVITIES.
- THE WORK AREA SHALL BE KEPT CLEAN THROUGHOUT THE DURATION OF THE PROJECT. THE CONTRACTOR SHALL COLLECT AND REMOVE ANY DEBRIS OR TRASH FROM WORK AREA ON DAILY BASIS. DEBRIS OR

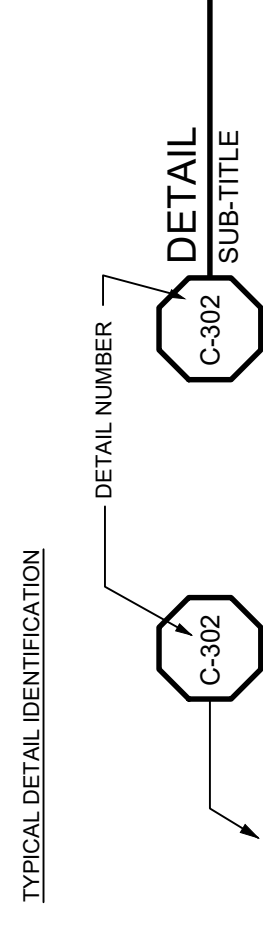
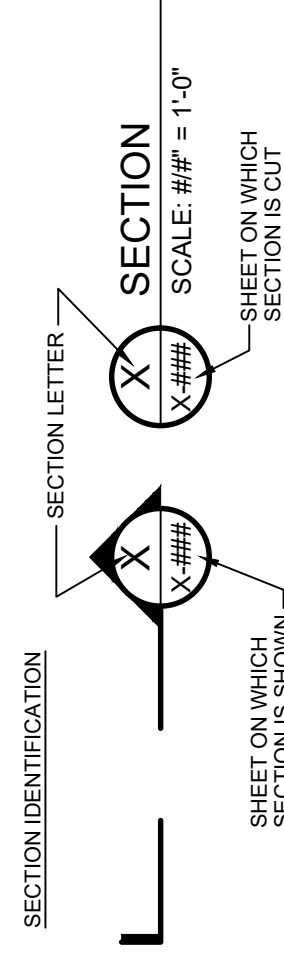
- TRASH SHALL BE STORED IN REFUSE CONTAINERS OR BINS UNTIL REMOVAL FROM THE SITE.
- THE CONTRACTOR SHALL MAKE HIS OWN ARRANGEMENTS FOR STORAGE OF EQUIPMENT AND MATERIAL FOR STAGING AND STORAGE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SAFE KEEPING AND SECURITY OF ALL MATERIAL AND EQUIPMENT STORED IN THIS LOCATION.
- THE LOCATION AND CONDITION OF EACH TIE-IN IS APPROXIMATE. IT IS THE CONTRACTOR'S RESPONSIBILITY, AS THE FIRST ORDER OF BUSINESS TO FIELD VERIFY THE LOCATION AND THE CONDITIONS OF EACH TIE-IN PRIOR TO ORDERING ANY MATERIALS AND INFORM THE ENGINEER.
- ADDITIONALLY, ONCE THE TIE-INS ARE EXPOSED, THE CONTRACTOR SHALL NOTIFY THE ENGINEER AND PARISH'S DEPARTMENT OF UTILITIES (DU) TO OPERATE AND EXERCISE THE ISOLATION VALVES AT EITHER END TO SEE IF THEY ARE OPERABLE AND LINES ARE FLUSHED AND CLEANED (ALL VALVES SHALL BE OPERATED BY OPERATIONS PERSONNEL OF DU ONLY). IN THE EVENT THAT THE VALVES ARE NOT OPERABLE AS DETERMINED BY THE ENGINEER, NEW VALVES SHALL BE INSTALLED UNDER APPLICABLE UNIT PRICES.

UTILITY DISPOSITION TABLE

UTILITY OWNER	POINT OF CONTACT	PHONE NO.	DESCRIPTION OF FACILITY	INTERSECTION WITH PIPELINE	DISPOSITION	RESPONSE - DATA RECEIVED
AT&T	STEVE BERGERON	(985) 327-6432	COMMUNICATIONS-FIBER OPTIC	VERIFY IN FIELD	DO NOT DISTURB	RESPONSIVE - NO CONFLICT IN PROJECT AREA
CLECO	PAUL GITZ	(985) 807-3755	ELECTRICAL (OVERHEAD, UNDERGROUND)	VERIFY IN FIELD	DO NOT DISTURB	RESPONSIVE - NO CONFLICT IN PROJECT AREA
TOWN OF MADISONVILLE	KYLE MATHEWS	(985) 845-7311	NATURAL GAS	VERIFY IN FIELD	DO NOT DISTURB	RESPONSIVE - APPROXIMATE LOCATION RECEIVED
ATMOS	RODNEY BABIN	(985) 290-0897	NATURAL GAS	VERIFY IN FIELD	DO NOT DISTURB	RESPONSIVE - NO CONFLICT IN PROJECT AREA
CHARTER / SPECTRUM	CURTIS SELDERS	(985) 406-7063	COMMUNICATIONS-FIBER OPTIC	VERIFY IN FIELD	DO NOT DISTURB	NOT RESPONSIVE
UNIFI FIBER	LESLIE BUTTS	(985) 643-6612	COMMUNICATIONS-FIBER OPTIC	VERIFY IN FIELD	DO NOT DISTURB	NOT RESPONSIVE
ENTERGY	NOT AVAILABLE	NOT AVAILABLE	ELECTRICAL (OVERHEAD, UNDERGROUND)	VERIFY IN FIELD	DO NOT DISTURB	RESPONSIVE - NO CONFLICT IN PROJECT AREA
LOUISIANA ONE CALL	NOT APPLICABLE	811	N/A	N/A	NOT APPLICABLE	N/A
ST. TAMMANY PARISH GOVERNMENT	DANIEL HILL	(985) 898-2552	ROADWAY, DRAINAGE	VERIFY IN FIELD	REMOVE AND RECONSTRUCT ROADWAY AND DRAINAGE PER CONTRACT DOCUMENTS.	N/A
ST. TAMMANY PARISH DEPARTMENT OF UTILITIES	NOT APPLICABLE	(985) 643-1376	POTABLE WATER, SEWERAGE	VERIFY IN FIELD	DO NOT DISTURB	RESPONSIVE - AS-BUILTS AND FIELD MARKINGS

DISPOSITION TABLE WAS CREATED BASED ON LA-811 TICKET NUMBERS #230379558, #230379559, #230379560 IN ADDITION TO COORDINATION BETWEEN THE UTILITY COMPANY AND EITHER ALL SOUTH CONSULTING ENGINEERS, LLC (SURVEYOR) AND/OR FAIRWAY CONSULTING AND ENGINEERING (DESIGN ENGINEER).

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.



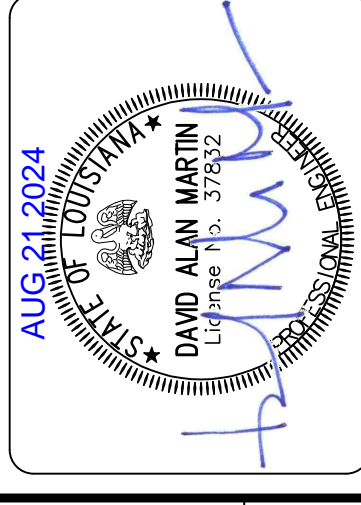
CURVE DATA (SEE PLAN & PROFILE)

CURVE	PVC (STA/ELEV)	PVI (STA/ELEV)	PVT (STA/ELEV)	RADIUS	LENGTH
V1	119+45.54	119+84.23	120+22.91	900.00'	77.37'
V2	120+22.91	120+61.60	121+00.28	900.00'	77.37'
V3	413+99.74	414+09.85	414+19.97	2000.00'	20.23'
V4	432+40.19	432+72.85	433+05.51	900.00'	65.32'
V5	433+05.51	433+39.75	433+73.99	900.00'	68.48'

BREWSTER ROAD SEWER
CONSOLIDATION
GENERAL NOTES AND
SPECIFICATIONS

SHEET NO.
G-03

DESIGNED BY:	M. LOKER
DRAWN BY:	J. HITT
CHECKED BY:	J. CATLANOTTO
PROJECT No.:	DU 188,170.
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

No.	DESCRIPTION OF REVISION	DATE:
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GRAVITY SEWER STANDARD NOTES

- ALL MATERIALS SHALL COMPLY WITH ALL APPLICABLE AWWA STANDARDS AND SPECIFICATIONS.
- THE CONTRACTOR SHALL PROVIDE A ONE-YEAR WARRANTY FOR ALL NEWLY INSTALLED SEWER INFRASTRUCTURE ASSOCIATED WITH THE CONSTRUCTION OF THE PROJECT, INCLUDING BUT NOT LIMITED TO ANY SEWER FORCE MAIN AND GRAVITY SEWER MAIN EXTENSIONS. THE WARRANTY SHALL EXTEND FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE. THE CONTRACTOR SHALL FURNISH ALL MATERIALS AND LABOR REQUIRED TO CORRECT DEFICIENCIES IN THE SYSTEM AT NO COST TO DEPARTMENT OF UTILITIES.
- A PRE-CONSTRUCTION MEETING WITH DEPARTMENT OF UTILITIES, THE CONTRACTOR AND ENGINEER OF RECORD SHALL BE HELD PRIOR TO THE START OF CONSTRUCTION. ALL PRE-CONSTRUCTION MEETINGS SHALL BE HELD ON THURSDAYS AT DEPARTMENT OF UTILITIES OFFICE IN COVINGTON. THE ENGINEER OF RECORD WILL COORDINATE WITH DEPARTMENT OF UTILITIES TO SCHEDULE THE DATE AND TIME OF THE PRE-CONSTRUCTION MEETING.
- PARALLEL SEWER LINES (I.E. GRAVITY SEWER LINES AND SEWER FORCE MAINS) AND WATER LINES SHALL BE LAID IN SEPARATE TRENCHES WITH THE HORIZONTAL CLEARANCE BETWEEN ALL WATER LINES AND ALL SEWER LINES OF 10'. THE HORIZONTAL CLEARANCE BETWEEN GRAVITY SEWER LINES AND SEWER FORCE MAINS SHALL BE 10'. IN THE EVENT A WATER LINE GROSSES OVER A SEWER LINE CROSS, THE MINIMUM VERTICAL CLEARANCE SHALL BE 18" BETWEEN THE WATER AND SEWER LINES. ALL SEWER LINES SHALL BE LOWER THAN WATER LINES. ANY CLEARANCES LESS THAN THE ABOVE MENTIONED SHALL BE APPROVED BY DEPARTMENT OF UTILITIES.
- EXCAVATIONS FOR SEWER LINES AND STRUCTURES SHALL BE EXCAVATED, BEDDED AND BACKFILLED IN ACCORDANCE WITH THE NOTES BELOW AND THE PROVIDED SEWER DETAILS.
 - GRAVITY SEWER MAINS AND SEWER FORCE MAINS SHALL BE BEDDED IN A CLEAN SAND COMPLYING WITH AASHTO A-3 CLASSIFICATION. THE CLEAN SAND BEDDING MATERIAL SHALL BE PLACED IN LOOSE 8" LIFTS AND COMPACTED TO 95% OF OPTIMAL DRY DENSITY AS DETERMINED BY ASTM D698.
 - THE MINIMUM THICKNESS FOR PIPE BEDDING MATERIAL UNDER ALL SEWER GRAVITY MAINS AND SEWER FORCE MAINS SHALL BE 6" OR AS DICTATED BY THE RECOMMENDATIONS OUTLINED IN THE GEOTECHNICAL REPORT. THE BEDDING MATERIAL SHALL EXTEND TO THE SPRINGLINE OF THE PIPE (I.E. HALF PIPE O.D.). THE MORE STRINGENT REQUIREMENT SHALL CONTROL.
 - WHEN A SOFT AND/OR WET EXCAVATION BOTTOM HAS BEEN ENCOUNTERED, THE EXCAVATION BOTTOM SHALL BE STABILIZED IN ACCORDANCE WITH THE RECOMMENDATIONS OUTLINED IN THE GEOTECHNICAL REPORT. HOWEVER AT A MINIMUM, A 6" THICK CRUSHED No. 57 LIMESTONE FOUNDATION SHALL BE USED TO STABILIZE A SOFT AND/OR WET EXCAVATION BOTTOM. A MINIMUM OF 6" OF THE SOFT AND/OR WET NATIVE MATERIAL SHALL BE REMOVED PRIOR TO PLACING THE CRUSHED LIMESTONE FOUNDATION. THE CRUSHED LIMESTONE FOUNDATION SHALL BE PLACED ON TOP OF A COMBINATION OF GEOTEXTILE AND BI-AXIAL GEOGRID FABRICS. THE CRUSHED LIMESTONE FOUNDATION SHALL BE PLACED IN LOOSE 8" LIFTS AND COMPACTED TO 75% OF THE RELATIVE DRY DENSITY AS DETERMINED BY ASTM D4253. THE GEOTEXTILE FABRIC SHALL ENCASE THE LIMESTONE FOUNDATION. THE MORE STRINGENT REQUIREMENTS SHALL CONTROL.
 - SEWER FORCE MAIN VALVES AND SEWER STRUCTURES (I.E. MANHOLES, WET WELLS, VALVE VAULTS, EQUIPMENT PADS) SHALL BE CONSTRUCTED ON No. 57 CRUSHED LIMESTONE BASE. THE MINIMUM THICKNESS OF THE LIMESTONE BASE AND THE USE OF GEO-SYNTHETIC FABRICS SHALL BE DICTATED BY THE RECOMMENDATIONS OUTLINED IN THE GEOTECHNICAL REPORT. HOWEVER, THE LIMESTONE BASE SHALL HAVE A MINIMUM THICKNESS 12" UNDER SEWER STRUCTURE AND 6" UNDER SEWER FORCE MAIN VALVES. THE LIMESTONE BASE SHALL BE PLACED ON TOP OF A COMBINATION OF GEOTEXTILE AND BI-AXIAL GEOGRID FABRICS. THE CRUSHED LIMESTONE MATERIAL SHALL BE PLACED IN LOOSE 8" LIFTS AND COMPACTED TO 75% OF THE RELATIVE DRY DENSITY AS DETERMINED BY ASTM D4253. THE GEOTEXTILE FABRIC SHALL ENCASE THE LIMESTONE BASE. THE MORE STRINGENT REQUIREMENTS SHALL CONTROL.
- THE COVER BETWEEN THE TOP OF PIPE FOR ALL SEWER LINES (I.E. GRAVITY SEWER AND SEWER FORCE MAINS) AND FINISHED GRADE SHALL BE AT LEAST 3' FOR LANDSCAPED AREAS AND 5' UNDER ROADS.
- THE LOCATION OF ALL NEW HOUSE CONNECTIONS SHALL BE IMPRESSED INTO THE CURB FACE OR STREET SURFACE WITH THE LETTERS "HC" AND AN ARROW POINTING THE DIRECTION THE HOUSE CONNECTION. THE LETTERING SHALL BE 4" BY 8"; REFER TO THE SEWER STANDARD DETAILS.

PRIOR THE CONSTRUCTION OF THE RESIDENCE, NEW HOUSE CONNECTIONS SHALL BE LOCATED USING A 2" BY 2" STAKE WITH A FLORESCENT GREEN FLAG/STREAMER OR PAINTED FLORESCENT GREEN FOR EASE OF LOCATING BY DEPARTMENT OF UTILITIES INSPECTORS. THE STAKE SHALL EXTEND AT LEAST 3 FEET FROM THE EXISTING GROUND SURFACE. THE STAKE MUST BE MAINTAINED UNTIL THE RESIDENCE HAS BEEN CONNECTED TO THE SERVICE LINE.

- DEPARTMENT OF UTILITIES REPRESENTATIVE SHALL BE ON-SITE FOR ALL TESTING REQUIRED FOR THE ACCEPTANCE OF THE DEVELOPMENT. THE DEVELOPER SHALL CONTACT DEPARTMENT OF UTILITIES AT LEAST 48-HOURS PRIOR TO TESTING. THE DEVELOPER SHALL CONTACT TAMMANY UTILITIES AT (985) 893-1717 TO SCHEDULE INSPECTIONS AND TESTING.
- THE CONTRACTOR AND ENGINEER OF RECORD SHALL BE RESPONSIBLE FOR VERIFYING THE HORIZONTAL AND VERTICAL LOCATION OF ALL NEW SEWER INFRASTRUCTURE. POST-CONSTRUCTION, THE FIELD VERIFICATION DATA SHALL BE REFLECTED AND CERTIFIED IN THE RECORD DRAWINGS/AS-BUILT PLANS TO BE PREPARED BY THE ENGINEER OF RECORD FOR THE PROJECT. DEPARTMENT OF UTILITIES SHALL NOT ACCEPT THE DEVELOPMENT UNTIL THE ENGINEER OF RECORD PROVIDES AN ACCURATE, VERIFIED SET OF RECORD DRAWINGS/AS-BUILT PLANS FOR THE DEVELOPMENT.
- THE RECORD DRAWINGS/AS-BUILT PLANS SHALL CONTAIN THE FOLLOWING SHEETS OF INFORMATION:
 - ALL SHEETS SHALL BE STAMPED WITH THE BLOCK "RECORD DRAWINGS" OR "AS-BUILT PLANS" AND SHALL BE DATED.
 - TITLE SHEET WITH AN INDEX OF SHEETS. IF ADDITIONAL SHEETS ARE NEEDED TO CAPTURE CHANGES VIA CHANGE-ORDER/PLAN CHANGE, THESE ADDITIONAL SHEETS SHALL BE LISTED IN THE INDEX OF SHEETS AND BE ADDED AT THE END OF THE PLAN SET.
 - GENERAL NOTES AND LEGEND. STRIKETHROUGH NOTES WHICH DO NOT APPLY.
 - SITE VICINITY MAP SHOWING NEW WATER AND SEWER INFRASTRUCTURE AND TIE-IN LOCATION TO THE EXISTING SYSTEM(S).
 - PLAN AND PROFILE SHEETS
 - SUMMARY OF MATERIAL QUANTITIES. FINAL QUANTITIES INSTALLED SHALL BE TABULATED.
 - SUMMARY OF HOUSE CONNECTIONS. INFORMATION REGARDING THE HOUSE CONNECTIONS SHALL BE TABULATED. THE LOCATION OF EACH HOUSE CONNECTION SHALL BE DETERMINED BY MEASURING ALONG THE CENTERLINE OF THE SEWER GRAVITY MAIN FROM THE CENTER OF THE DOWNSTREAM MANHOLE. ADDITIONALLY, THE DIRECTION AND OFFSET OF EACH HOUSE CONNECTION SHALL BE MEASURED FROM THE CENTERLINE OF THE SEWER (I.E. 35' L).
 - STANDARD DETAILS - STRIKETHROUGH STANDARD DETAILS NOT USED.
- PLAN AND PROFILE SHEETS IN THE RECORD DRAWINGS/AS-BUILT PLANS SHALL CONTAIN THE FOLLOWING INFORMATION AT A MINIMUM:
 - LABEL THE CENTER-TO-CENTER DISTANCE BETWEEN MANHOLES ALONG THE DIRECTION OF FLOW IN PLAN-VIEW ONLY.
 - LABEL THE SLOPE AND DIRECTION OF FLOW FOR ALL SEWER LINES IN PLAN-VIEW ONLY. SLOPE OF THE GRAVITY SEWER LINE SHALL BE LABELED. SLOPE SHALL BE PROVIDED AS A PERCENTAGE.
 - LABEL TOP-OF-CASTING (TOC) AND INVERT ELEVATIONS FOR ALL MANHOLES. SHOW INVERT ELEVATIONS AND CARDINAL DIRECTION (I.E. N, INV. 20.19) FOR ALL PIPES IN THE MANHOLE
 - SHOW AND LABEL TIE-IN LOCATIONS BETWEEN EXISTING AND NEW SEWER INFRASTRUCTURE.
 - SEPARATE PLAN AND PROFILE SHEETS SHALL BE PROVIDED FOR THE LIFT STATION(S) AND FORCE MAIN(S). LABEL ALL VALVES AND FITTINGS ALONG THE FORCE MAIN. LABEL THE DISTANCE BETWEEN ALL VALVES AND FITTINGS. LABEL VERTICAL AND HORIZONTAL OFFSETS FROM PROJECT BASELINE OR DATUM.
- THE CONTRACTOR'S REDLINE DRAWINGS SHALL NOT BE SUBSTITUTED FOR OR ACCEPTED BY DEPARTMENT OF UTILITIES AS RECORD DRAWINGS/AS-BUILT PLANS
- THE CONTRACTOR AND/OR ENGINEER OF RECORD FOR THE PROJECT SHALL PROVIDE RECORD DRAWINGS/AS-BUILT PLANS IN THE FOLLOWING FORMATS AND QUANTITIES: THREE (3) FULL-SIZE HARD COPIES, ONE (1) COPY IN PDF FORMAT, AND ONE (1) COPY IN AUTOCAD 2016 FORMAT.
- DEPARTMENT OF UTILITIES STANDARD NOTES AND DETAILS SHALL BE MADE PART OF THE CONSTRUCTION DOCUMENTS. ALL WORK SHALL BE

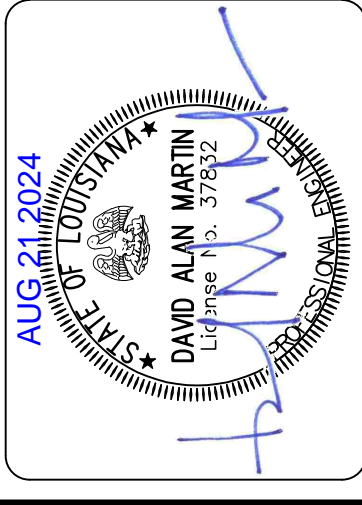
COMPLETED IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS, INCLUDING DEPARTMENT OF UTILITIES STANDARD NOTES AND DETAILS.

SEWER MANHOLE NOTES

- ALL NEW MANHOLES SHALL HAVE MINIMUM INSIDE DIAMETER OF 48 INCHES. ALL COMPONENTS OF THE MANHOLES (I.E. BASE, RISER, AND TOP) SHALL BE A PRE-CAST, REINFORCED CONCRETE STRUCTURE CONFORMING TO ASTM C478. THE PRE-CAST MANHOLE STRUCTURE SHALL BE DESIGNED TO MEET OR EXCEED AASHTO HS-20 LOADING.
- CONCRETE SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 4,000 PSI. CONCRETE SHALL CONTAIN XYPEX CONTENT OF AT LEAST 3% BY WEIGHT. REINFORCING STEEL SHALL BE GRADE 60 AND CONFORM TO ASTM A615.
- CONCRETE SHALL BE FORTIFIED WITH THE CORROSION CONTROL ADDITIVE "CON-SHIELD" IN ADDITION TO XYPEX OR XYPEX C500 BIO-SAN FOR THE FOLLOWING CONDITIONS: (1) MANHOLES RECEIVING DISCHARGE FROM A FORCE MAIN, (2) MANHOLES WITHIN 100' OF A LIFT STATION, OR (3) MANHOLES WITH A DEPTH GREATER THAN 8'. CONCRETE SHALL CONTAIN "CON-SHIELD" AT RATE OF ONE GALLON PER CUBIC YARD IN ADDITION TO XYPEX C100R AT 3% BY WEIGHT OF CEMENT OR XYPEX C500 BIO-SAN BY 1% BY WEIGHT OF CEMENT.
- EXISTING MANHOLES TO BE REFURBISHED AND/OR TO RECEIVE FLOW FROM A SEWER FORCE MAIN SHALL BE COATED USING ONE OF THE FOLLOWING COMPOSITE LINER SYSTEMS: MADEWELL MAINSTAY (ML72 TO REBUILD TO ORIGINAL THICKNESS OR MIN. 3/8" THICKNESS, D55 EPOXY LINER WITH 125 MILS THICKNESS), TNEVEC PERMASHIELD (SERIES 217 MORTOR CLAD TO REBUILD TO ORIGINAL THICKNESS OR MIN. 3/8" THICKNESS, SERIES 454 PERMA-SHIELD EPOXY LINER WITH 125 MILS THICKNESS) OR XYPEX BIO-SAN MEGAMIX 2 (MIN. 3/8" THICKNESS). PRIOR TO APPLYING THE SELECTED COMPOSITE LINER SYSTEM, ALL SURFACES SHALL BE PREPARED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. THE COMPOSITE LINER SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. COORDINATE WITH DEPARTMENT OF UTILITIES TO DETERMINE THE SCOPE OF THE MANHOLE REFURBISHMENT PRIOR TO BEGINNING WORK.
- JOINTS IN THE MANHOLE SECTIONS SHALL BE SEALED WITH "RAM-NEK" OR A RUBBER GASKET CONFORMING TO ASTM C433. EXCESS JOINT SEALANT MATERIAL PROTRUDING FROM THE JOINT ON THE INTERIOR OF THE MANHOLE SHALL BE TRIMMED FLUSH WITH THE INTERIOR OF SURFACE OF THE MANHOLE. INTERIOR JOINTS SHALL THEN BE SEALED WITH A NON-SHRINK, NON-METALLIC GROUT.
- ALL PIPE PENETRATIONS INTO MANHOLES SHALL BE CAST OR CORED. CONNECTION OF SEWER PIPES TO MANHOLES SHALL BE WATERTIGHT. THE CONNECTIONS SHALL BE MADE WITH AN ELASTOMERIC PIPE TO MANHOLE CONNECTOR OR BOOT CONFORMING TO ASTM C923 AND NON-METALLIC EPOXY GROUT.
- GROUT AND MORTAR MIXES SHALL CONTAIN CONCRETE ADDITIVES LISTED IN NOTE #3 ABOVE.
- MANHOLE FRAMES AND COVERS SHALL BE GRAY IRON CONFORMING TO ASTM A48. MANHOLE FRAMES AND COVERS SHALL EAST JORDAN IRON WORKS OR US FOUNDRY. ALL MANHOLE FRAMES AND COVERS SHALL BE RATED FOR AASHTO HS-20 LOADING. A "RAINSTOPPER" INSERT SHALL BE INSTALLED WITH ALL NEW MANHOLE COVERS.
- MANHOLE COVERS SHALL HAVE DIAMOND TREAD PATTERN AND HAVE WORD "SEWER" CAST ON THE COVER.

SEWER LINETYPES AND SYMBOLS	
SYMBOL	MEANING
SS	GRAVITY SEWER LINE
6"HC	SEWER SERVICE LINE
SFM	SEWER FORCE MAIN
EFM	EFFLUENT FORCE MAIN
↔	SINGLE SEWER HOUSE CONNECTION
↔	DUAL SEWER HOUSE CONNECTION
	SEWER CLEAN-OUT
	SEWER MANHOLE
LS	SEWER LIFT STATION
	VALVE ON SEWER FORCE MAIN
WATER LINETYPES AND SYMBOLS	
SYMBOL	MEANING
W	WATER MAIN
↔	SINGLE WATER SERVICE CONNECTION
↔	DUAL WATER SERVICE CONNECTION
	WATER METER
	FIRE HYDRANT
(V)	WATER VALVE & MANHOLE
	BACK FLOW PREVENTER
VALVE SYMBOLS	
SYMBOL	MEANING
↔	CHECK VALVE
↔	ISOLATION VALVE
↔	GATE VALVE
↔	PLUG VALVE
	TAPPING SLEEVE AND VALVE
	AIR RELEASE VALVE
	TEE, VALVE AND FIRE HYDRANT ASSEMBLY
GENERAL LINETYPES AND SYMBOLS	
SYMBOL	MEANING
R/W	RIGHT-OF-WAY
	SERVITUDE
OHP	OVERHEAD POWER LINE
	POWER POLE
UGE	UNDERGROUND POWER LINE
	PAD MOUNTED TRANSFORMER
	GAS LINE
	GAS VALVE & MANHOLE
D	DRAINAGE CULVERT, SUBSURFACE
	TOP OF DITCH
	DRAINAGE DROP INLET OR CATCH BASIN
	DEMOLITION AND REMOVAL
	PORTLAND CEMENT CONCRETE
	GRANULAR BACKFILL, COMPACTED
	BEDDING MATERIAL, COMPACTED
	SELECT FILL (IN SITU SOILS), COMPACTED

DESIGNED BY: M LOKER	DRAWN BY: J. HITT
CHECKED BY: J. CATLANOTTO	SUBMITTED BY: FARWAY CE
PROJECT No.: DU 168,170.	ISSUE DATE: 08/20/2024
175, 177	APPROVED BY: D. MARTIN
AS NOTED	SHEET SIZE: ANSI D 34x22



BREWSTER ROAD SEWER
CONSOLIDATION
GENERAL SEWER NOTES AND
GENERAL SYMBOLS

SHEET NO.
G-04



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

No.	DESCRIPTION OF REVISION	Date
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GRAVITY SEWER MAIN NOTES

- NEW GRAVITY SEWER LINES BETWEEN 6" AND 15" DIAMETER, INCLUDING HOUSE SERVICE CONNECTIONS, SHALL BE POLYVINYL CHLORIDE (PVC) PIPE CONFORMING TO ASTM D3034. NEW GRAVITY SEWER LINES BETWEEN 6" AND 15" DIAMETER SHALL HAVE A PIPE STIFFNESS NO LESS THAN 115 PSI (SDR26). CONNECTIONS BETWEEN PIPE LENGTHS SHALL BE OF AN INTEGRATED "BELL AND SPIGOT" DESIGN WITH A RUBBER GASKET SEAL. RUBBER SEAL SHALL CONFORM TO ASTM F477. NEW GRAVITY SEWER LINES SHALL BE THE COLOR GREEN AND LABELED AS "SEWER".
- NEW GRAVITY SEWER LINES BETWEEN 18" AND 48" DIAMETER SHALL BE POLYVINYL CHLORIDE (PVC) PIPE CONFORMING TO ASTM F679. NEW GRAVITY SEWER LINES BETWEEN 18" AND 48" DIAMETER SHALL HAVE A PIPE STIFFNESS NO LESS THAN 115 PSI (PS115). CONNECTIONS BETWEEN PIPE LENGTHS SHALL BE OF AN INTEGRATED "BELL AND SPIGOT" DESIGN WITH A RUBBER GASKET SEAL. RUBBER SEAL SHALL CONFORM TO ASTM F477. NEW GRAVITY SEWER LINES SHALL BE THE COLOR GREEN AND LABELED AS "SEWER".
- NEW GRAVITY SEWER MAINS SHALL BE NO SMALLER THAN 8" INSIDE DIAMETER PVC PIPE WITH A MINIMUM SLOPE 0.4%. NEW GRAVITY SEWER MAINS SHALL HAVE MINIMUM VELOCITY OF 2 FEET PER SECOND.
- NEW HOUSE SERVICE CONNECTIONS SHALL BE NO SMALLER THAN 6" INSIDE DIAMETER PVC PIPE. A NEW HOUSE SERVICE CONNECTIONS SHALL BE INSTALLED A PERPENDICULAR TO THE GRAVITY SEWER MAIN AND SHALL BE PROPERLY SECURED WITH A PVC CAP.
- THE LOCATION OF THE HOUSE SERVICE CONNECTIONS SHALL BE STAMPED IN THE CURB FACE OR ROAD SURFACE USING THE LETTERING "H1C", AND THE LETTERING SHALL BE AT LEAST 4" BY 8".
- ALL NEW HOUSE SERVICE CONNECTIONS SHALL BE LOCATED AT THE LOT LINE. HOUSE SERVICE CONNECTION SHALL NOT BE LOCATED WITHIN THE DRIVEWAY.
- THE GRAVITY SEWER SYSTEM SHALL BE TESTED FOR LEAKS BY SMOKE TESTING.
- GRAVITY SEWER PIPES SHALL BE CHECKED FOR ALIGNMENT BY MANDREL TESTING AND VIDEO INSPECTION. CLEAN WATER SHALL BE INTRODUCED INTO THE GRAVITY SEWER LINE UNDERGOING VIDEO INSPECTION TO DETERMINE IF THE GRAVITY SEWER LINE HAS ANY SAGS OR HIGH POINTS THAT WILL IMPEDE FLOW. A DEPARTMENT OF UTILITIES REPRESENTATIVE SHALL BE ON-SITE DURING THE VIDEO INSPECTION.
- IN THE EVENT A SECTION OF GRAVITY SEWER PIPE FAILS INSPECTION AND TESTING, PIPES SHALL BE RE-LAID AND RE-CHECKED AT EXPENSE OF THE CONTRACTOR AND/OR THE DEVELOPER.

SEWER LIFT STATION NOTES

- WET WELLS SHALL HAVE A MINIMUM INSIDE DIAMETER OF 60 INCHES.
- LIFT STATIONS LOCATED IN AN INDUSTRIAL SETTING OR ALONG A HIGHWAY SHALL BE SECURED BY A CHAIN LINK FENCE. THE FENCE SHALL CONSTRUCTED ALONG THE PERIMETER OF LIFT STATION SERVICITUDE. THE FENCE SHALL BE 6-FEET TALL WITH A BARBED WIRE TOP-OF-FENCE TREATMENT. ADDITIONALLY, A DARK GREEN PRIVACY MESH FABRIC SHALL BE INSTALLED ON THE FENCE AND GATE. A ROLLER GATE SHALL BE PROVIDED FOR MAINTENANCE VEHICLE ACCESS, AND THE CLEAR OPENING FOR THE GATE SHALL BE 16-FEET. THE APPROPRIATE WARNING SIGNS AND DEPARTMENT OF UTILITIES SIGNS SHALL BE ATTACHED TO FENCE AND GATE.
- ALL COMPONENTS OF THE WET WELL (I.E. BASE, RISER, AND TOP) SHALL BE A PRE-CAST, REINFORCED CONCRETE STRUCTURE CONFORMING TO ASTM C478. THE PRE-CAST WET WELL STRUCTURE SHALL BE DESIGNED TO MEET OR EXCEED AASHTO HS-20 LOADING.
- CONCRETE SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 4,000 PSI. REINFORCING STEEL SHALL BE GRADE 60 AND CONFORM TO ASTM A615. CONCRETE SHALL CONTAIN XYPEX C1000-R CONTENT OF AT LEAST 3% BY WEIGHT OF CEMENT AND SHALL BE FORTIFIED WITH A CORROSION CONTROL ADDITIVE SUCH AS "CON-SHIELD" OR XYPEX C500 BIO-SAN. CONCRETE SHALL CONTAIN "CON-SHIELD" AT RATE OF ONE GALLON PER CUBIC YARD IN ADDITION TO XYPEX C100R AT 3% BY WEIGHT OF CEMENT OR XYPEX C500 BIO-SAN BY 1% BY WEIGHT OF CEMENT. THE CONTRACTOR SHALL SUBMIT CONCRETE MIX DESIGNS FOR APPROVAL BY THE ENGINEER AND DEPARTMENT OF UTILITIES PRIOR TO ORDERING THE WET WELL.
- JOINTS IN THE WET WELL OF THE SEWER LIFT STATION SECTIONS SHALL BE SEALED WITH A RUBBER GASKET CONFORMING TO ASTM C433. EXCESS JOINT SEALANT MATERIAL PROTRUDING FROM THE JOINT ON THE INTERIOR OF THE WET WELL SHALL BE TRIMMED FLUSH WITH THE INTERIOR OF SURFACE OF THE WET WELL. INTERIOR JOINTS SHALL THEN BE SEALED WITH

A NON-SHRINK, NON-METALLIC GROUT.

- GROUT AND MORTAR MIXES SHALL CONTAIN CONCRETE ADDITIVES LISTED IN NOTE #6 ABOVE.
- EXISTING WET WELLS TO BE REFURBISHED SHALL BE COATED USING ONE OF THE FOLLOWING COMPOSITE LINER SYSTEMS: MADEWELL MAINSTAY (ML72 TO REBUILD TO ORIGINAL THICKNESS OR MIN. 3/8" THICKNESS, D55 EPOXY LINER WITH 125 MILS THICKNESS), NEMEC PERMASHIELD (SERIES 217 MORTOR CLAD TO REBUILD TO ORIGINAL THICKNESS OR MIN. 3/8" THICKNESS, SERIES 434 PERMA-SHIELD EPOXY LINER WITH 125 MILS THICKNESS) OR XYPEX BIO-SAN MEGAMIX 2 (MIN. 3/8" THICKNESS). PRIOR TO APPLYING THE SELECTED COMPOSITE LINER SYSTEM, ALL SURFACES SHALL BE PREPARED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. THE COMPOSITE LINER SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. COORDINATE WITH DEPARTMENT OF UTILITIES TO DETERMINE THE SCOPE OF THE WET WELL REFURBISHMENT PRIOR TO BEGINNING WORK.
- ALL PIPE PENETRATIONS INTO THE WET WELL SHALL BE CAST OR CORED. CONNECTIONS OF SEWER PIPES TO MANHOLES SHALL BE WATERTIGHT. THE CONNECTIONS SHALL BE MADE WITH AN ELASTOMERIC PIPE TO MANHOLE CONNECTOR OR BOOT CONFORMING TO ASTM C923 AND NON-METALLIC EPOXY GROUT.
- A COLLECTOR MANHOLE SHALL BE CONSTRUCTED IMMEDIATELY UPSTREAM OF THE WET WELL TO MINIMIZE THE NUMBER OF PENETRATIONS IN THE WET WELL WALL. THE MANHOLE AND WET WELL SHALL BE CONNECTED USING 12" DIAMETER GRAVITY SEWER LINE WITH MINIMUM SLOPE OF 2.5%. THE GRAVITY SEWER LINE BETWEEN THE MANHOLE AND WET WELL SHALL BE PVC PIPE CONFORMING TO THE "GRAVITY SEWER NOTES" ABOVE. THE SEALS AROUND PIPE PENETRATIONS SHALL CONFORM TO THE "GRAVITY SEWER NOTES" AND "SEWER LIFT STATION NOTES". THE COLLECTOR MANHOLE SHALL CONFORM TO THE "SEWER MANHOLE NOTES" PREVIOUSLY NOTED.
- WET WELL HATCH FRAMES AND COVERS SHALL BE CONSTRUCTED OF ALUMINUM AND BE RATED FOR AASHTO HS-20 LOADING.

SEWER FORCE MAIN NOTES

- NEW SEWER FORCE MAINS CONNECTING TO OTHER SEWER FORCE MAINS SHALL HAVE MINIMUM INSIDE DIAMETER OF 4". NEW SEWER FORCE MAINS FOR LIFT STATIONS INTERIOR TO A SUBDIVISION (I.E. DAISY CHAIN OF LIFT STATIONS) SHALL HAVE MINIMUM INSIDE DIAMETER OF 3".
- MINIMUM VELOCITY IN ALL SEWER FORCE MAINS SHALL BE 3 FEET PER SECOND. MAXIMUM VELOCITY IN ALL SEWER FORCE MAINS SHALL NOT EXCEED 8 FEET PER SECOND. VELOCITIES IN EXCESS OF 8 FEET PER SECOND SHALL APPROVED BY DEPARTMENT OF UTILITIES.
- NEW SEWER FORCE MAINS SHALL BE POLYVINYL CHLORIDE (PVC) PIPE CONFORMING TO AWWA C900 OR HIGH-DENSITY POLYETHYLENE (HDPE) PIPE CONFORMING TO AWWA C906.
- SEWER FORCE MAINS CONSTRUCTED USING PVC PIPE BETWEEN 4" AND 30" DIAMETER SHALL BE AWWA C900 DR-18. CONNECTIONS BETWEEN PIPE LENGTHS OF PVC SHALL BE OF AN INTEGRATED "BELL AND SPIGOT" PUSH-ON DESIGN WITH A RUBBER GASKET SEAL. RUBBER SEAL SHALL CONFORM TO AWWA C111. NEW SEWER FORCE MAINS SHALL BE THE COLOR GREEN AND LABELED AS "SFM".
- SEWER FORCE MAINS CONSTRUCTED USING PVC PIPE 3" AND 30" DIAMETER SHALL BE A PRESSURE CLASS OF 160 PSI (SDR26). CONNECTIONS BETWEEN PIPE LENGTHS OF PVC SHALL BE OF AN INTEGRATED "BELL AND SPIGOT" PUSH-ON DESIGN WITH A RUBBER GASKET SEAL. RUBBER SEAL SHALL CONFORM TO AWWA C111. NEW SEWER FORCE MAINS SHALL BE THE COLOR GREEN AND LABELED AS "SFM".
- ALL SEWER FORCE MAINS CONSTRUCTED USING HDPE PIPE BETWEEN 4" AND 48" DIAMETER SHALL HAVE A PRESSURE CLASS OF 160 PSI (DR13.5) AND CONFORM TO DUCTILE IRON PIPE SIZES (DIPS). CONNECTIONS BETWEEN PIPE LENGTHS SHALL BE FUSED IN ACCORDANCE WITH THE MANUFACTURER'S DIRECTIONS AND RECOMMENDATIONS. NEW HDPE SEWER FORCE MAINS SHALL BE THE COLOR BLACK WITH A GREEN STRIPE. CONNECTIONS TO OTHER SEWER FORCE MAINS, INCLUDING THOSE OF DIFFERENT MATERIAL, SHALL BE MADE USING THE APPROPRIATE ADAPTERS AND FITTINGS.
- NEW SEWER FORCE MAINS INSTALLED USING HORIZONTAL DIRECTIONAL DRILLING (HDD) METHODS SHALL USE HIGH-DENSITY POLYETHYLENE (HDPE) PIPE CONFORMING TO NOTE #5 ABOVE.
- UPON COMPLETION OF SEWER FORCE MAIN CONSTRUCTION, THE DRILLING LOGS FOR ALL HDD INSTALLED FORCE MAINS SHALL BE PROVIDED WITH THE RECORD DRAWINGS/AS-BUILT PLANS. THE DRILLING LOGS SHALL CONTAIN, AT MINIMUM, THE SIZE OF THE FORCE MAIN, THE DEPTH OF INSTALLATION, AND THE LENGTH OF THE SEGMENT.

- THE CONTRACTOR SHALL INSTALL A TRACER WIRE ALONG THE ENTIRE LENGTH OF THE FORCE MAIN. THE TRACER WIRE SHALL BE INSTALLED SIMULTANEOUSLY WITH THE FORCE MAIN.
- JOINT RESTRAINTS FOR PVC PIPE BELL JOINTS SHALL BE RESTRAINED WITH A SERIES 1900 SERRATED RESTRAINT HARNESS MANUFACTURED BY EBBA, INC. OR APPROVED EQUAL.

- ALL APPLICABLE FORCE MAIN JOINTS SHALL BE RESTRAINED IN ACCORDANCE WITH THE PROVIDED DETAIL. THE MINIMUM RESTRAINT LENGTH FOR PVC PIPE JOINTS SHALL BE IN ACCORDANCE WITH THE PROVIDED DETAIL.

- NEW SEWER FORCE MAIN FITTINGS SHALL BE DUCTILE IRON FITTINGS CONFORMING TO AWWA C110/A21.10 WITH FITTING JOINTS CONFORMING TO AWWA C111/A21.11. THE DUCTILE IRON FITTING SHALL BE EPOXY COATED INSIDE AND OUT. FITTINGS SHALL BE MECHANICAL JOINT (MJ) FITTINGS. THE CONNECTION BETWEEN THE PVC FORCE MAIN AND THE FITTING SHALL BE RESTRAINED WITH A 2000PV OR 2000SV MEGA-LUG MECHANICAL JOINT THRUST RESTRAINT MANUFACTURED BY EBBA, INC. OR AN APPROVED EQUAL. THE NUTS AND BOLTS SHALL BE TEFLON COATED COR-TEN FASTENERS.

- THE CONTRACTOR SHALL INSTALL IDENTIFICATION TAPE ALONG THE ENTIRE LENGTH OF THE NEW SEWER FORCE MAIN. IDENTIFICATION TAPE SHALL BE INSTALLED BY THE CONTRACTORS ONCE THE BACKFILL HAS BEEN PLACED AND COMPACTED TO AT LEAST 12" ABOVE THE TOP OF THE PIPE AND NOT MORE THAN 18" ABOVE THE CONNECTION.

- AIR RELEASE VALVES (ARVS) SHALL BE LOCATED UPSTREAM OF THE LIFT STATIONS AND AT HIGH POINTS ALONG THE LENGTH OF THE FORCE MAIN. THE ARVS SHALL BE CONTAINED WITHIN A STANDARD PRE-CAST SEWER MANHOLE.

- ALL NEW SEWER FORCE MAINS SHALL UNDERGO HYDROSTATIC TESTING TO VERIFY LEAK TIGHTNESS. NEW SEWER FORCE MAINS SHALL TESTED A 150 PSI FOR 2 HOURS. THERE SHALL BE NO PRESSURE DROPS DURING THE TEST. IN THE EVENT THE SEWER FORCE MAIN FAILS THE TEST, THE FORCE MAIN PIPES SHALL BE CHECKED AND REPAIRED ACCORDINGLY. THE FORCE MAIN SHALL BE RE-TESTED.

SEWER LINETYPES AND SYMBOLS	
SYMBOL	MEANING
SS	GRAVITY SEWER LINE
6"HC	SEWER SERVICE LINE
SFM	SEWER FORCE MAIN
EFM	EFFLUENT FORCE MAIN
↔	SINGLE SEWER HOUSE CONNECTION
↔	DUAL SEWER HOUSE CONNECTION
	SEWER CLEAN-OUT
	SEWER MANHOLE
LS	SEWER LIFT STATION
	VALVE ON SEWER FORCE MAIN
WATER LINETYPES AND SYMBOLS	
SYMBOL	MEANING
W	WATER MAIN
↔	SINGLE WATER SERVICE CONNECTION
↔	DUAL WATER SERVICE CONNECTION
	WATER METER
	FIRE HYDRANT
(V)	WATER VALVE & MANHOLE
	BACK FLOW PREVENTER
VALVE SYMBOLS	
SYMBOL	MEANING
↔	CHECK VALVE
↔	ISOLATION VALVE
	GATE VALVE
↔	PLUG VALVE
	TAPPING SLEEVE AND VALVE
	AIR RELEASE VALVE
	TEE, VALVE AND FIRE HYDRANT ASSEMBLY
GENERAL LINETYPES AND SYMBOLS	
SYMBOL	MEANING
R/W	RIGHT-OF-WAY
	SERVITUDE
OHP	OVERHEAD POWER LINE
UGE	POWER POLE
	UNDERGROUND POWER LINE
	PAD MOUNTED TRANSFORMER
GAS	GAS LINE
◇	GAS VALVE & MANHOLE
D	DRAINAGE CULVERT, SUBSURFACE
	TOP OF DITCH
	DRAINAGE DROP INLET OR CATCH BASIN
	DEMOLITION AND REMOVAL
	PORTLAND CEMENT CONCRETE
	GRANULAR BACKFILL, COMPACTED
	BEDDING MATERIAL, COMPACTED
	SELECT FILL (IN SITU SOILS), COMPACTED



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

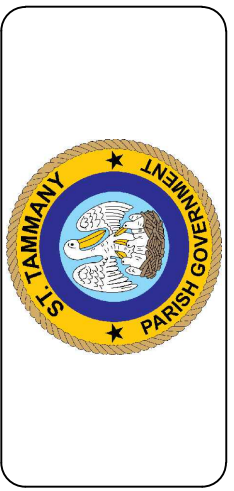
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DESIGNED BY: M LOKER	DRAWN BY: J. HITT
CHECKED BY: J. CATALANOTTO	FARWAY CE
PROJECT No.: DU 168,170.	175, 177
ISSUE DATE: 08/20/2024	APPROVED BY: D. MARTIN
SHEET SIZE: ANSI D 34x22	AS NOTED



BREWSTER ROAD SEWER
CONSOLIDATION
GENERAL SEWER NOTES AND
SYMBOLS CONTINUED

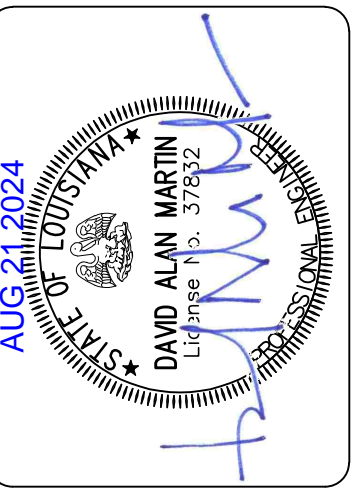
SHEET NO.
G-05



DEPT. OF UTILITIES
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GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

NO.	DESCRIPTION OF REVISION	DATE:
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DESIGNED BY:	M. LOKER
DRAWN BY:	J. HITT
CHECKED BY:	J. CATLANOTTO
PROJECT NO.:	DU 168,170.
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED



BREWSTER ROAD SEWER
CONSOLIDATION
DESIGN CRITERIA AND PIPE
SCHEDULES

SHEET NO.
G-06

PIPING USAGE SCHEDULE

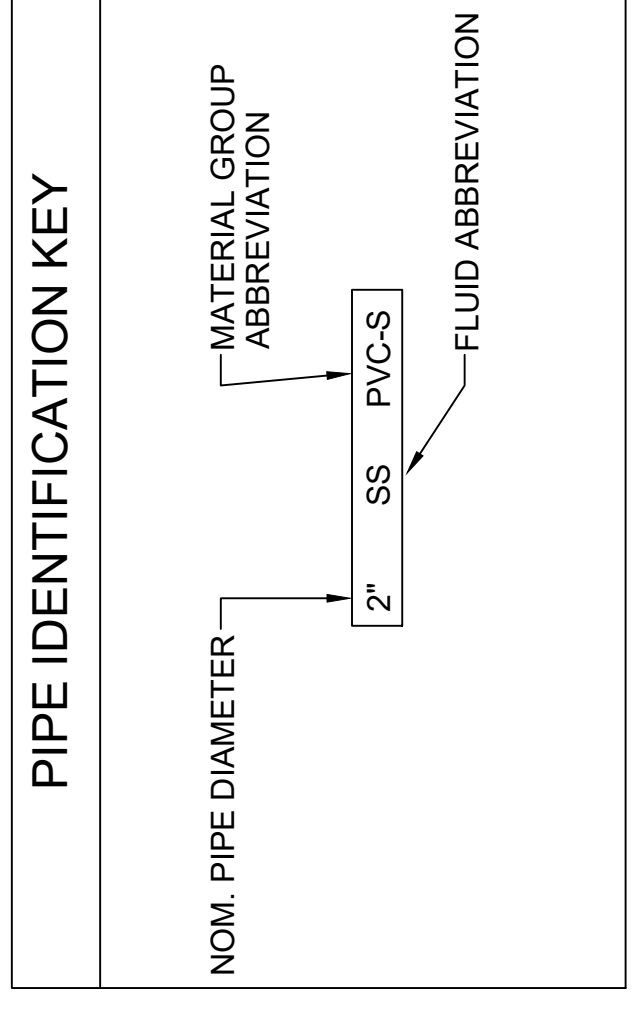
FLUID SERVICE	ABB.	PIPING MATERIALS	PIPING TEST MEDIUM	MINIMUM TEST PRESSURE (PSI)	LEAKAGE ALLOWANCE	PIPE COLOR WHERE EXPOSED	PIPE MARKER COLOR WHERE EXPOSED	LETTER COLOR WHERE EXPOSED	REMARKS
SANITARY SEWERAGE (GRAVITY)	SS-G	EXISTING, PVC-S	N/A	N/A	N/A	N/A	N/A	N/A	---
SANITARY SEWERAGE (FORCED)	SFM	CELDI	WATER	125	N/A	GREEN	GREEN	WHITE	---
STORM SEWER (GRAVITY)	STM	RCP	N/A	N/A	N/A	N/A	N/A	N/A	---

PIPING MATERIALS SCHEDULE

MATERIAL GROUP	GROUP ABBREVIATION	PIPING SPECIFICATION	FITTING SPECIFICATION	VALVE SPECIFICATION	REMARKS
CERAMIC EPOXY LINED DUCTILE IRON PIPE	CELDI	CERAMIC EPOXY LINED DUCTILE IRON, AWWA C151 BELL AND SPIGOT ENDS, MECHANICAL JOINT FITTINGS AND PIPE TO PIPE JOINTS WHERE BURIED AND FLANGED PIPE TO FITTING JOINT WHERE EXPOSED OR IN VAULTS, INTERIOR LINED WITH APPROVED CERAMIC EPOXY	CERAMIC EPOXY LINED DUCTILE IRON, AWWA C153, FULLY RESTRAINED MECHANICAL JOINT FITTINGS WHERE BURIED AND GASKETED FITTINGS WHERE EXPOSED OR IN VAULTS, INTERIOR LINED WITH APPROVED CERAMIC EPOXY	GATE: DUCTILE IRON OR CAST IRON RESILIENT SEAT AWWA C509/C515 COMPLYING WITH VALVE SPECIFICATION, ARV: DUCTILE IRON BODY COMBINATION AIR RELEASE VALVE WITH VALVE SPECIFICATIONS, CHECK: DUCTILE IRON BODY RUBBER FLAPPER CHECK VALVE COMPLYING WITH VALVE SPECIFICATIONS, PLUG: ECCENTRIC NON-LUBRICATED PLUG VALVE, DUCTILE IRON COMPLYING WITH VALVE SPECIFICATIONS	---
HIGH DENSITY POLYETHYLENE SERVICE TUBE	HDPE-C901	HIGH DENSITY POLYETHYLENE SERVICE TUBING, AWWA C901, IRON PIPE SIZE, SDR 9, FUSION BUTT WELDED JOINTS	HIGH DENSITY POLYETHYLENE FITTINGS, FUSION BUTT WELD, ASTM D3261, PRESSURE RATING TO MEET OR EXCEED TUBE PRESSURE RATING.	GATE: DUCTILE IRON OR CAST IRON RESILIENT SEAT AWWA C509/C515 COMPLYING WITH VALVE SPECIFICATION, ARV: DUCTILE IRON BODY COMBINATION AIR RELEASE VALVE WITH VALVE SPECIFICATIONS, CHECK: DUCTILE IRON BODY RUBBER FLAPPER CHECK VALVE COMPLYING WITH VALVE SPECIFICATIONS, PLUG: ECCENTRIC NON-LUBRICATED PLUG VALVE, DUCTILE IRON COMPLYING WITH VALVE SPECIFICATIONS	---
POLYVINYL CHLORIDE PRESSURE PIPE	C900	POLYVINYL CHLORIDE, AWWA C900, DR 18, BLUE FOR WATER MAINS AND GREEN FOR SEWERAGE FORCE MAINS.	CERAMIC LINED DUCTILE IRON, AWWA C153, FULLY RESTRAINED MECHANICAL JOINT FITTINGS, INTERIOR LINED WITH APPROVED CERAMIC EPOXY.	GATE: DUCTILE IRON OR CAST IRON RESILIENT SEAT AWWA C509/C515 COMPLYING WITH VALVE SPECIFICATION, ARV: DUCTILE IRON BODY COMBINATION AIR RELEASE VALVE WITH VALVE SPECIFICATIONS, CHECK: DUCTILE IRON BODY RUBBER FLAPPER CHECK VALVE COMPLYING WITH VALVE SPECIFICATIONS, PLUG: ECCENTRIC NON-LUBRICATED PLUG VALVE, DUCTILE IRON COMPLYING WITH VALVE SPECIFICATIONS	---
HIGH DENSITY POLYETHYLENE PIPE	HDPE-C906	HIGH DENSITY POLYETHYLENE, AWWA C906, DR 11, WITH INDELIBLE BLUE STRIPE FOR WATER MAINS AND INDELIBLE GREEN STRIPE FOR SEWER MAINS.	CERAMIC LINED DUCTILE IRON, AWWA C153, FULLY RESTRAINED MECHANICAL JOINT FITTINGS, INTERIOR LINED WITH APPROVED CERAMIC EPOXY, PROVIDE FUSED ADAPTER WITH BACKUP RING.	GATE: DUCTILE IRON OR CAST IRON RESILIENT SEAT AWWA C509/C515 COMPLYING WITH VALVE SPECIFICATION, ARV: DUCTILE IRON BODY COMBINATION AIR RELEASE VALVE WITH VALVE SPECIFICATIONS, CHECK: DUCTILE IRON BODY RUBBER FLAPPER CHECK VALVE COMPLYING WITH VALVE SPECIFICATIONS, PLUG: ECCENTRIC NON-LUBRICATED PLUG VALVE, DUCTILE IRON COMPLYING WITH VALVE SPECIFICATIONS	---
PVC SEWER PIPE	PVC-SS	POLYVINYL CHLORIDE GRAVITY SEWER PIPE, ASTM D3034, BELL AND SPIGOT	POLYVINYL CHLORIDE, ANSI/ASTM D3034, BELL AND/OR SPIGOT	N/A	---
EXISTING DUCTILE IRON	DI - EXIST	EXISTING DUCTILE IRON	EXISTING DUCTILE IRON	EXISTING VALVES	---
EXISTING PVC	PVC - EXIST	EXISTING POLYVINYL CHLORIDE	EXISTING POLYVINYL CHLORIDE	EXISTING VALVES	---
RCP	RCP-STM	REINFORCED CONCRETE, ASTM C78, RUBBER GASKETED JOINTS LISTED ON LADOTD AML	N/A		---

FAIRFIELD OAKS, THREE RIVERS, AND TCHEFUNCTE PARC DESIGN CRITERIA

	FAIRFIELD LIFT STATION	THREE RIVERS LIFT STATION	TCHEFUNCTE PARC LIFT STATION
TYPE OF PUMP	SELF-PRIMING	SUBMERSIBLE	SUBMERSIBLE
SUCTION LINE	3"	N/A - SUBMERSIBLE	N/A - SUBMERSIBLE
DISCHARGE LINE	3"	4"	10"
COMMON LINE	4"	4"	10"
MAXIMUM SOLIDS PASSIAGE (2-1/2" MINIMUM)	3"	3"	3"
GATE VALVE ON SUCTION	NO	N/A - SUBMERSIBLE	N/A - SUBMERSIBLE
GATE VALVE ON DISCHARGE	YES	YES	YES
CHECK VALVE ON DISCHARGE	YES	YES	YES
AIR RELEASE VALVE ON DISCHARGE	YES	YES	YES
DETENTION/DESIGN FLOW	7.5 MIN	7.5 MIN	7.5 MIN
PUMP CYCLE TIME	15.0 MIN	15.0 MIN	15.0 MIN
VOLUME (LOW WATER TO LEAD PUMP ON)	563 GALLONS	450 GALLONS	3,372 GALLONS
WELL MATERIAL	REINFORCED CONCRETE	REINFORCED CONCRETE	REINFORCED CONCRETE
DIAMETER (FEET)	6' INSIDE DIAMETER	6' INSIDE DIAMETER	10' INSIDE DIAMETER
BOTTOM ELEVATION	0.67'	9.70'	(-14.67')
INVERT OF INFLUENT	9.80'	16.00'	7.57'
FLOOR SLOPE	AS RECOMMENDED BY MANUFACTURER	AS RECOMMENDED BY MANUFACTURER	AS RECOMMENDED BY MANUFACTURER
ACCESS COVER SIZE	AS RECOMMENDED BY MANUFACTURER	AS RECOMMENDED BY MANUFACTURER	AS RECOMMENDED BY MANUFACTURER
VENTED	YES	YES	YES
SCREENED	YES	YES	YES
FORCE MAIN SIZE	4"	4"	12"
FORCE MAIN MATERIAL	PVC/HDPE	PVC/HDPE	PVC/HDPE
FORCE MAIN VELOCITY	3.83 FPS	3.06 FPS	2.55 FPS
LIFT STATION COVER CONSTRUCTION	ALUMINUM (H-20 RATED)	ALUMINUM (H-20 RATED)	ALUMINUM (H-20 RATED)
NO. OF PUMPS	2	2	3
ALARM SYSTEM - AUDIBLE	YES	YES	YES
ALARM SYSTEM - VISUAL	YES	YES	YES
TELEMETRY	FUTURE	FUTURE	FUTURE
STATION CAPACITY	150 GPM	120 GPM	900 GPM
TOTAL DYNAMIC HEAD	42 FT	26 FT	172 FT
PUMP HP	7.5	3.5	72

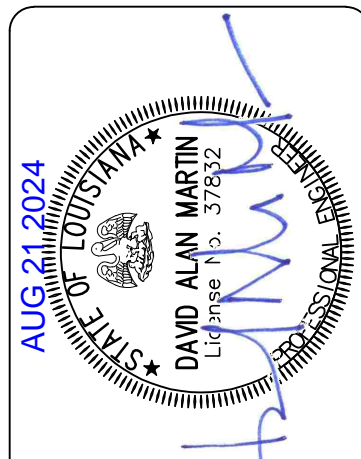




DEPT. OF UTILITIES
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GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

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DESIGNED BY:	M. LOKER
DRAWN BY:	J. HITT
CHECKED BY:	U. CATLANOTTO
PROJECT NO.:	DU 168,170.
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED
AS NOTED:	



BREWSTER ROAD SEWER
CONSOLIDATION
PROJECT SCHEMATIC

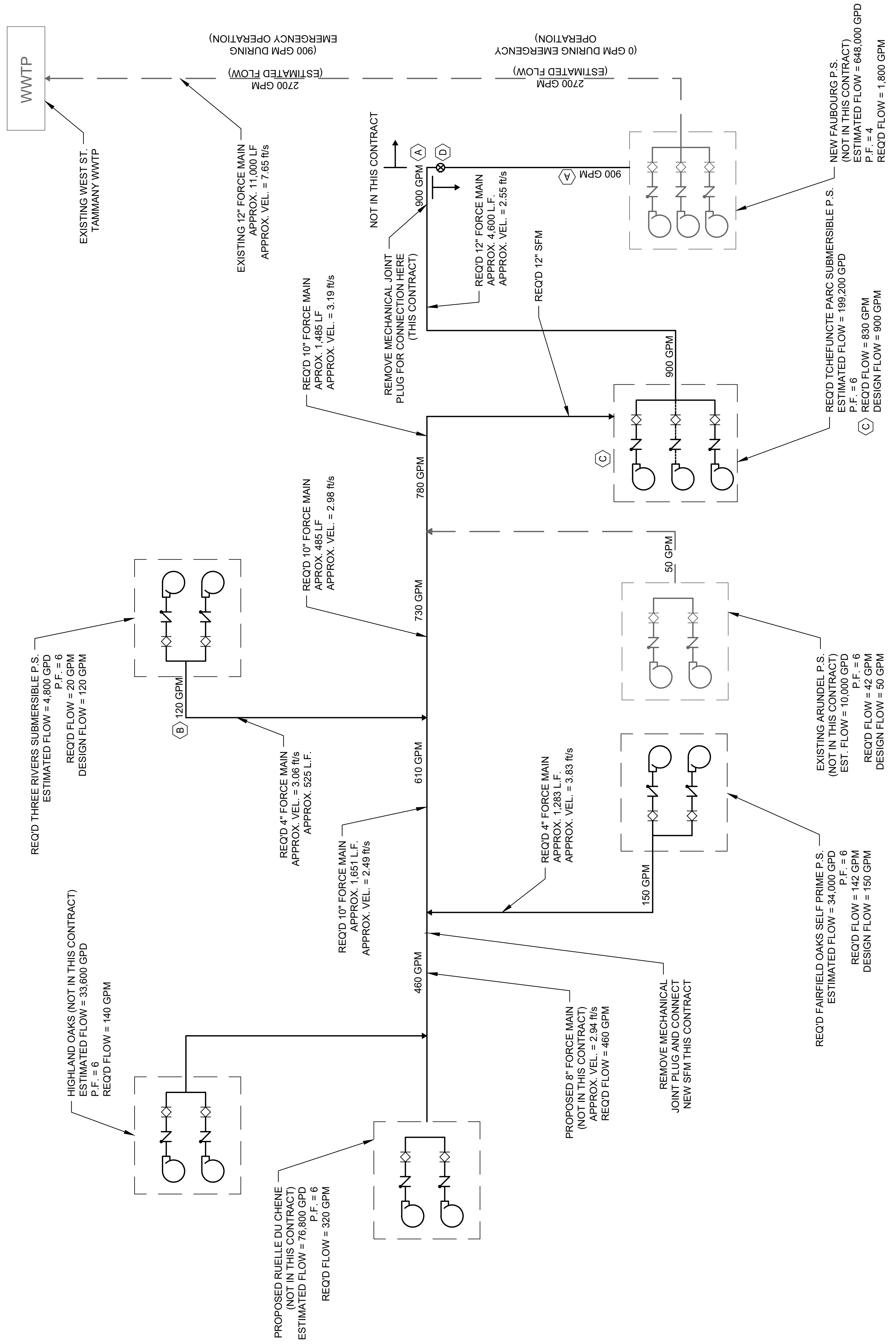
SHEET NO.
G-07

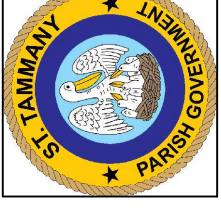
GENERAL NOTES

- ALL PROPOSED PIPELINES MODELED USING C=140, AND EXISTING PIPELINES USING C=120.
- SCHEMATIC IS CONCEPTUAL AND NOT FOR CONSTRUCTION.
- THIS SCHEMATIC IS ILLUSTRATIVE IN NATURE AND IS MEANT FOR ILLUSTRATION OF THE DESIGN CONCEPT AND THE SCOPE OF THE WORK AND IS NOT TO BE USED FOR CONSTRUCTION DETAILS. REFER TO OTHER PLAN SHEETS FOR DETAILED REQUIREMENTS.
- EXISTING PUBLICLY OWNED TREATMENT WORKS TO BE DEMOLISHED ARE NOT SHOWN ON THE DRAWING.
- IN ORDINARY OPERATION, THE TCHEFUNCTE PARC STATION WILL DISCHARGE TO FAUBOURG NO. 2 VIA FORCE MAIN EXTENDED (NOT IN THIS CONTRACT) BY OTHERS. IN EMERGENCY OPERATION, THE TCHEFUNCTE PARC PUMP STATION WILL DISCHARGE DIRECTLY TO WEST ST/TAMMANY WWTP VIA FORCE MAIN ALONG LA 1077. EMERGENCY OPERATION ASSUMES THAT FAUBOURG NO. 2 STATION IS NOT OPERABLE AND IT IS PRESUMED THAT NO FLOW COMES FROM FAUBOURG NO. 2 DURING EMERGENCY OPERATIONS.

SHEET KEYNOTES

- ASSUMED THAT ONLY FLOW IN THE PIPELINE IS FROM PROPOSED TCHEFUNCTE PARC L.S.
- MINIMUM FLOW TO ACHIEVE 3 FT/S IN 4" FORCE MAIN. ALLOW NON CLOG PUMPS
- ESTIMATED FLOW INCLUDE LES BOIS SUBDIVISION.
- REQD GATE VALVE, NORMALLY OPEN (CLOSED DURING EMERGENCY OPERATION (NOT IN THIS CONTRACT))
- REQD GATE VALVE, NORMALLY CLOSED, (OPEN DURING EMERGENCY OPERATION) (NOT IN THIS CONTRACT)

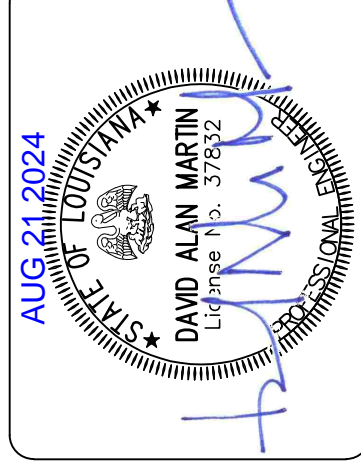




DEPT. OF UTILITIES
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COVINGTON, LA 70433

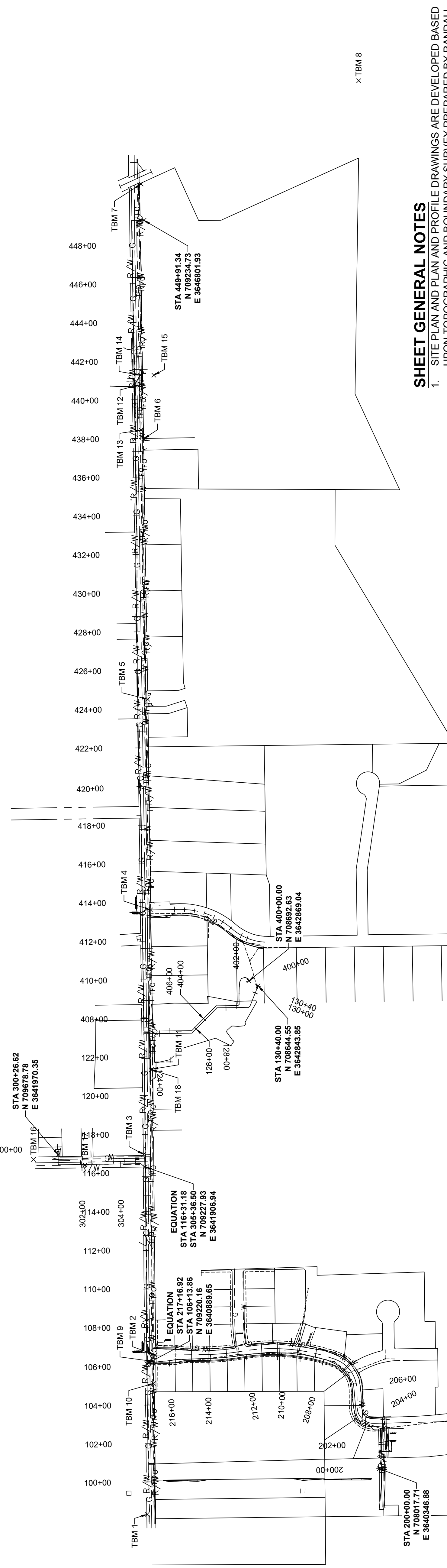
No.	DESCRIPTION OF REVISION	DATE:
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DESIGNED BY:	M. LOKER
DRAWN BY:	J. HITT
CHECKED BY:	J. CATLANOTTO
SUBMITTED BY:	FAIRWAY CE
PROJECT No.:	DU 168,170.
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED



PROJECT TBM MAP
CONSOLIDATION
BREWSTER ROAD SEWER

SHEET NO.
G-08



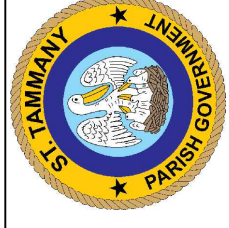
x TBM 8

SHEET GENERAL NOTES

1. SITE PLAN AND PLAN AND PROFILE DRAWINGS ARE DEVELOPED BASED UPON TOPOGRAPHIC AND BOUNDARY SURVEY PREPARED BY RANDALL R. BROWN AND ASSOCIATES, LLC, DATED AUGUST 2022.
2. ELEVATIONS ARE REFERENCED TO NAVD 88.
3. COORDINATES ARE GIVEN IN STATE PLANE.

TEMPORARY BENCHMARKS

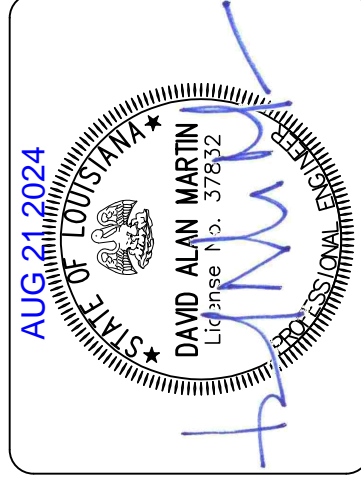
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E: 3640110.4777
Z: 19.09
- TBM 2: PRIMARY CONTROL MAG NAIL
N: 709176.4225
E: 3640934.8075
Z: 19.32
- TBM 3: PRIMARY CONTROL IR 3
N: 709236.5019
E: 3641972.3593
Z: 19.59
- TBM 4: PRIMARY CONTROL PK NAIL
N: 709200.9781
E: 3643236.1437
Z: 18.66
- TBM 5: PRIMARY CONTROL PK NAIL
N: 709215.2633
E: 3644325.0479
Z: 19.53
- TBM 6: PRIMARY CONTROL IP FND
N: 709236.2680
E: 3645671.8891
Z: 20.34
- TBM 7: PRIMARY CONTROL IR SET
N: 709249.6115
E: 3646989.5575
Z: 21.00
- TBM 8: PRIMARY CONTROL PK NAIL
N: 708124.5117
E: 3647523.5493
Z: 20.32
- TBM 9: PRIMARY CONTROL PK FND
N: 709187.3225
E: 3640901.7376
Z: 19.35
- TBM 10: PRIMARY CONTROL PK NAIL
N: 709184.7091
E: 3640787.7392
Z: 19.16
- TBM 11: PRIMARY PK NAIL
N: 709193.0672
E: 3642412.6732
Z: 19.07
- TBM 12: PRIMARY CONTROL 60D NAIL
N: 709253.9779
E: 3645952.1578
Z: 19.37
- TBM 13: PRIMARY CONTROL 60D NAIL
N: 709249.7834
E: 3645716.9254
Z: 19.73
- TBM 14: PRIMARY CONTROL 60D NAIL
N: 709252.9189
E: 3646000.6992
Z: 19.74
- TBM 15: PRIMARY CONTROL 60D NAIL
N: 709183.6930
E: 3646000.9174
Z: 19.88
- TBM 16: PRIMARY CONTROL PK NAIL
N: 709806.1456
E: 3641946.4826
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- TBM 17: PRIMARY CONTROL PK NAIL
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E: 3641917.4148
Z: 19.66
- TBM 18: PRIMARY CONTROL X MARK
N: 709197.5642
E: 3642409.2343
Z: 19.07



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

No.	DESCRIPTION OF REVISION	DATE:
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DESIGNED BY:	M. LOKER
DRAWN BY:	J. HITT
CHECKED BY:	J. CATALANOTTO
PROJECT No.:	DU 168,170.
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED



BREWSTER ROAD SEWER
CONSOLIDATION
FAIRFIELD OAKS DEMOLITION - I

SHEET NO.
20D-01

DEMO PLAN GENERAL NOTES

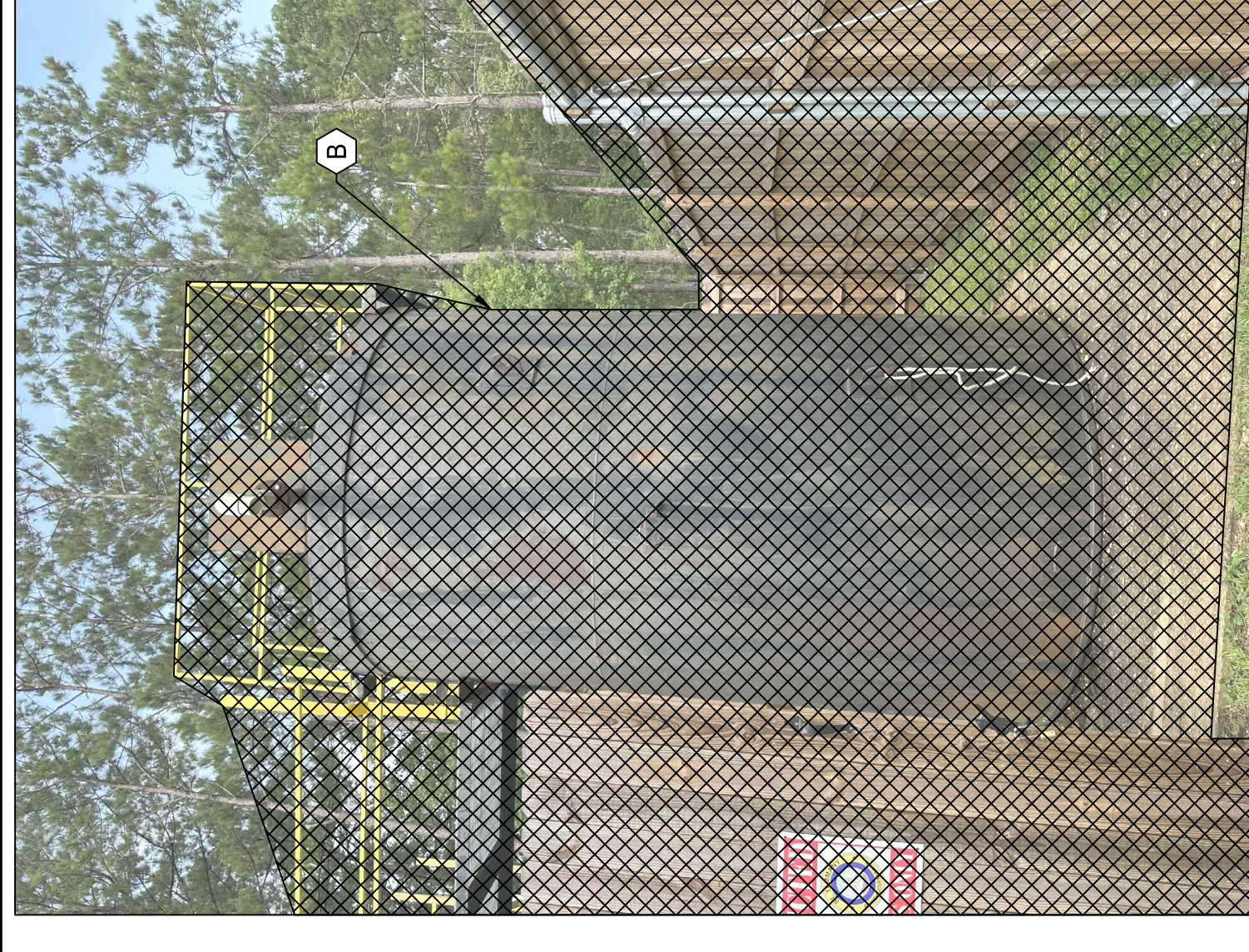
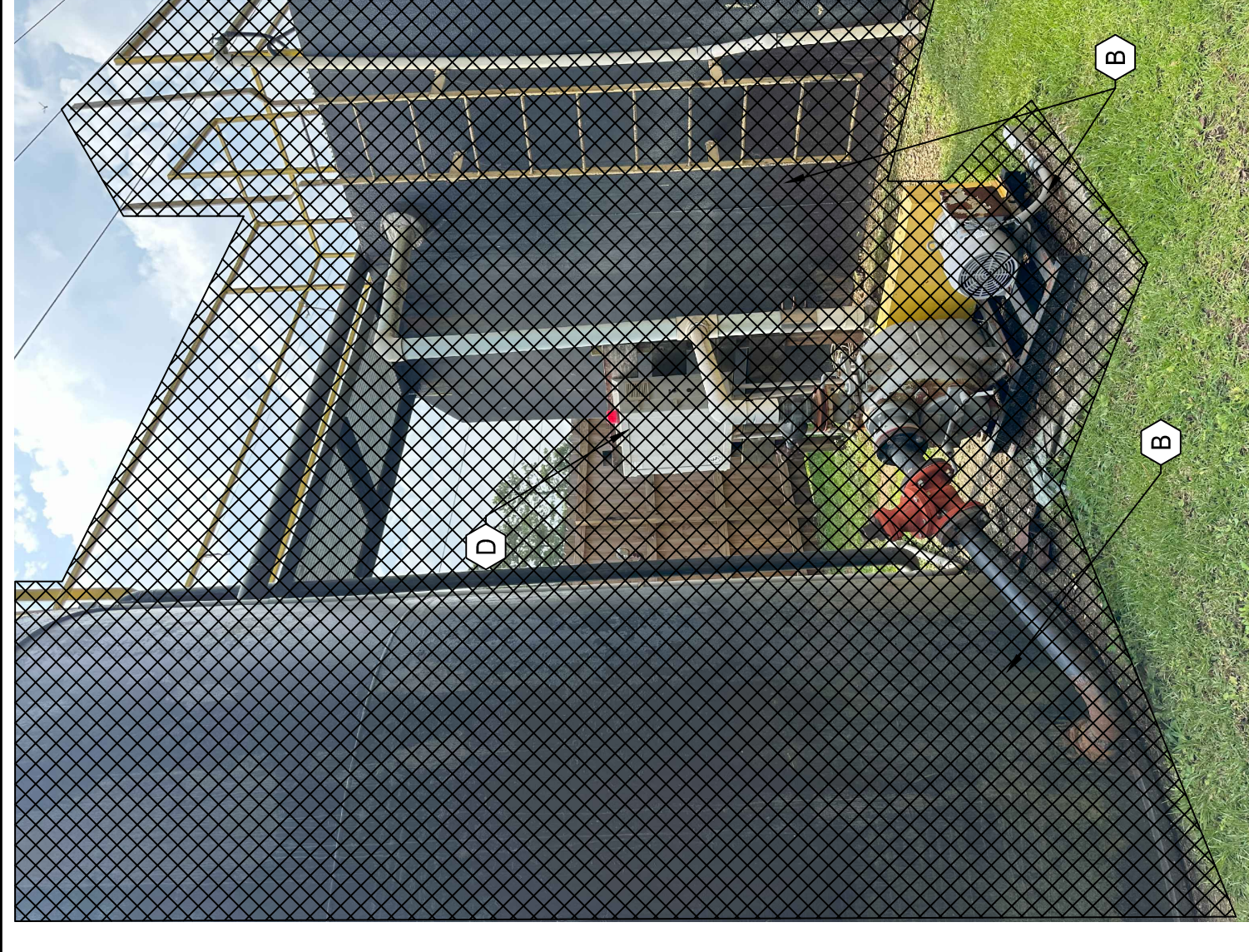
1. MAINTAIN EXISTING WASTEWATER TREATMENT PLANT AND LIFT STATION IN OPERATION UNTIL NEW STATION AND FORCE MAINS ARE PLACED IN SERVICE.
2. DEMOLITION OF STRUCTURES: INCLUDE IN THE DEMOLITION OF ABOVEGROUND STRUCTURES DISPOSAL OF ABOVEGROUND STRUCTURES MECHANICAL EQUIPMENT, TANKAGE, FOUNDATION WALLS TO THREE FEET BELOW EXISTING GRADE. UTILITY LINES EXPOSED BY DEMOLITION, ELECTRICAL EQUIPMENT, CABLING, AND ALL OTHER ITEMS WHICH CAN REASONABLY BE INFERRED ARE PART OF THE EXISTING FACILITY.
3. DELIVER CONTROL PANELS, VALVES, PUMPS, BLOWERS, AND TANKAGE TO THE DEPARTMENT OF UTILITIES YARD AT 620 NORTH TYLER STREET, COVINGTON, LA.
3. DISPOSE OF ALL WASTEWATER AND SLUDGE REMOVED FROM STATION AT WEST ST. TAMMANY SEWER TREATMENT PLANT OR AS OTHERWISE DIRECTED BY THE OWNER.
4. CAREFULLY COORDINATE DEMOLITION OF FACILITIES WHICH ARE ADJACENT TO FACILITIES TO REMAIN.

SHEET KEYNOTES

- A. DEMOLISH AND DISPOSE OF EXISTING WOODEN FENCE AND ALL COMPONENTS WITHIN THE FAIRFIELD OAKS WWTP SITE.
- B. DEMOLISH AND DISPOSE OF EXISTING WASTE WATER TREATMENT PLANT AND ACCESSORIES INCLUDING AERATION, CLARIFIER, AND CHLORINE CONTACT BASIN PUMPS, WALKWAYS, PIPE, CONDUIT, ETC.
- C. DEMOLISH AND DISPOSE OF EXISTING CONCRETE SLAB
- D. DEMOLISH AND DISPOSE OF CONTROL PANEL AND ALL ELECTRICAL ACCESSORIES.
- E. EQUIPMENT DEMOLITION TABLE IS PROVIDED FOR CONVENIENCE ONLY. VERIFY IN FIELD PRIOR TO SUBMITTING A BID

EQUIPMENT DEMOLITION TABLE (E)

WWTP		
SITE FEATURE	LENGTH X DEPTH X HEIGHT	
CLARIFIER	16ft X 8 ft x 11ft	
CHLORINE CONTACT CHAMBER	3 ft x 8 ft x 11 ft	
AERATION BASIN	35 ft x 12 ft x 11 ft	
TANK	DIAMETER 8 ft HEIGHT 13 ft 4 in	
SLAB	60 ft x 14 ft x 8 in	
FENCE	85 ft x 24 ft x 8 ft	

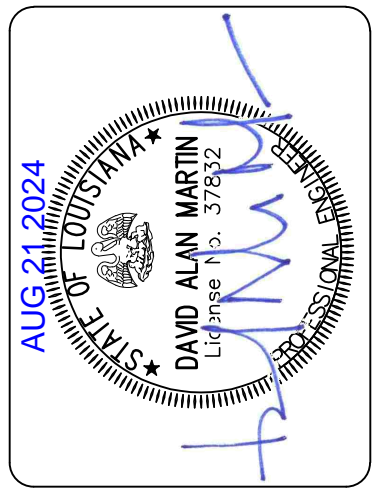




DEPT. OF UTILITIES
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DESIGNED BY:	M. LOKER
DRAWN BY:	J. HITT
CHECKED BY:	J. CATLANOTTO
SUBMITTED BY:	FAIRWAY CE
PROJECT No.:	DU 168,170,
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED



BREWSTER ROAD SEWER
CONSOLIDATION
FAIRFIELD OAKS DEMOLITION - II

SHEET NO.
20D-02

DEMO PLAN GENERAL NOTES

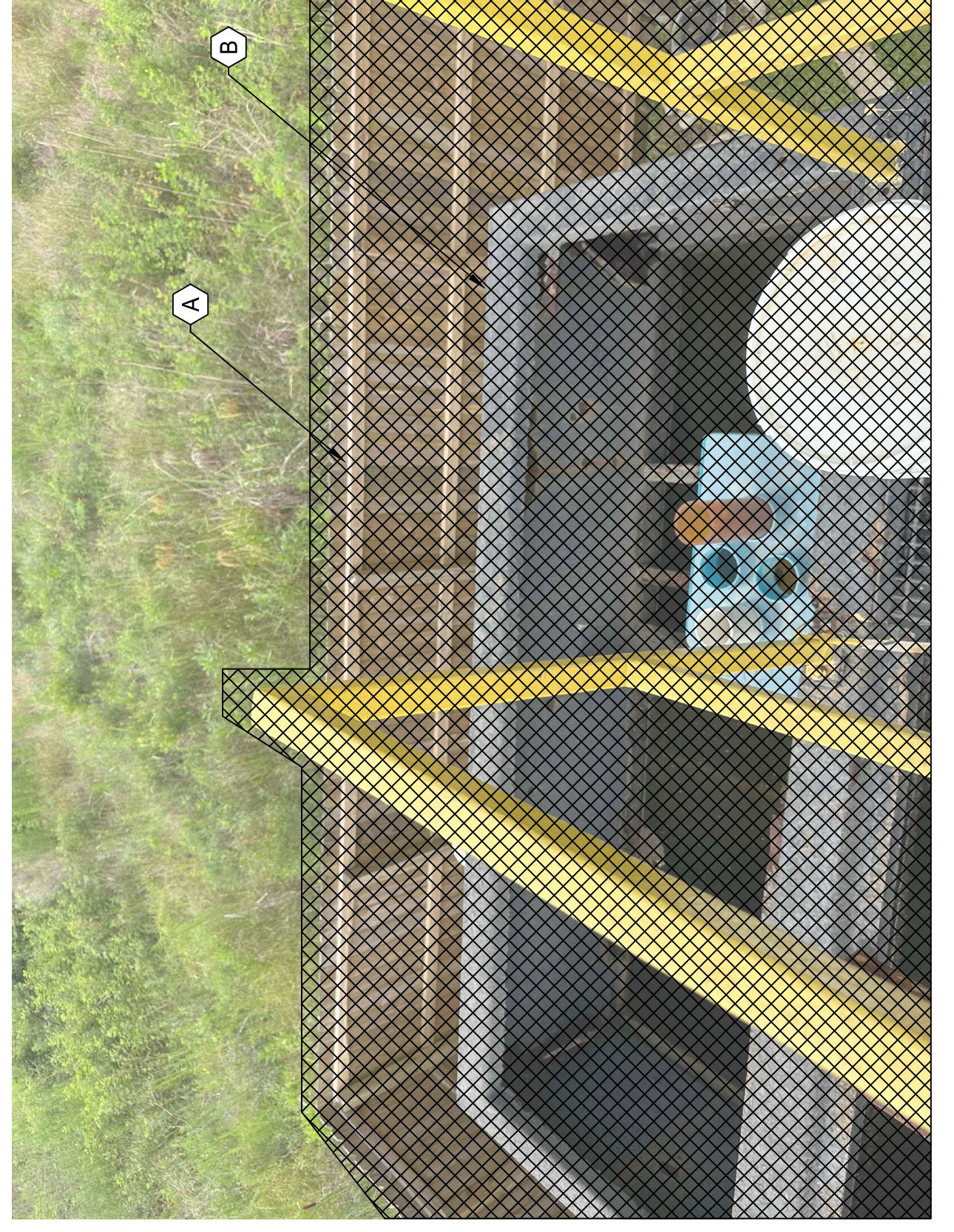
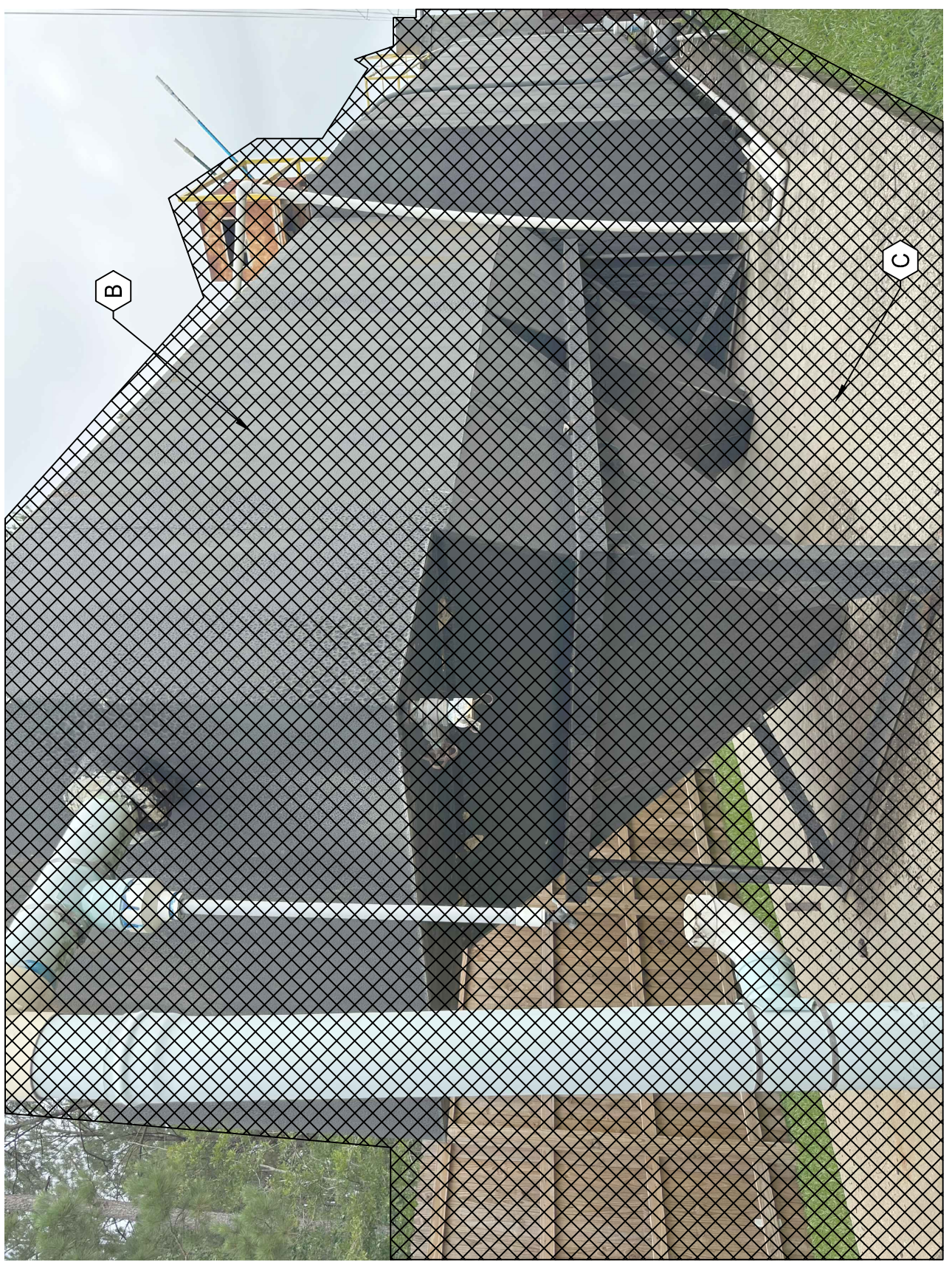
1. MAINTAIN EXISTING WASTEWATER TREATMENT PLANT AND LIFT STATION IN OPERATION UNTIL NEW STATION AND FORCE MAINS ARE PLACED IN SERVICE.
2. DEMOLITION OF STRUCTURES: INCLUDE IN THE DISPOSAL OF ABOVEGROUND STRUCTURES MECHANICAL EQUIPMENT, TANKAGE, FOUNDATION WALLS TO THREE FEET BELOW EXISTING GRADE, UTILITY LINES EXPOSED BY DEMOLITION, ELECTRICAL EQUIPMENT, CABLING, AND ALL OTHER ITEMS WHICH CAN REASONABLY BE INFERRED ARE PART OF THE EXISTING FACILITY.
3. DELIVER CONTROL PANELS, VALVES, PUMPS, BLOWERS, AND TANKAGE TO THE DEPARTMENT OF UTILITIES YARD AT 620 NORTH TYLER STREET, COVINGTON, LA.
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4. CAREFULLY COORDINATE DEMOLITION OF FACILITIES WHICH ARE ADJACENT TO FACILITIES TO REMAIN.

SHEET KEYNOTES

- A. DEMOLISH AND DISPOSE OF EXISTING WOODEN FENCE AND ALL COMPONENTS WITHIN THE FAIRFIELD OAKS WWTP SITE.
- B. DEMOLISH AND DISPOSE OF EXISTING WASTE WATER TREATMENT PLANT AND ACCESSORIES INCLUDING AERATION, CLARIFIER, AND CHLORINE CONTACT BASIN PUMPS, WALKWAYS, PIPE, CONDUIT, ETC.
- C. DEMOLISH AND DISPOSE OF EXISTING CONCRETE SLAB
- D. DEMOLISH AND DISPOSE OF EXISTING CONTROL, CONDUIT, ELECTRICAL ACCESSORIES.
- E. DEMOLISH AND DISPOSE OF ALL EQUIPMENT, PIPE, CONDUIT, ETC. WITHIN WET WELL. WET WELL STRUCTURE TO BE REMOVED AND EXCAVATION BACK FILLED.

EQUIPMENT DEMOLITION TABLE

WWTP	
OBJECT	LENGTH X WIDTH X HEIGHT
CLARIFIER	16ft X 8 ft x 11ft
CHLORINE CONTACT CHAMBER	3 ft x 8 ft x 11 ft
AERATION BASIN	35 ft x 12 ft x 11 ft
TANK	DIAMETER 8 ft HEIGHT 13 ft 4 in
LIFT STATION	
SLAB	60 ft x 14 ft x 8 in
FENCE	85 ft x 24 ft x 8 ft
SLAB	6 ft x 5 ft 8 in x 1 ft
WET WELL	DIAMETER 5 ft
WOODEN RACK (INCLUDES ELECTRICAL EQUIPMENT)	4 ft x 3 ft





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DESIGNED BY:	M. LOKER
DRAWN BY:	J. HITT
CHECKED BY:	J. CATALANOTTO
PROJECT No.:	DU 168,170, 175, 177
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED



BREWSTER ROAD SEWER
CONSOLIDATION
THREE RIVERS DEMOLITION - I

SHEET NO.
30D-01

DEMO PLAN GENERAL NOTES

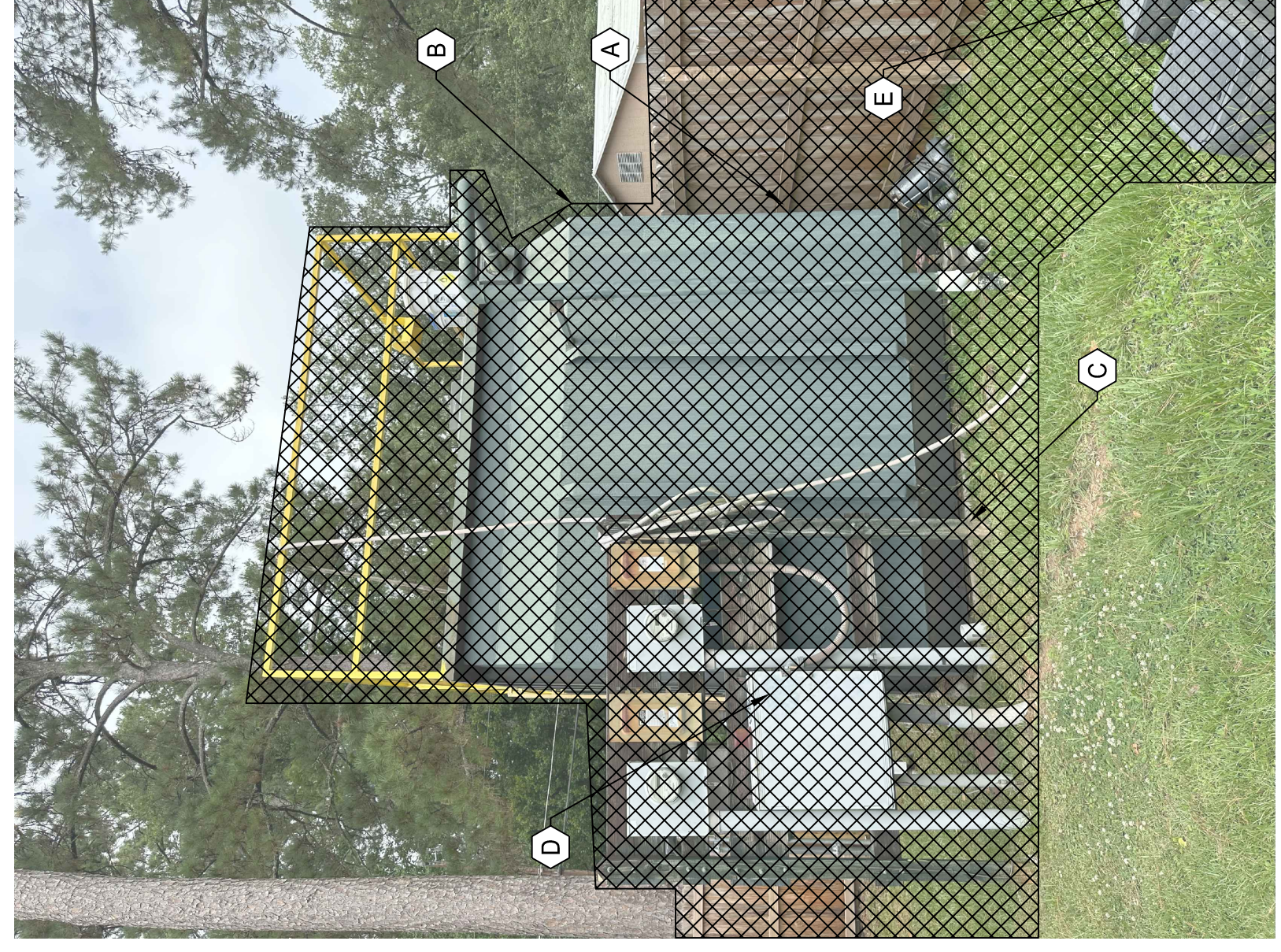
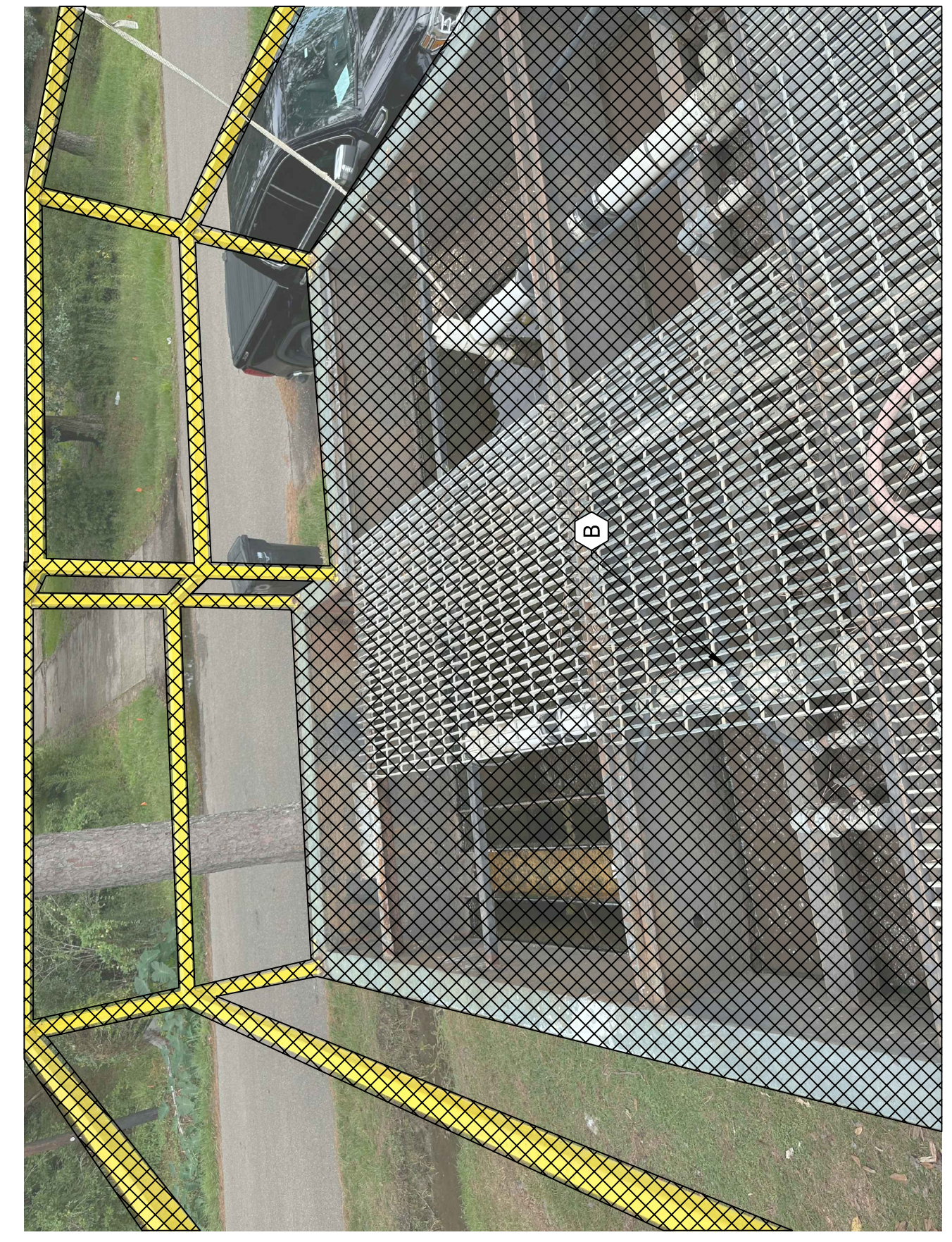
1. MAINTAIN EXISTING WASTEWATER TREATMENT PLANT AND LIFT STATION IN OPERATION UNTIL NEW STATION AND FORCE MAINS ARE PLACED IN SERVICE.
2. DEMOLITION OF STRUCTURES: INCLUDE IN THE DEMOLITION OF STRUCTURES THE REMOVAL AND DISPOSAL OF ABOVEGROUND STRUCTURES, MECHANICAL EQUIPMENT, TANKAGE, FOUNDATION WALLS TO THREE FEET BELOW EXISTING GRADE, UTILITY LINES EXPOSED BY DEMOLITION, ELECTRICAL EQUIPMENT, CABLING, AND ALL OTHER ITEMS WHICH CAN REASONABLY BE INFERRED ARE PART OF THE EXISTING FACILITY.
3. DELIVER CONTROL PANELS, VALVES, PUMPS, BLOWERS, AND TANKAGE TO THE DEPARTMENT OF UTILITIES YARD AT 620 NORTH TYLER STREET, COVINGTON, LA.
3. DISPOSE OF ALL WASTEWATER AND SLUDGE REMOVED FROM STATION AT WEST ST. TAMMANY SEWER TREATMENT PLANT OR AS OTHERWISE DIRECTED BY THE OWNER.
4. CAREFULLY COORDINATE DEMOLITION OF FACILITIES WHICH ARE ADJACENT TO FACILITIES TO REMAIN.

SHEET KEYNOTES

- A. SECTION OF EXISTING WOODEN FENCE TO BE DEMOLISHED AND DISPOSED OF.
- B. DEMOLISH AND DISPOSE OF EXISTING WASTE WATER TREATMENT PLANT AND ACCESSORIES INCLUDING AERATION, CLARIFIER, AND CHLORINE CONTACT BASIN PUMPS, WALKWAYS, PIPE, CONDUIT, ETC.
- C. DEMOLISH AND DISPOSE OF EXISTING CONCRETE SLAB
- D. DEMOLISH AND DISPOSE OF EXISTING WOODEN RACK INCLUDING CONTROL PANEL AND ALL OTHER ELECTRICAL EQUIPMENT.
- E. DEMOLISH AND DISPOSE OF ALL EQUIPMENT, PIPE, CONDUIT, ETC. WITHIN WET WELL. WET WELL STRUCTURE TO BE REMOVED AND EXCAVATION BACK FILLED.

EQUIPMENT DIMENSIONS TABLE

OBJECT	LENGTH X WIDTH X HEIGHT
CLARIFIER	9 ft x 8 ft x 10 ft
CHLORINE CONTACT CHAMBER	4.5 ft x 1.5 ft x 10 ft
AERATION BASIN	9 ft x 13 ft 10 in x 10 ft
FENCE	29.5 ft x 6 ft
WET WELL	DIAMETER 3.5 ft
WOODEN RACK (INCLUDING ELECTRICAL EQUIPMENT)	6 ft x 6 ft



DEMO PLAN GENERAL NOTES

1. MAINTAIN EXISTING LIFT STATION IN OPERATION UNTIL NEW STATION AND FORCE MAINS ARE PLACED IN SERVICE.
2. DEMOLITION OF STRUCTURES: INCLUDE IN THE DEMOLITION OF STRUCTURES THE REMOVAL AND DISPOSAL OF ABOVEGROUND STRUCTURES, MECHANICAL EQUIPMENT, FOUNDATION WALLS TO THREE FEET BELOW EXISTING GRADE, UTILITY LINES EXPOSED BY DEMOLITION, ELECTRICAL EQUIPMENT, CABLING, AND ALL OTHER ITEMS WHICH CAN REASONABLY BE INFERRED ARE PART OF THE EXISTING FACILITY.
3. DELIVER CONTROL PANELS, VALVES, AND PUMPS, TO THE DEPARTMENT OF UTILITIES YARD AT 620 NORTH TYLER STREET, COVINGTON, LA.
3. DISPOSE OF ALL WASTEWATER AND SLUDGE REMOVED FROM STATION AT WEST ST. TAMMANY SEWER TREATMENT PLANT OR AS OTHERWISE DIRECTED BY THE OWNER.
4. CAREFULLY COORDINATE DEMOLITION OF FACILITIES WHICH ARE ADJACENT TO FACILITIES TO REMAIN.

SHEET KEYNOTES 

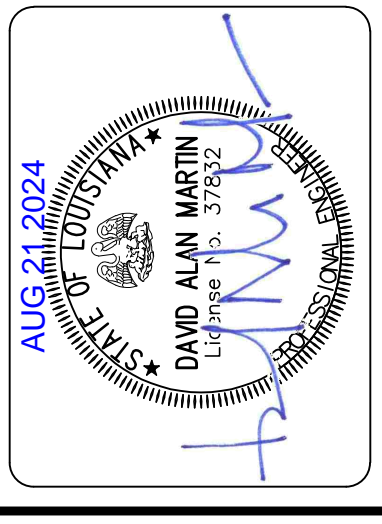
- A. PUMPING STATION AND ALL PIPING, VALVES, PUMPS, AND INTERNAL COMPONENTS TO BE DEMOLISHED AND DISPOSED OF.
- B. DEMOLISH AND DISPOSE OF EXISTING WOODEN RACK, CONTROL PANEL, CONDUIT, ELECTRICAL ACCESSORIES.
- C. DEMOLISH AND DISPOSE OF ALL EQUIPMENT, PIPE, CONDUIT, ETC. WITHIN WET WELL. WET WELL STRUCTURE TO BE REMOVED AND EXCAVATION BACK FILLED.



BREWSTER ROAD SEWER
CONSOLIDATION

TCHEFUNCTE PARC DEMOLITION - I

SHEET NO.
40D-01



DESIGNED BY:	M. LOKER
DRAWN BY:	J. HITT
CHECKED BY:	J. CATALANOTTO
PROJECT No.:	DU 168,170, 175, 177
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED

No.	DESCRIPTION OF REVISION	DATE:
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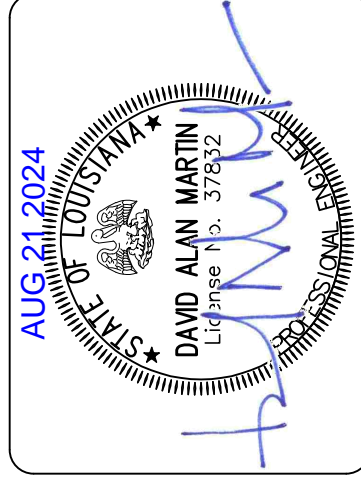




DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

No.	DESCRIPTION OF REVISION	DATE:
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DESIGNED BY:	M. LOKER
DRAWN BY:	J. HITT
CHECKED BY:	J. CATLANOTTO
SUBMITTED BY:	FAIRWAY CE
PROJECT No.:	DU 168,170.
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED



BREWSTER ROAD SEWER
CONSOLIDATION
CIVIL DETAILS III

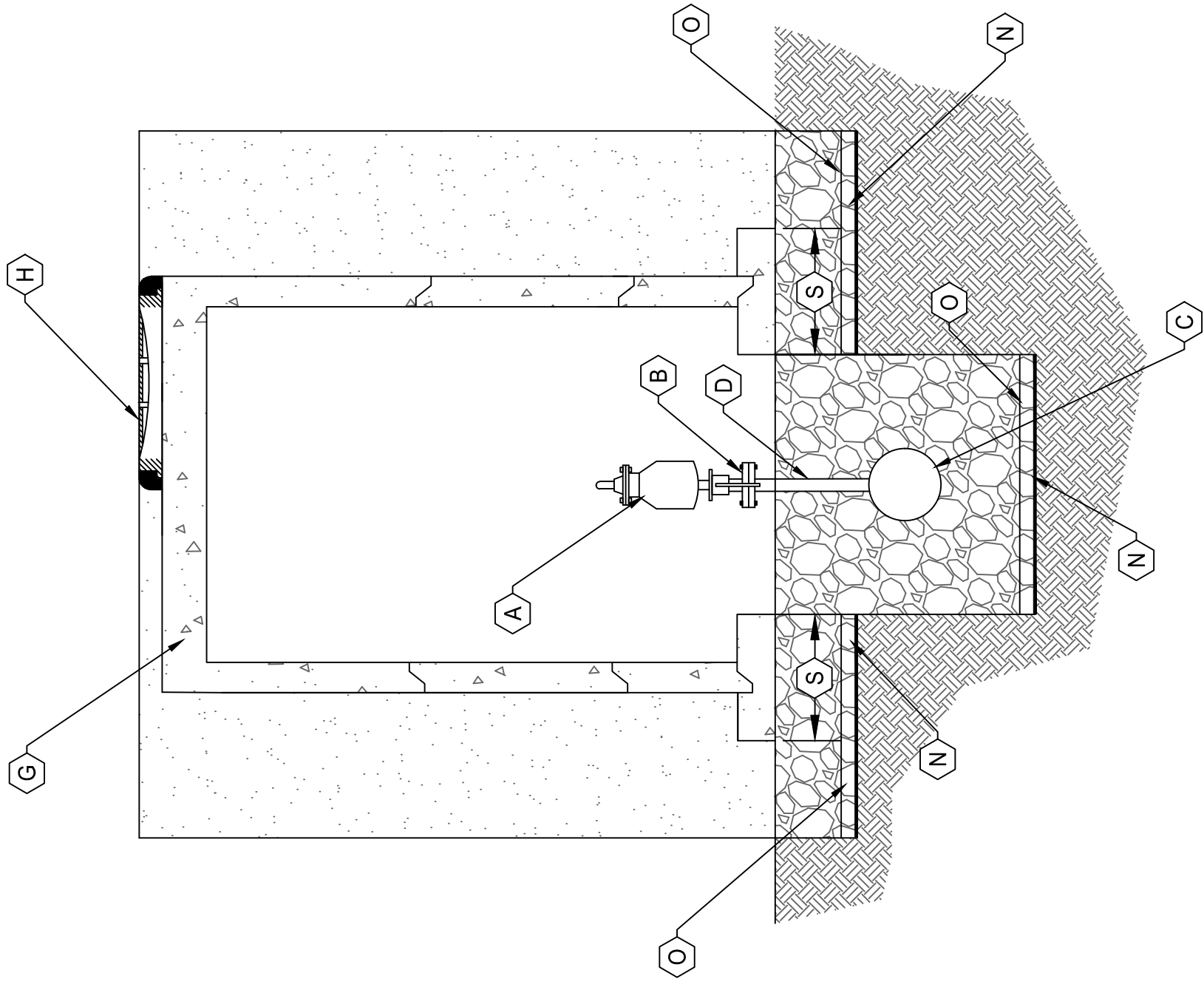
SHEET NO.
GC-03

GENERAL NOTES

- PRE-CAST CONCRETE, OPEN-BOTTOM VAULTS SHALL BE USED TO CONSTRUCT THE ARV VAULTS. VAULTS SHALL BE CONSTRUCTED OF PRE-CAST, REINFORCED CONCRETE STRUCTURE CONFORMING TO ASTM C858. ALL COMPONENTS OF THE VAULTS (I.E. FOOTING, RISER, AND TOP) SHALL CONFORM TO ASTM C858. THE PRE-CAST VAULT STRUCTURE SHALL BE DESIGNED TO MEET OR EXCEED AASHTO HS-20 LOADING.
- CONCRETE SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 4,000 PSI. CONCRETE SHALL CONTAIN XYPEX CONTENT OF AT LEAST 3% BY WEIGHT. REINFORCING STEEL SHALL BE GRADE 60 AND CONFORM TO ASTM A615.
- CONCRETE SHALL BE FORTIFIED WITH "CON-SHIELD" CON-SHIELD SHALL BE ADDED IN ADDITION TO XYPEX.
- JOINTS IN THE VAULT SECTIONS SHALL BE SEALED WITH "RAM-NEK" OR A RUBBER GASKET CONFORMING TO ASTM C433.
- MANHOLE FRAMES AND COVERS SHALL BE GRAY IRON CONFORMING TO ASTM A48. MANHOLE FRAMES AND COVERS SHALL EAST JORDAN IRON WORKS OR US FOUNDRY. ALL MANHOLE FRAMES AND COVERS SHALL BE RATED FOR AASHTO HS-20 LOADING.
- MANHOLE COVERS SHALL HAVE DIAMOND TREAD PATTERN AND HAVE WORD "SEWER" CAST ON THE COVER.
- SELECT FILL SHALL BE A SILTY OR CLAYEY SAND COMPLYING WITH AASHTO GROUP CLASSIFICATION A-2-4. IN-SITU SOILS USED AS SELECT FILL SHALL MEET AASHTO GROUP CLASSIFICATION A-2-4 AND SHALL BE FREE OF LARGE DEBRIS, LARGE ROCKS, ROOTS, AND OTHER DELETERIOUS MATERIALS. SELECT FILL SHALL HAVE MINIMUM COMPACTION OF 95% OF THE MAXIMUM DRY UNIT WEIGHT AS DETERMINED BY ASTM D698.
- GRANULAR BACKFILL AROUND THE ARV VAULT SHALL BE CLEAN SAND COMPLYING WITH AASHTO GROUP CLASSIFICATION A-3. GRANULAR BACKFILL SHALL BE PLACED IN LOOSE LIFTS NOT EXCEEDING A THICKNESS OF EIGHT INCHES (8") PER LIFT. GRANULAR BACKFILL SHALL HAVE MINIMUM COMPACTION OF 95% OF THE MAXIMUM DRY UNIT WEIGHT AS DETERMINED BY ASTM D698.
- BEDDING MATERIALS FOR ARV VAULT AND SEWER FORCE MAIN SHALL BE A CRUSHED No. 57 LIMESTONE BEDDING MATERIALS SHALL BE PLACED IN LOOSE LIFTS NOT EXCEEDING A THICKNESS OF EIGHT INCHES (8") PER LIFT. GRANULAR BACKFILL SHALL HAVE MINIMUM COMPACTION OF 90% OF THE MAXIMUM DRY UNIT WEIGHT AS DETERMINED BY ASTM D4253.
- THE PLACEMENT OF GEOGRID SHALL BE AS SHOWN ON THE DETAIL. ALL GEOGRID SHALL BE A BIAXIAL GEOGRID SUCH AS TENSAR BX1200, SYNTEC SBX12 OR APPROVED EQUAL. TRANSVERSE AND LONGITUDINAL OVERLAP SHALL BE A MINIMUM OF 24 INCHES.
- THE PLACEMENT OF GEOTEXTILE FABRIC SHALL BE AS SHOWN ON THE DETAIL. GEOTEXTILE FABRIC SHALL BE MIRAFI 500X, PROPEX GEOTEXT 200ST OR APPROVED EQUAL. TRANSVERSE AND LONGITUDINAL OVERLAP SHALL BE A MINIMUM OF 24 INCHES.
- CONCRETE THURST BLOCK SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 3,000 PSI.
- AIR RELEASE VALVES SHALL BE ARI D-025 AIR RELEASE VALVE FOR WATER OR APPROVED EQUAL.
- DETAIL SHOWS FLANGE-BY-FLANGE JOINT CONNECTION OF PIPE AND FITTINGS. MJ FITTINGS SHALL BE ALLOWED IF THE JOINT AT THE FITTINGS CAN BE ADEQUATELY RESTRAINED.
- VENT STACK SHALL BE INLINE WITH THE DISCHARGE PORT OF THE AIR RELEASE VALVE. OPENING OF VENT STACK SHALL BE AT LEAST 18 INCHES ABOVE THE 100-YEAR BASE FLOOD ELEVATION.
- EXPOSED PVC TO BE PAINTED GREY.

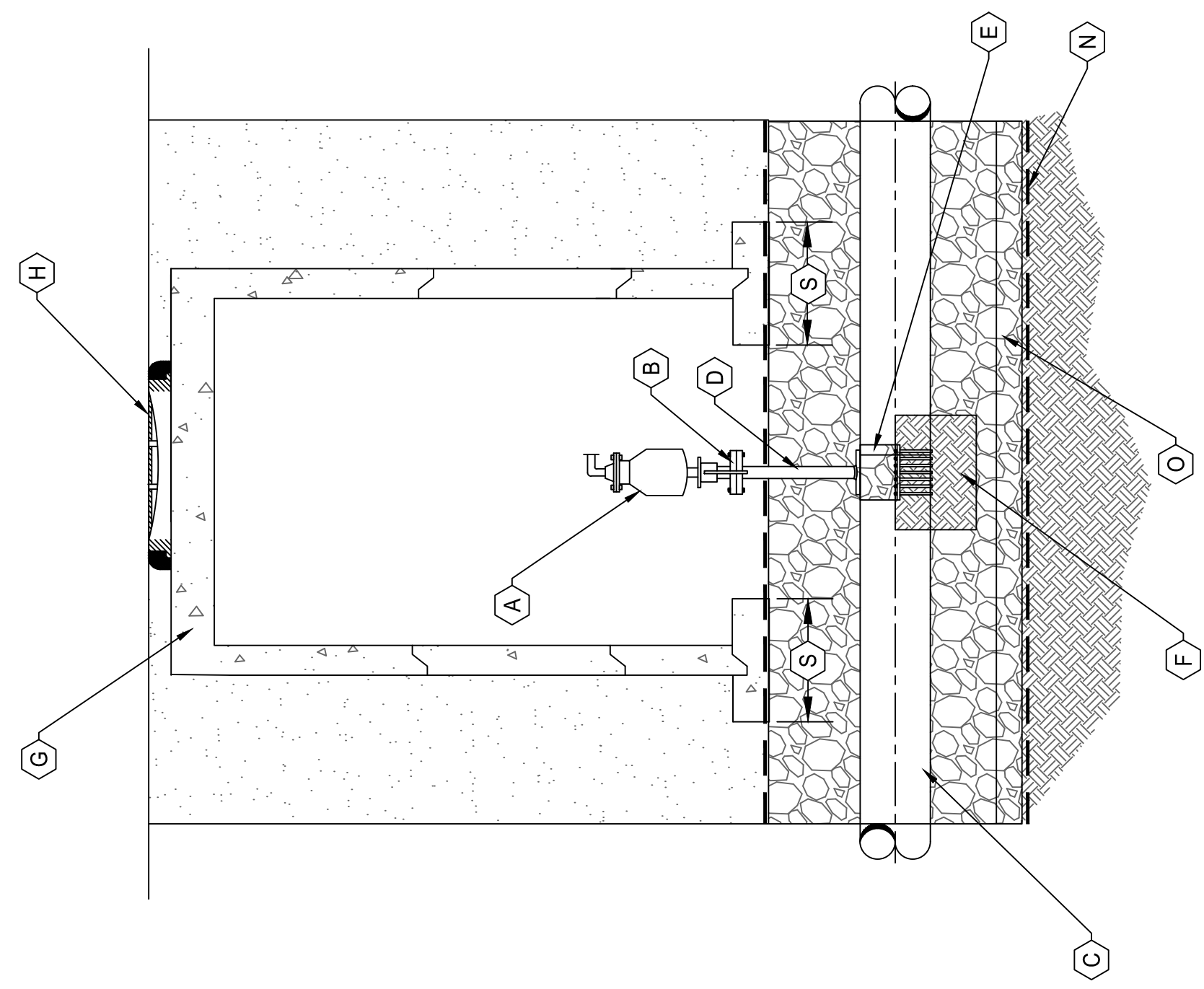
KEYNOTES

- REQ'D AIR RELEASE VALVE
- REQ'D 2" BALL VALVE, BRASS CONSTRUCTION
- REQ'D WATER MAIN
- REQ'D 2" STAINLESS STEEL PIPE, LENGTH AS REQUIRED, SCHEDULE 40
- REQ'D TAPPING SLEEVE
- REQ'D THURST BLOCK
- REQ'D OPEN BOTTOM MANHOLE
- REQ'D CASTING MARKED "WATER"
- REQ'D 2" PVC SNORKEL PIPE, THIS TO BE PAID BY LINEAR FOOT
- REQ'D 2" PVC SNORKEL PIPE, THIS TO BE PAID IN PRICE OF ARV
- REQ'D 2" X 2" X 8" THICK UNREINFORCED CONCRETE PAD
- REQ'D 2" SNORKEL PIPE
- SET BOTTOM OF VENT 1' ABOVE BASE FLOOD ELEVATION (EL. 14.0)
- GEO TEXTILE
- GEO GRID
- REQ'D 1" ELBOW
- REQ'D 3" NIPPLE
- REQ'D 1" ELBOW W/ 24 MESH SCREEN FASTENED TO OUTLET WITH SOLVENT WELDED COUPLING
- DESIGNED BY SUPPLIER, AS REQUIRED TO NOT EXCEED 1500 PSF BEARING PRESSURE
- REQ'D PENETRATION SEALED WITH LINKED MECHANICAL SEAL AND NON-SHRINK GROUT
- REQ'D UNION +/- 3' ABOVE GRADE

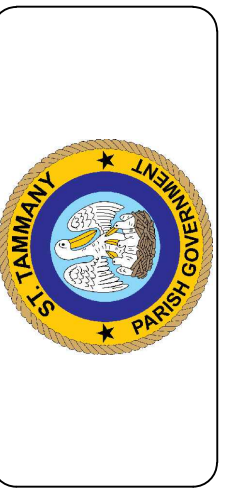


PLAN VIEW
NOT TO SCALE

SECTION B-B
NOT TO SCALE



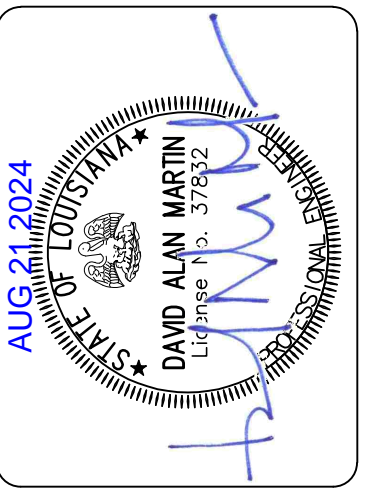
SECTION A-A
NOT TO SCALE



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

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DESIGNED BY:	M. LOKER
DRAWN BY:	J. HITT
CHECKED BY:	J. CATALANOTTO
SUBMITTED BY:	FAIRWAY CE
PROJECT No.:	DU 168,170, 175, 177
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APPROVED BY:	D. MARTIN
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SCALE:	AS NOTED



BREWSTER ROAD SEWER
CONSOLIDATION
CIVIL DETAILS IV

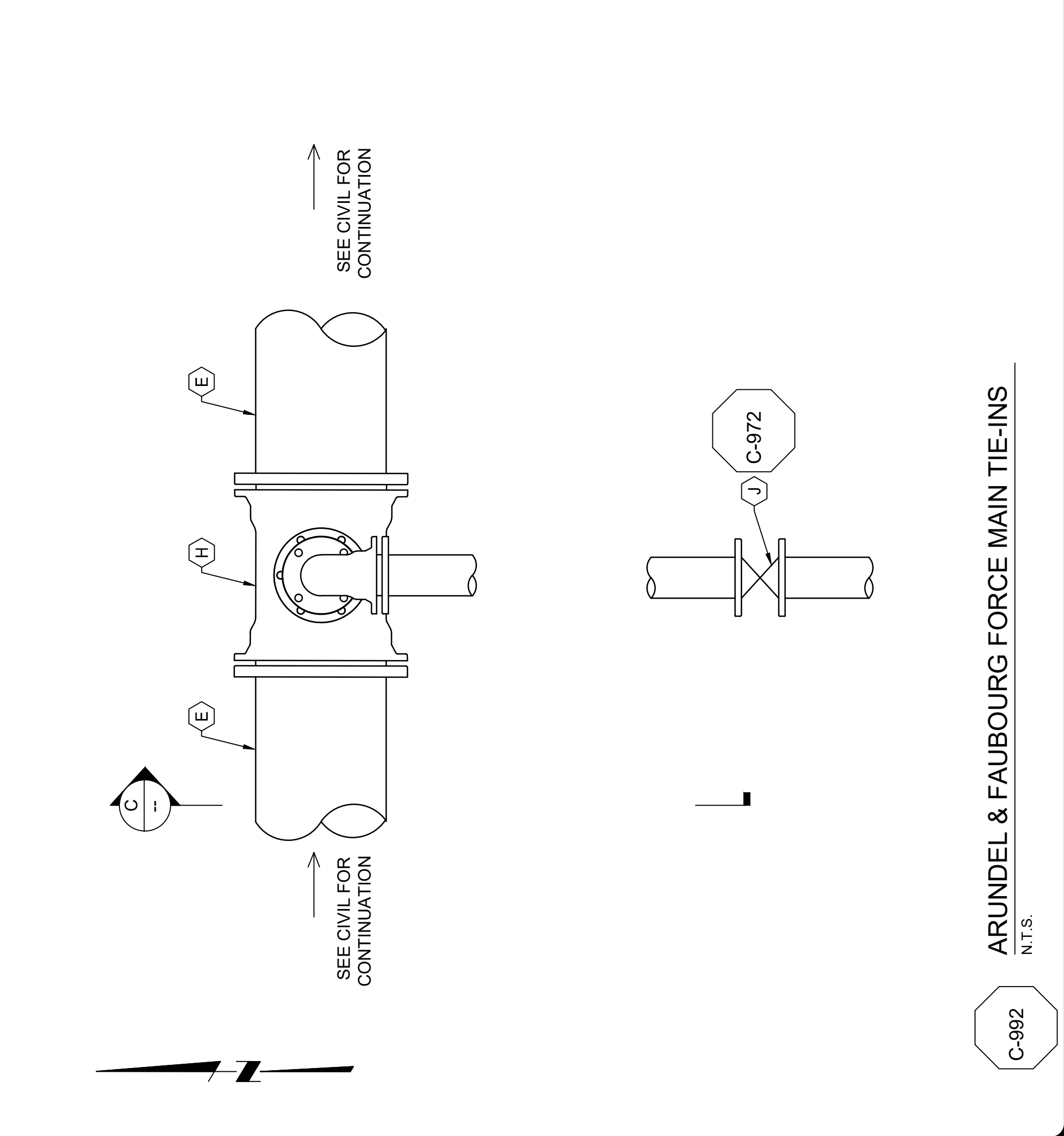
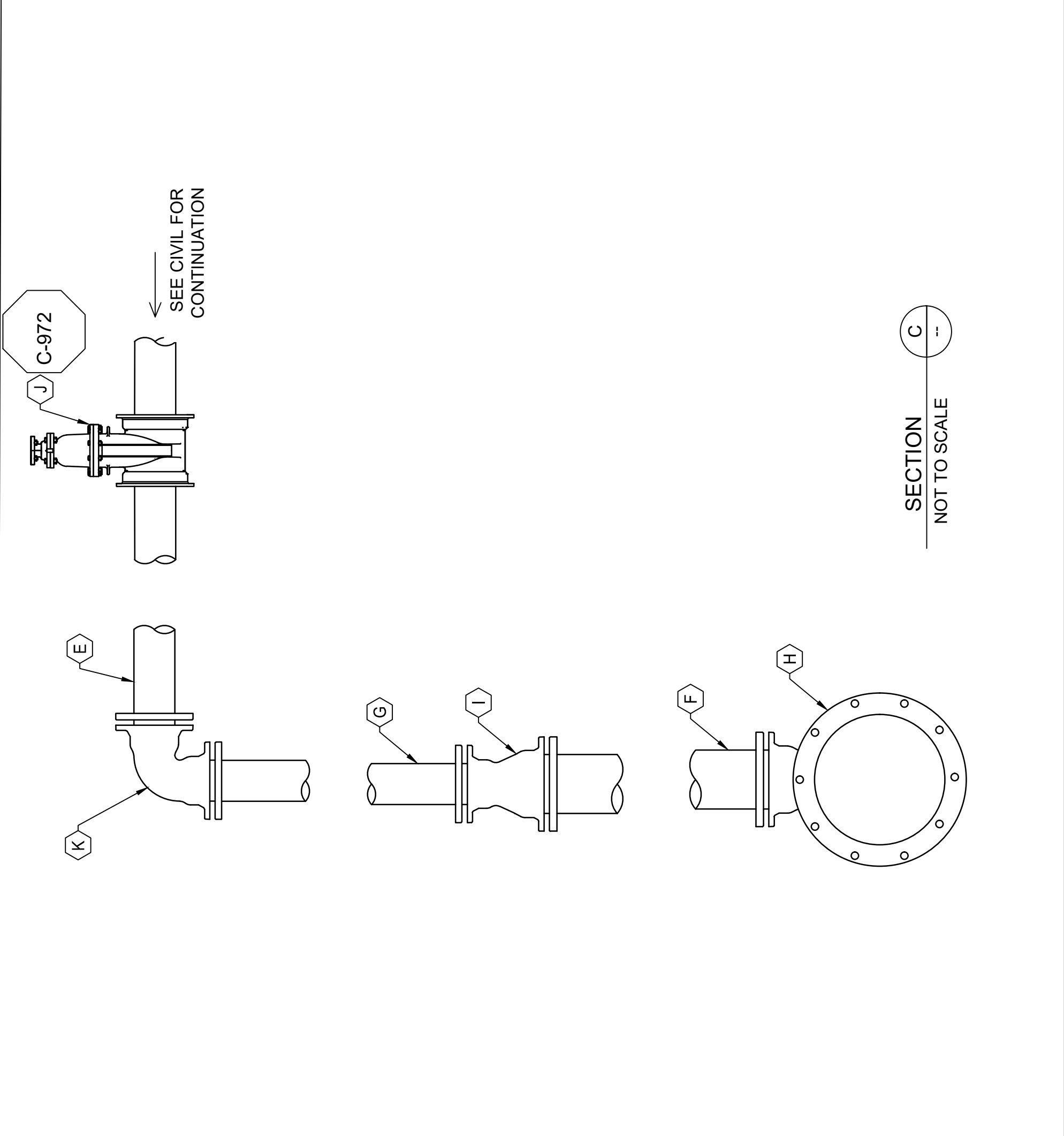
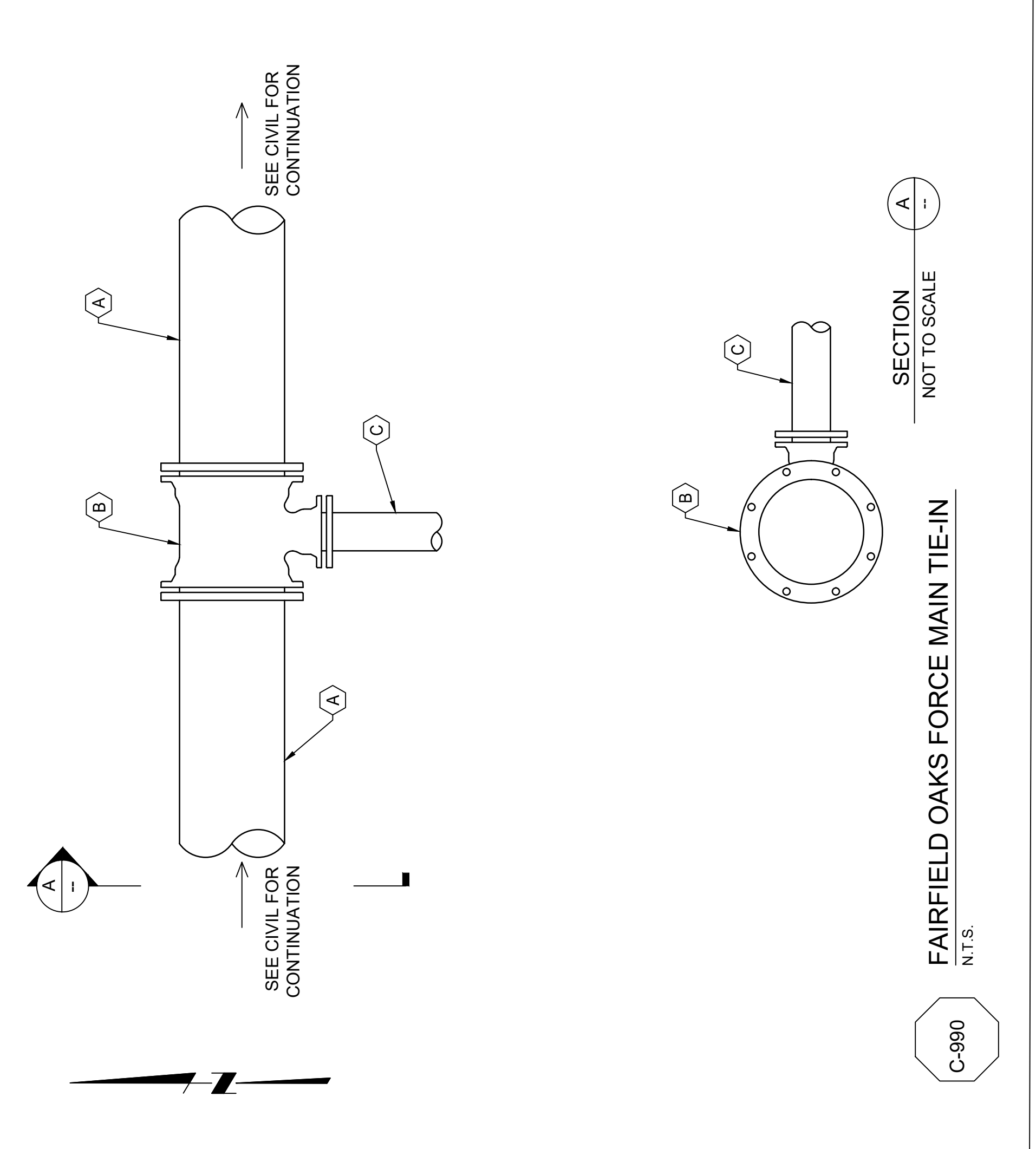
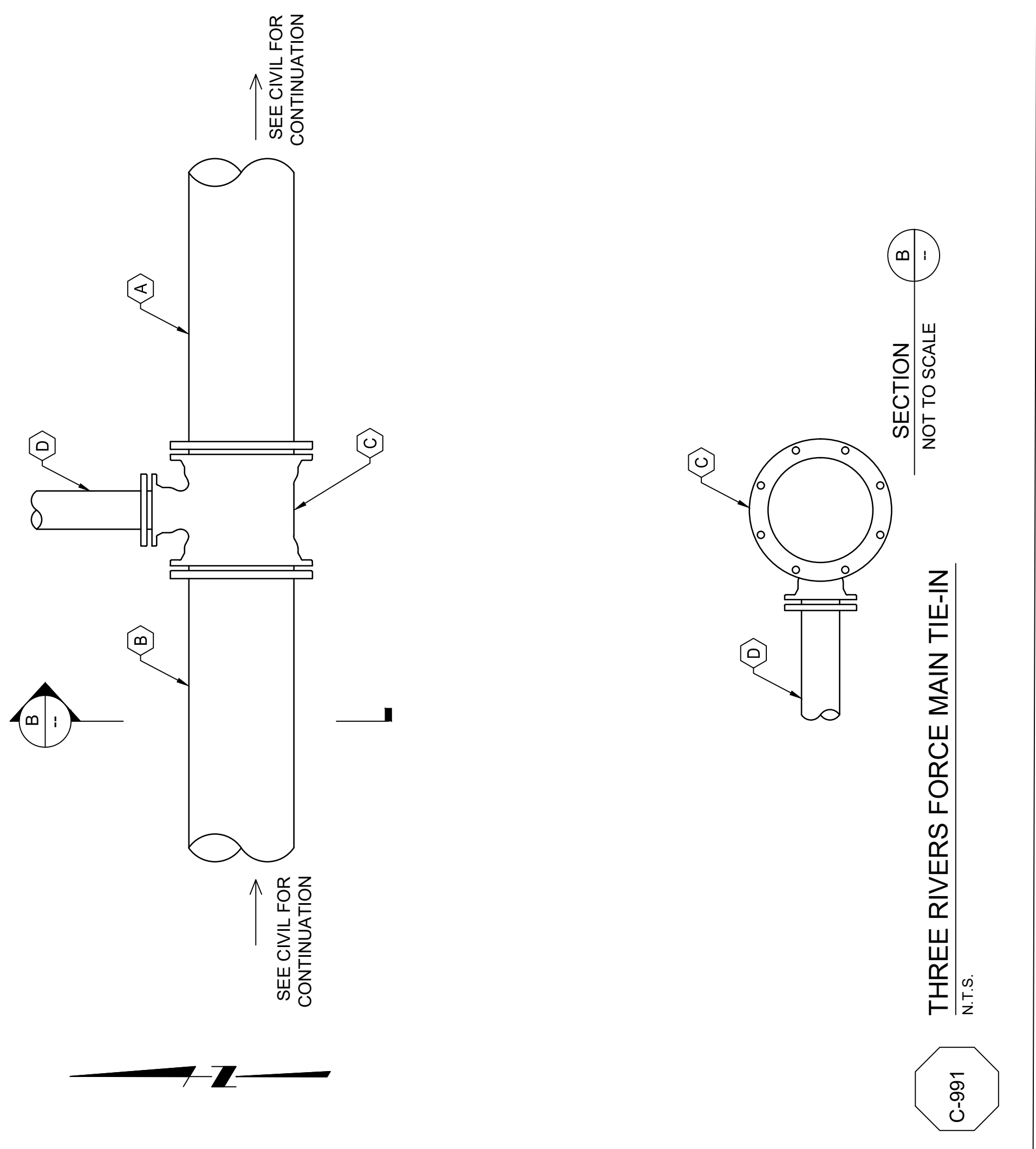
SHEET NO.
GC-04

SHEET GENERAL NOTES

- SEE PLAN AND PROFILES FOR ADDITIONAL REQUIREMENTS.
- PROVIDE BEDDING AND BACKFILL FOR PRESSURE PIPES PER CIVIL DETAILS.
- PROVIDE APPROVED RESTRAINED ADAPTERS FOR ALL FITTINGS.

SHEET KEY NOTES

- A. REQ'D 12" HDPE FORCE MAIN
- B. REQ'D 12"x 4" DI MJ TEE WITH MJ ADAPTERS
- C. REQ'D FORCE MAIN FROM FAIRFIELD OAKS
- D. REQ'D FORCE MAIN FROM THREE RIVERS
- E. REQ'D 14" HDPE FORCE MAIN
- F. REQ'D 6" HDPE PIPE (± 2')
- G. REQ'D 4" HDPE PIPE, (AS REQ'D)
- H. REQ'D 14" X 6" DI MJ TEE WITH MJ ADAPTERS
- I. REQ'D 4" X 6" DI MJ REDUCER WITH MJ ADAPTERS
- J. REQ'D 4" GATE VALVE (BURIED) PER CIVIL DETAILS
- K. REQ'D 4" 90° MJ ELBOW WITH MJ ADAPTERS

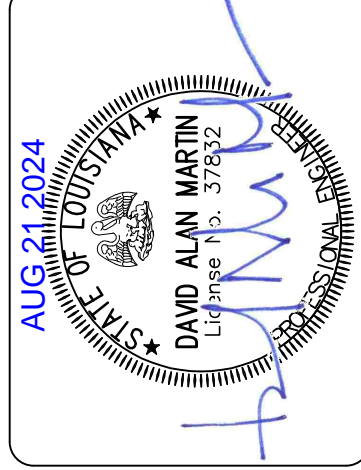




DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

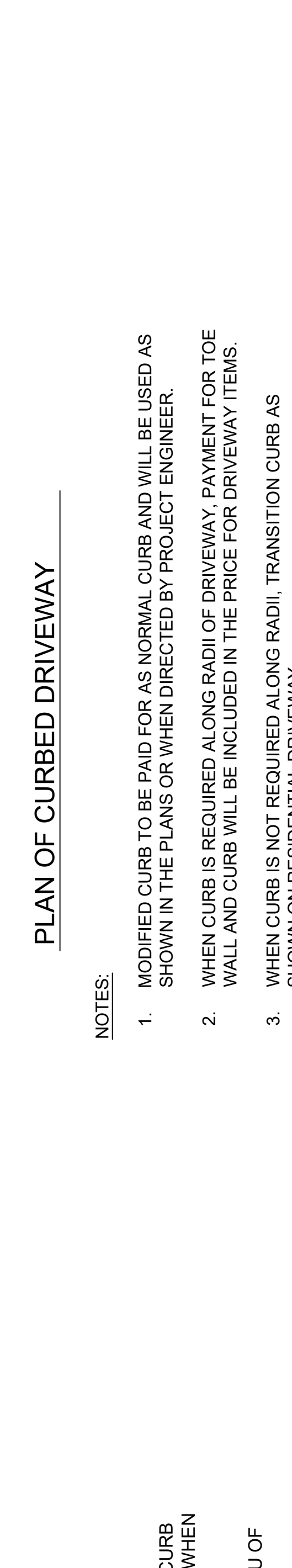
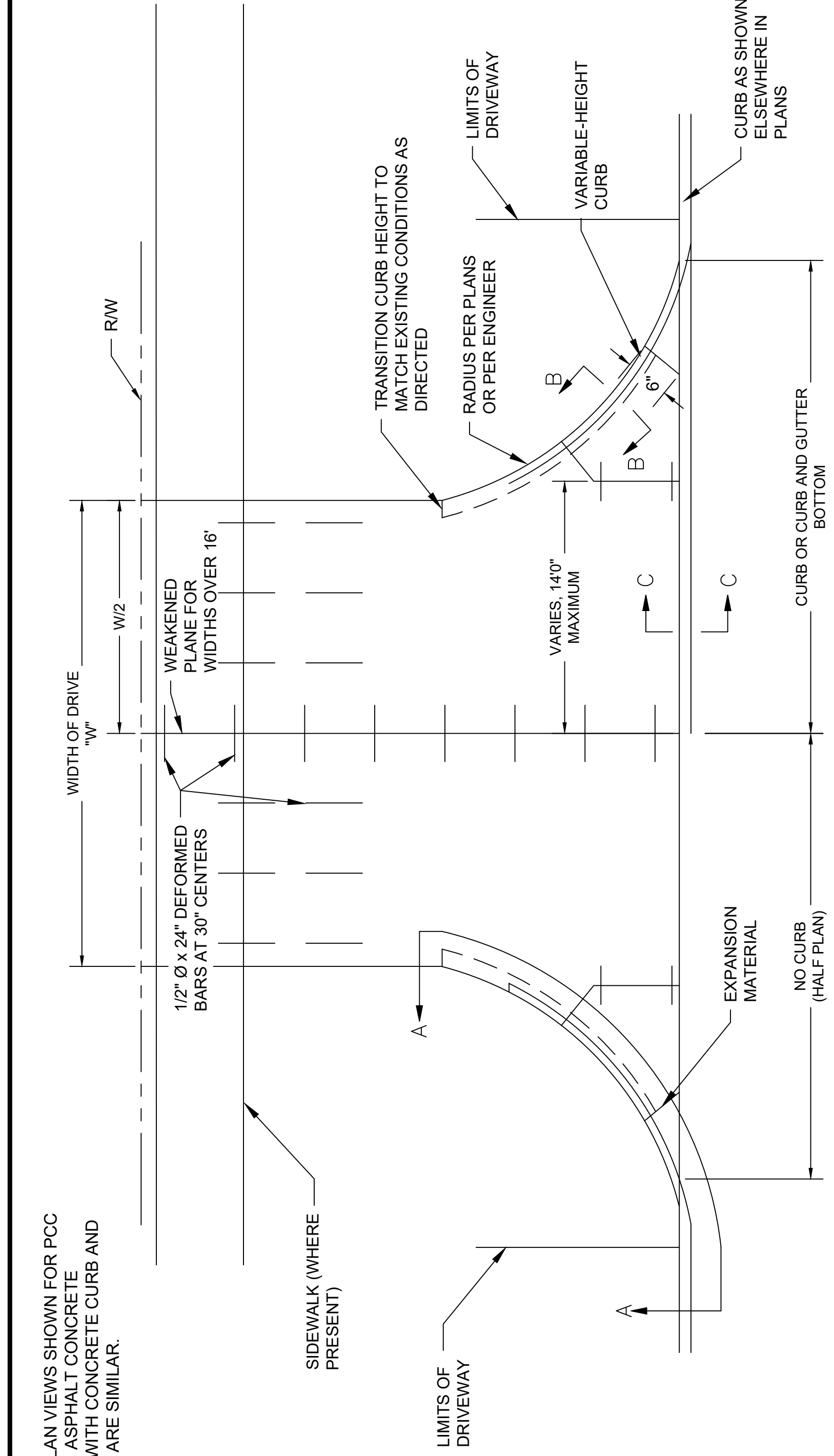
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DESIGNED BY: M. LOKER	CHECKED BY: U. HITT
DRAWN BY: J. CATALANOTTO	FARWAY CE 175, 177
PROJECT No.: DU 168, 170	ISSUE DATE: 08/20/2024
APPROVED BY: D. MARTIN	SHEET SIZE: ANSI D 34x22
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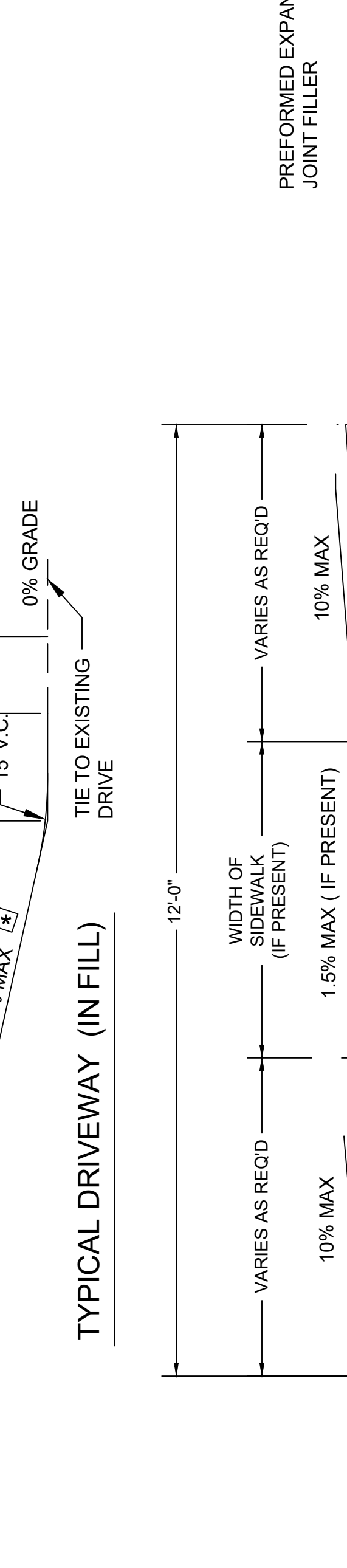
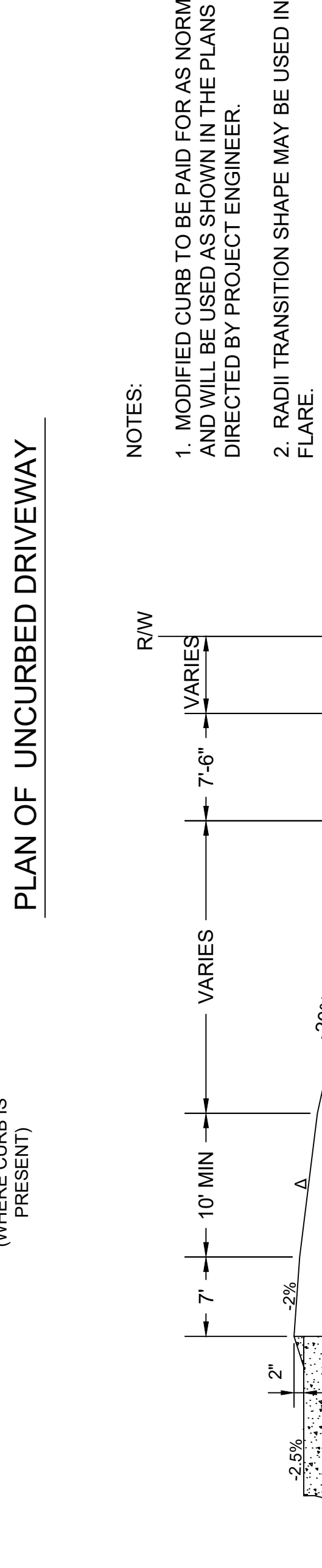
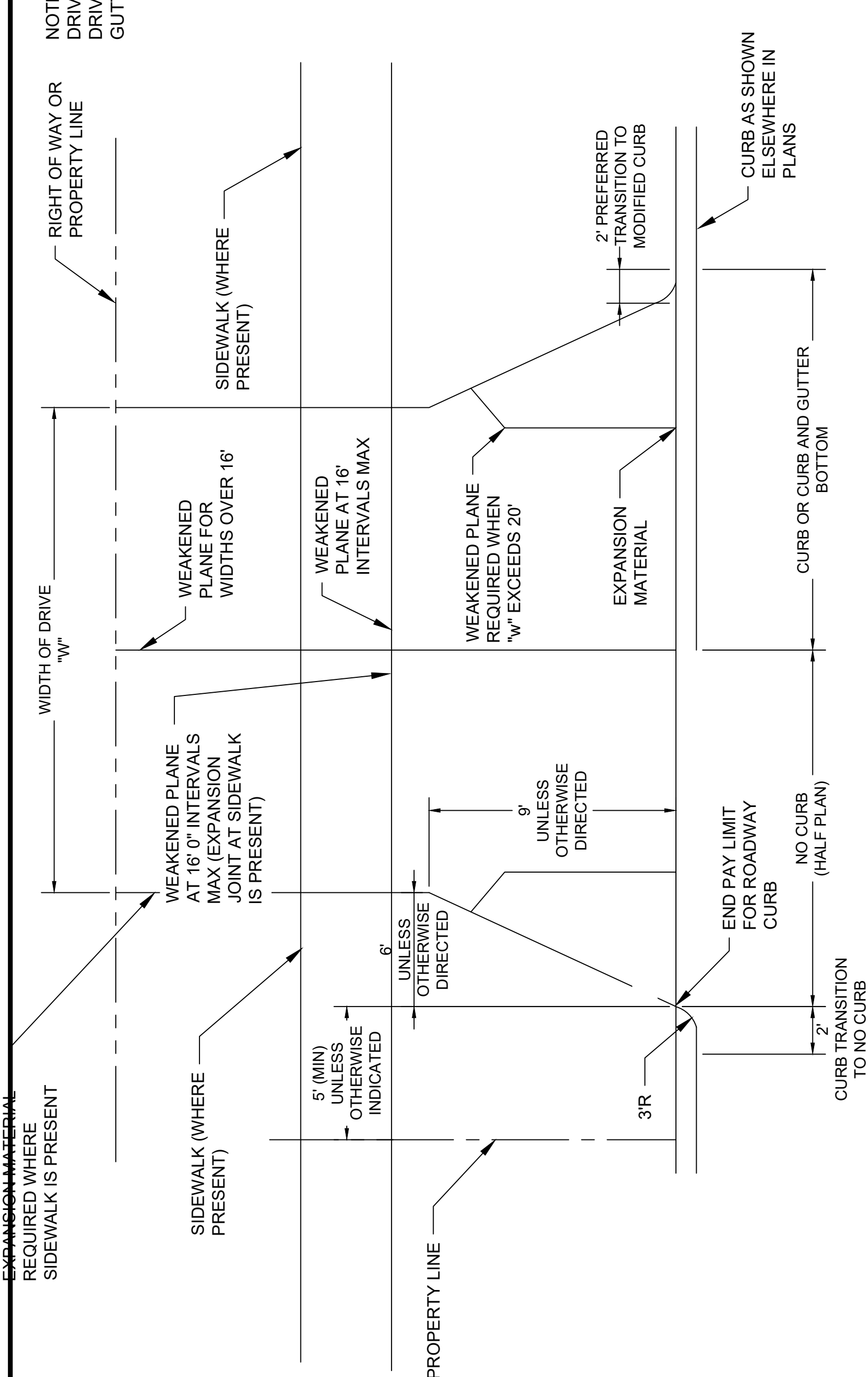
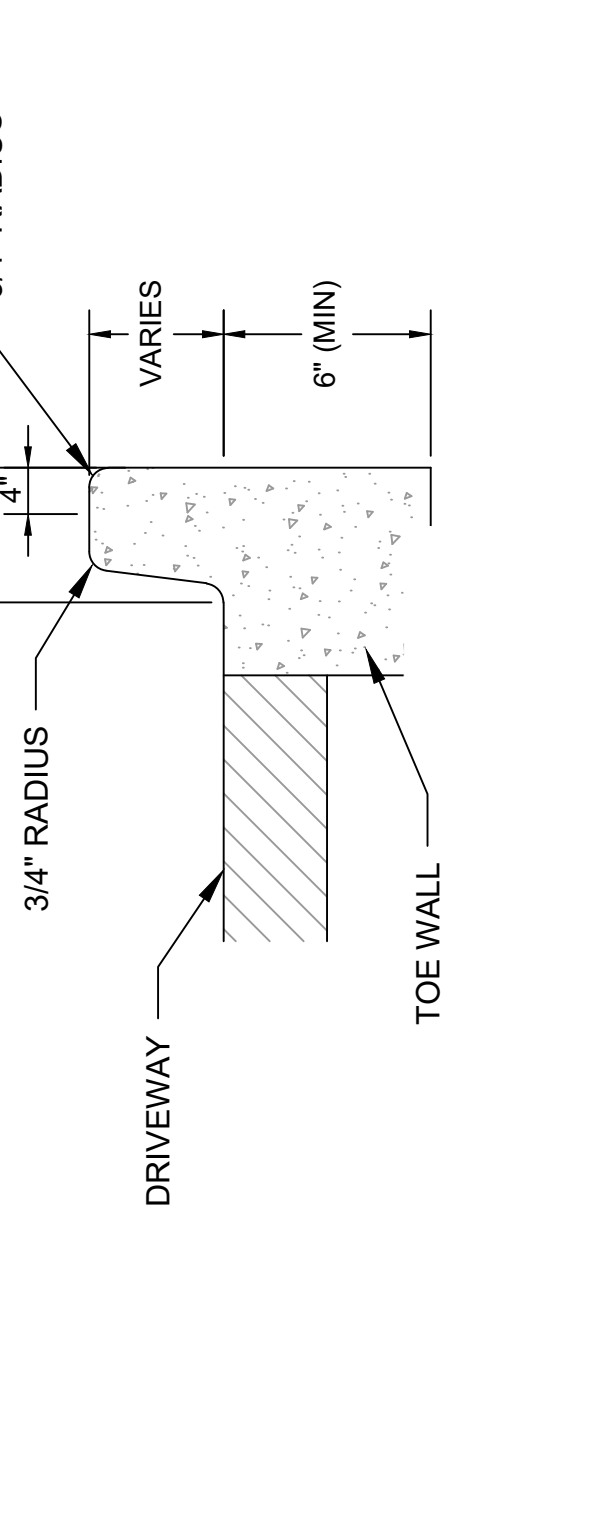
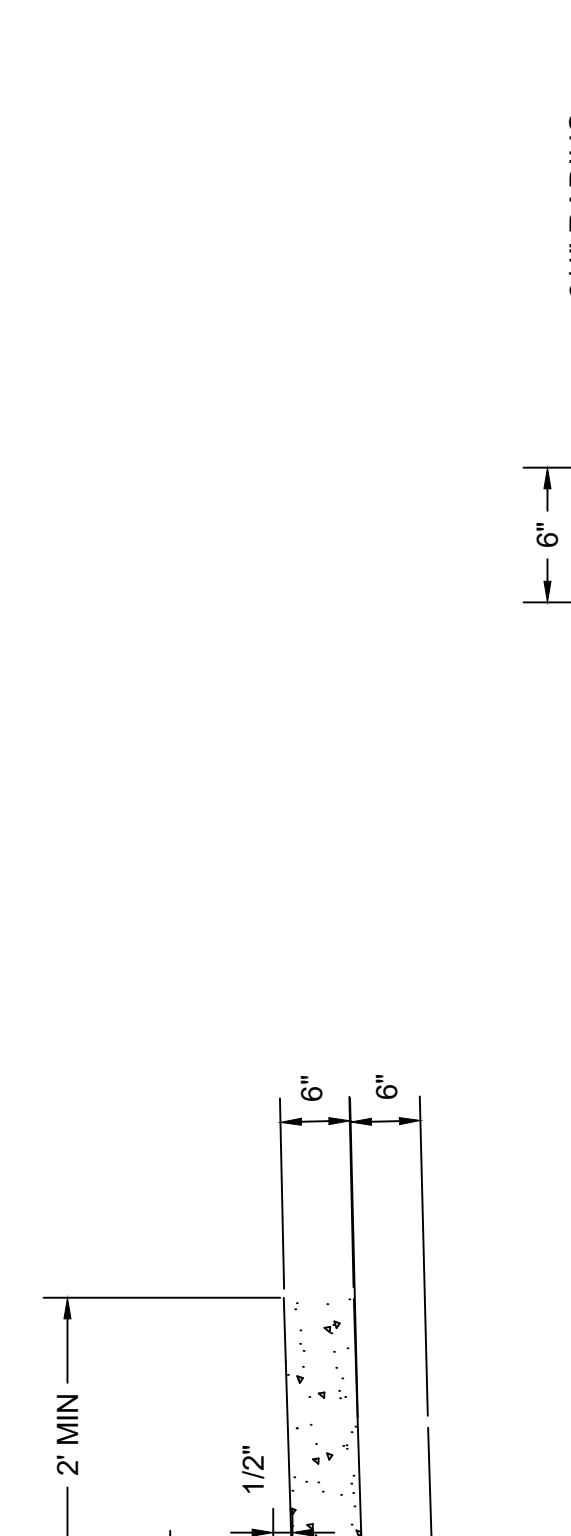
BREWSTER ROAD SEWER
CONSOLIDATION
PORTLAND CEMENT CONCRETE
DRIVEWAY

SHEET NO.
DW-01



NOTES:

1. MODIFIED CURB TO BE PAID FOR AS NORMAL CURB AND WILL BE USED AS SHOWN IN THE PLANS OR WHEN DIRECTED BY PROJECT ENGINEER.
2. WHEN CURB IS REQUIRED ALONG RADII OF DRIVEWAY, PAYMENT FOR TOE WALL AND CURB WILL BE INCLUDED IN THE PRICE FOR DRIVEWAY ITEMS.
3. WHEN CURB IS NOT REQUIRED ALONG RADII, TRANSITION CURB AS SHOWN ON RESIDENTIAL DRIVEWAY.



GENERAL NOTES:

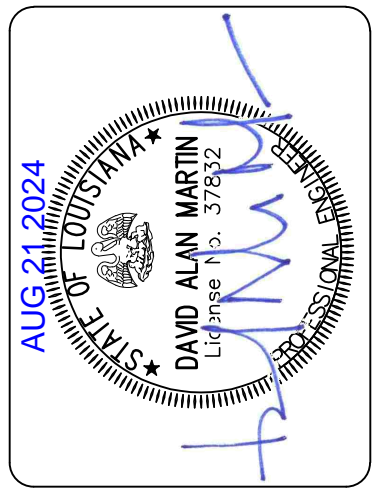
1. DETAILS SHOWN ARE TYPICAL AND MAY BE VARIED BY THE ENGINEER TO MATCH EXISTING CONDITIONS IF CONDITIONS WARRANT OR REQUIRE.
2. VERIFY ALL GRADES AND JOINT LAYOUT WITH THE ENGINEER PRIOR TO PLACEMENT OF CONCRETE.



DEPT. OF UTILITIES
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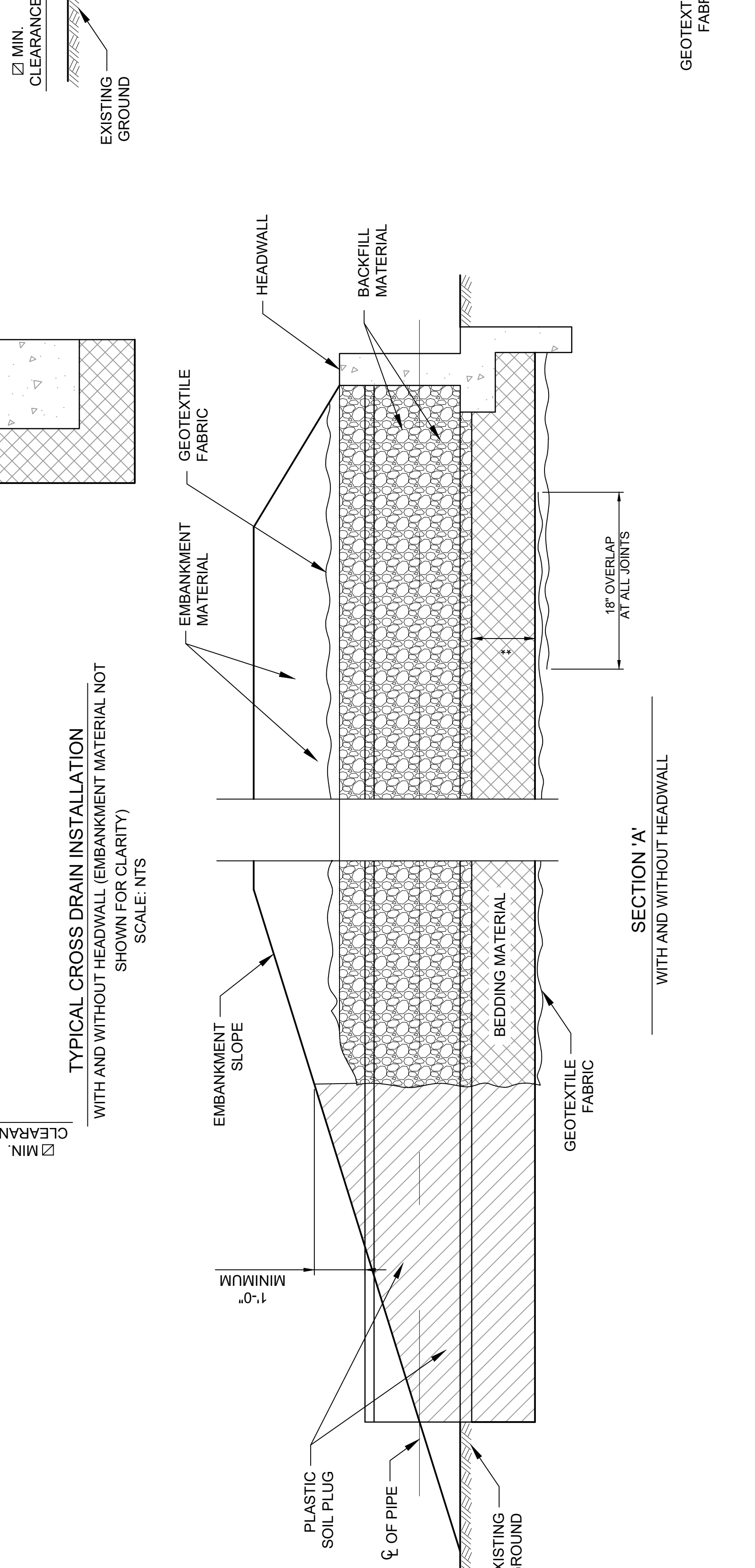
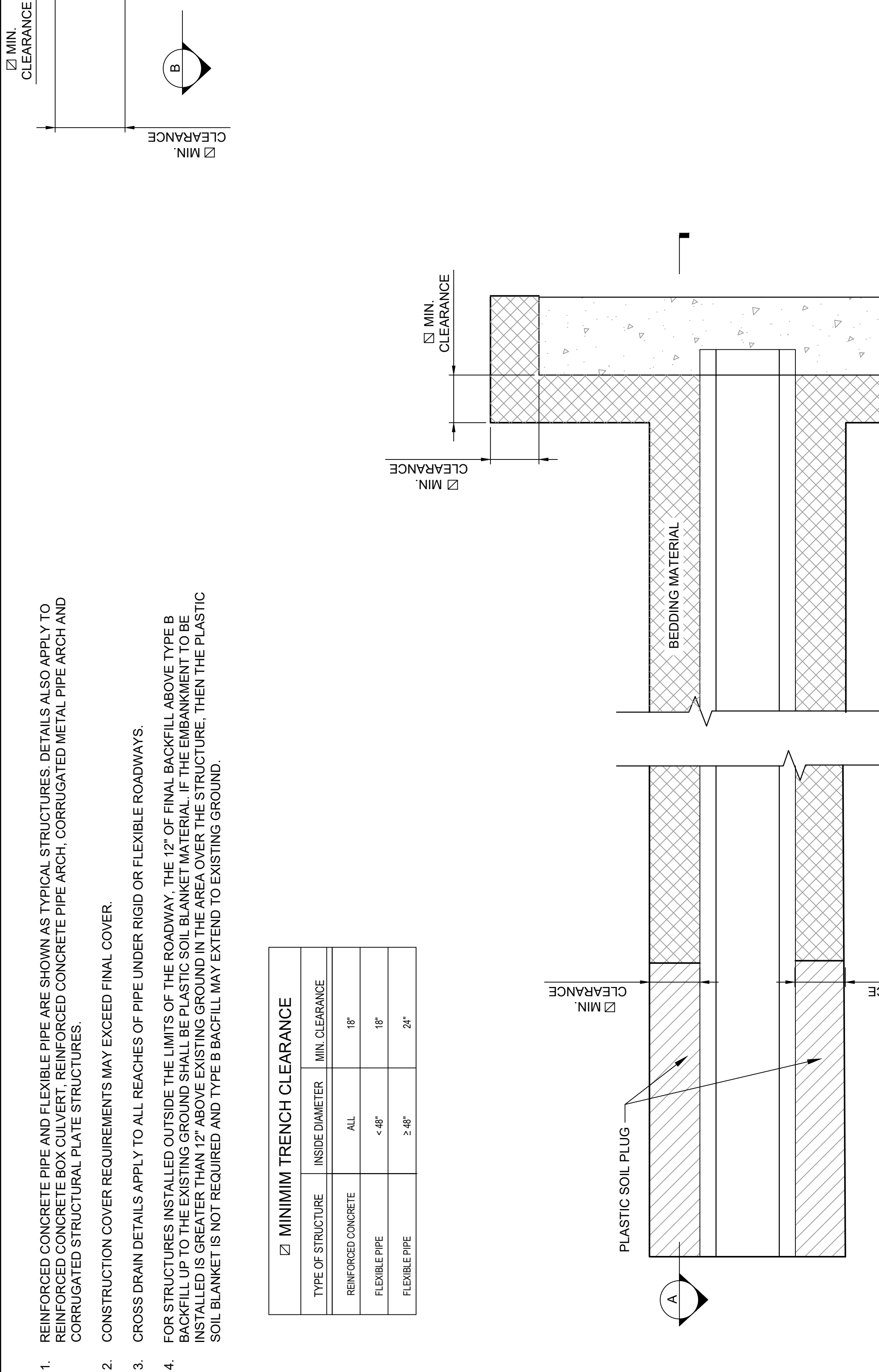
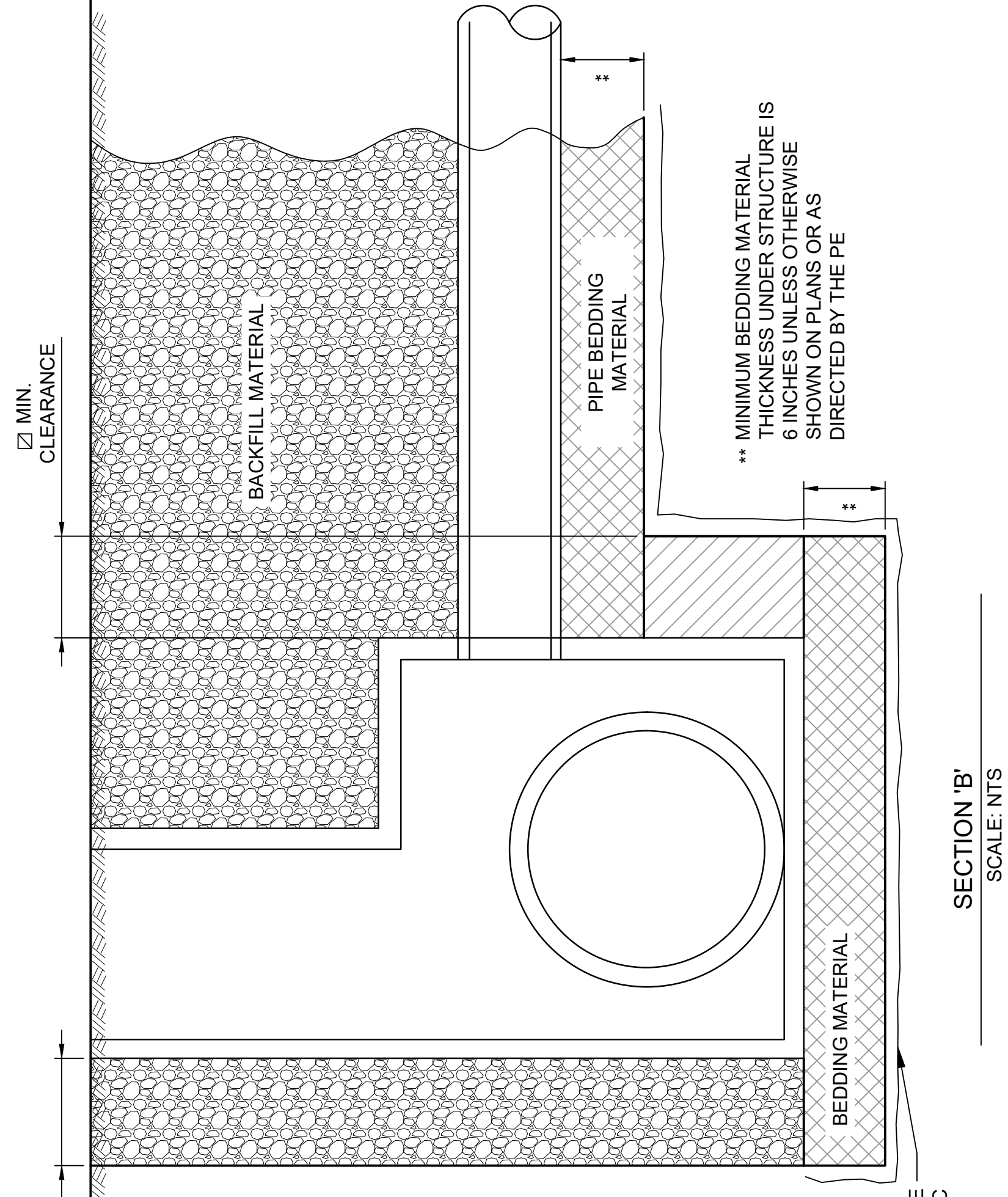
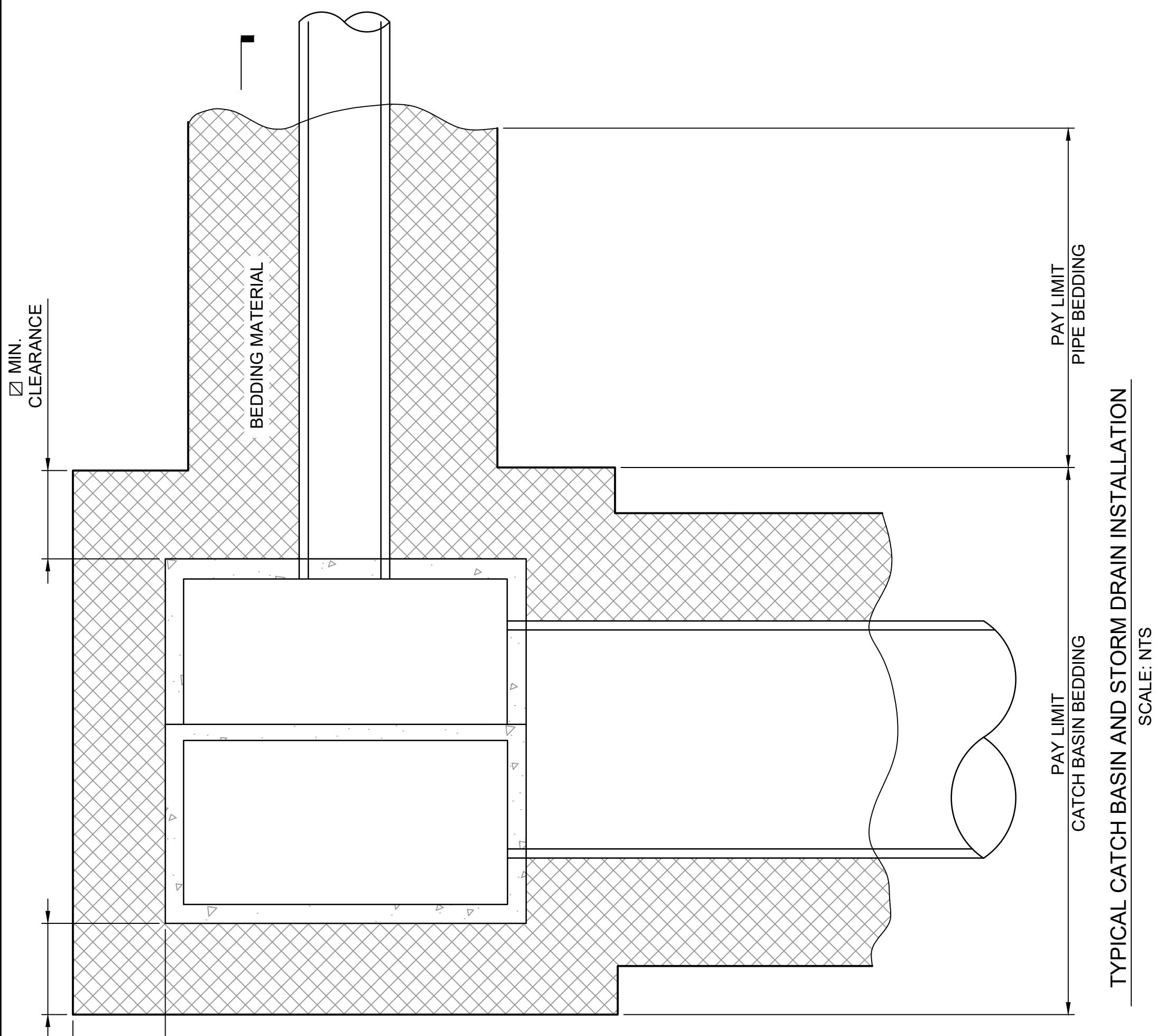
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DESIGNED BY: M. LOKER
DRAWN BY: J. HITT
CHECKED BY: J. CATLANOTTO
SUBMITTED BY: FAIRWAY CE
PROJECT No.: DU 168,170, 175, 177
ISSUE DATE: 08/20/2024
APPROVED BY: D. MARTIN
SHEET SIZE: ANSI D 34x22
SCALE: AS NOTED



BREWSTER ROAD SEWER
CONSOLIDATION
DRAINAGE STRUCTURES BEDDING AND
BACKFILL - I

SHEET NO.
BM-01



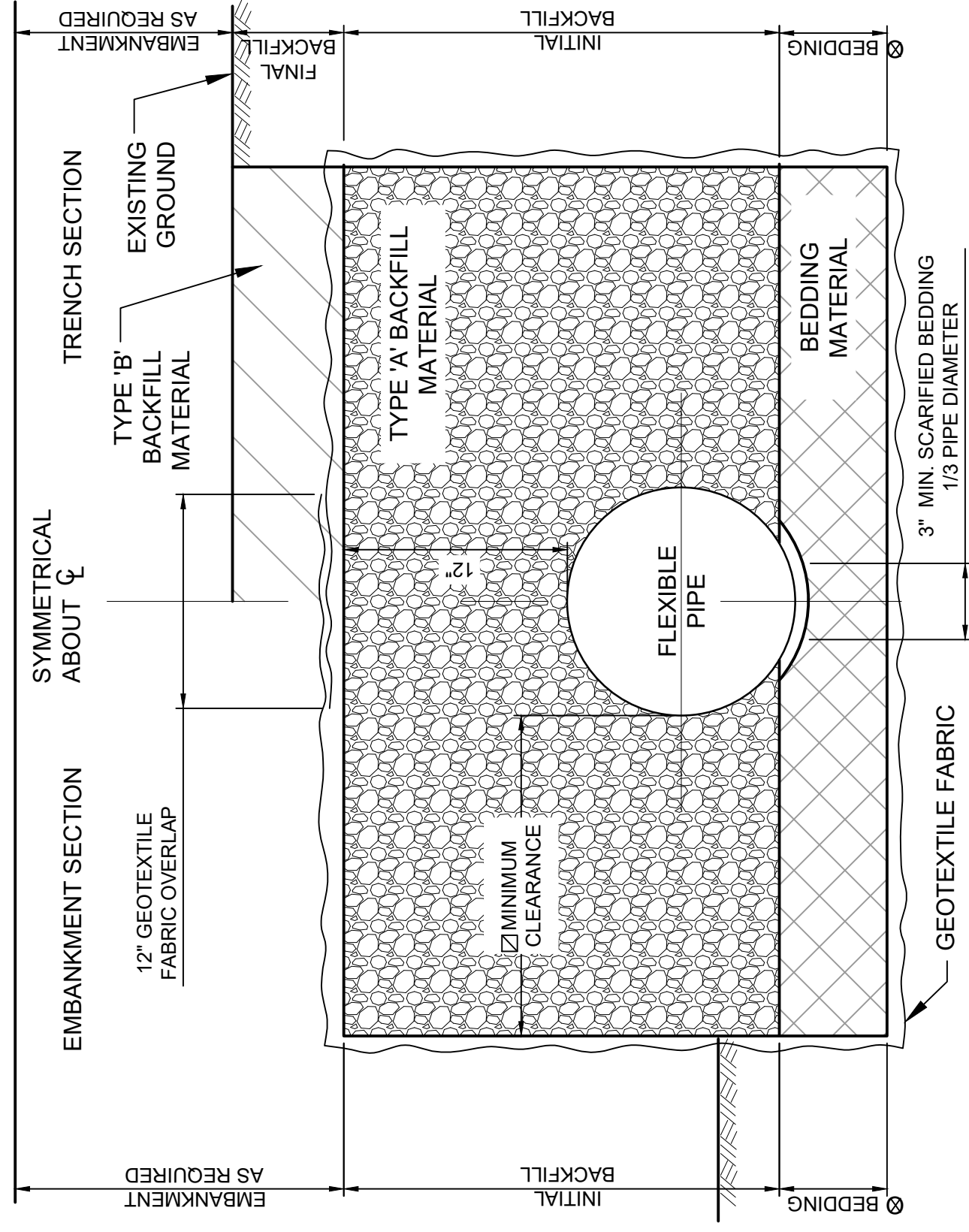
MINIMUM TRENCH CLEARANCE

TYPE OF STRUCTURE	INSIDE DIAMETER	MIN. CLEARANCE
REINFORCED CONCRETE	ALL	18"
FLEXIBLE PIPE	< 48"	18"
FLEXIBLE PIPE	≥ 48"	24"

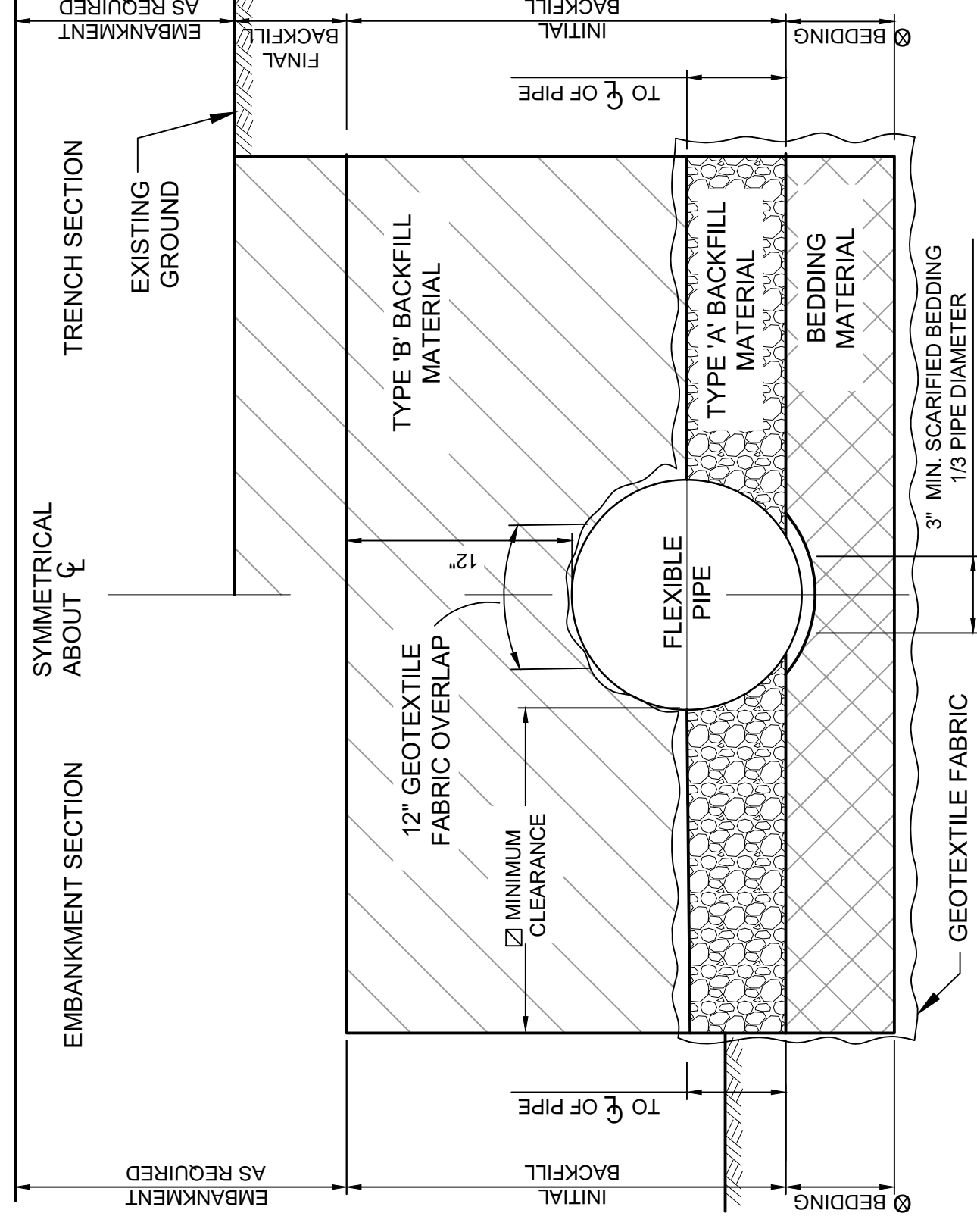
- REINFORCED CONCRETE PIPE AND FLEXIBLE PIPE ARE SHOWN AS TYPICAL STRUCTURES. DETAILS ALSO APPLY TO REINFORCED CONCRETE BOX CULVERT, REINFORCED CONCRETE PIPE ARCH, CORRUGATED METAL PIPE ARCH AND CORRUGATED STRUCTURAL PLATE STRUCTURES.
- CONSTRUCTION COVER REQUIREMENTS MAY EXCEED FINAL COVER.
- CROSS DRAIN DETAILS APPLY TO ALL REACHES OF PIPE UNDER RIGID OR FLEXIBLE ROADWAYS.
- FOR STRUCTURES INSTALLED OUTSIDE THE LIMITS OF THE ROADWAY, THE 12" OF FINAL BACKFILL ABOVE TYPE B BACKFILL UP TO THE EXISTING GROUND SHALL BE PLASTIC SOIL BLANKET MATERIAL. IF THE EMBANKMENT TO BE INSTALLED IS GREATER THAN 12" ABOVE EXISTING GROUND IN THE AREA OVER THE STRUCTURE, THEN THE PLASTIC SOIL BLANKET IS NOT REQUIRED AND TYPE B BACKFILL MAY EXTEND TO EXISTING GROUND.

MINIMUM TRENCH CLEARANCE		
TYPE OF STRUCTURE	INSIDE DIAMETER	MIN. CLEARANCE
REINFORCED CONCRETE	ALL	18"
FLEXIBLE PIPE	<48"	18"
FLEXIBLE PIPE	≥48"	24"

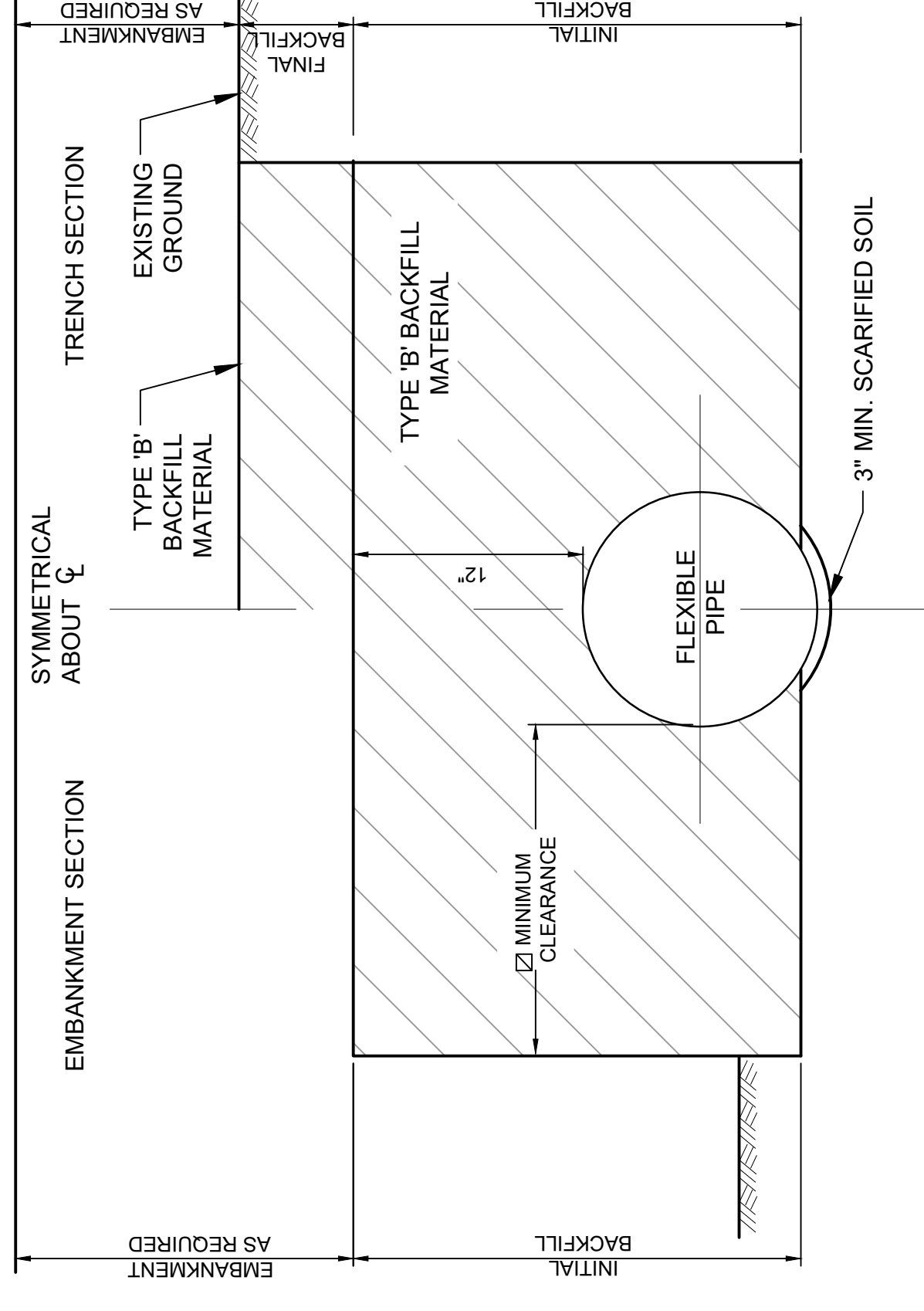
- ⊗ MINIMUM BEDDING MATERIAL THICKNESS UNDER STRUCTURE IS 6 INCHES UNLESS OTHERWISE SHOWN ON PLANS OR DIRECTED BY THE PE
- △ NO BEDDING MATERIAL REQUIRED UNLESS OTHERWISE SPECIFIED ON THE PLANS OR AS DIRECTED BY THE PE.
- REFER TO NOTE 3 ON SHEET 1 OF SERIES



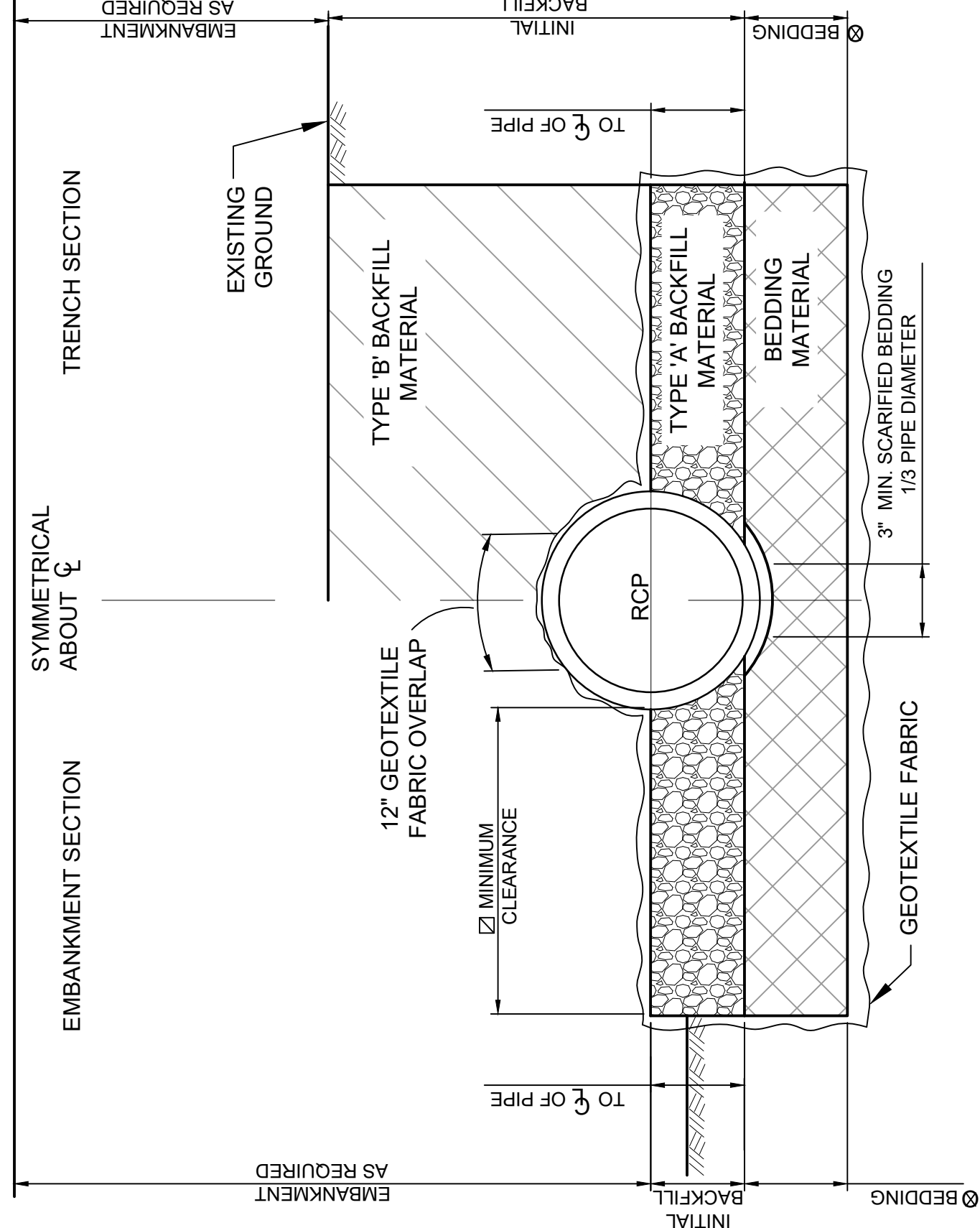
△ FLEXIBLE PIPE CROSS DRAIN
TRENCH AND EMBANKMENT INSTALLATIONS
SCALE: NTS



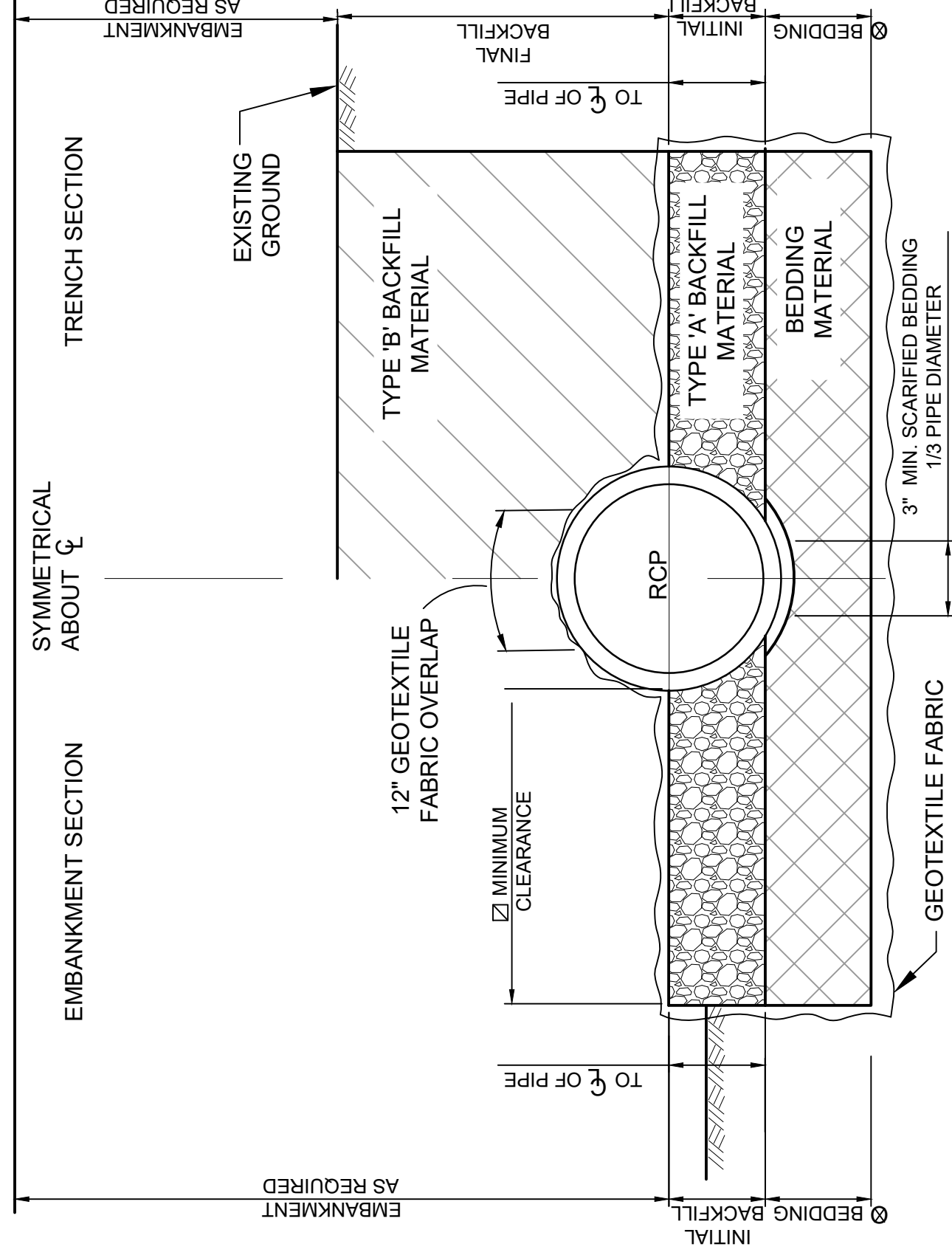
△ FLEXIBLE PIPE STORM DRAIN
TRENCH AND EMBANKMENT INSTALLATIONS
SCALE: NTS



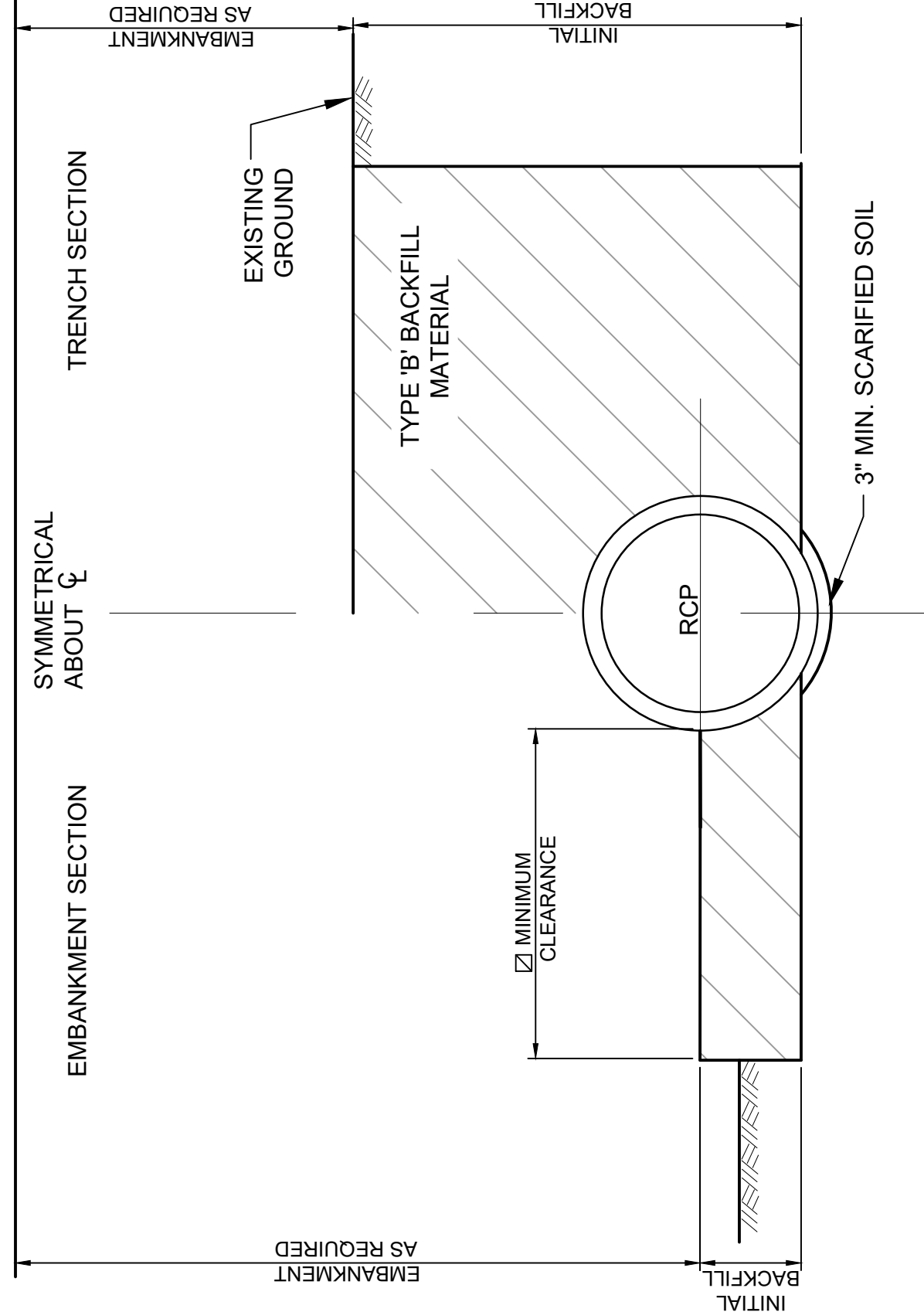
△ FLEXIBLE PIPE SIDE DRAIN
TRENCH AND EMBANKMENT INSTALLATIONS
SCALE: NTS



△ REINFORCED CONCRETE PIPE CROSS DRAIN
TRENCH AND EMBANKMENT INSTALLATIONS
SCALE: NTS



△ REINFORCED CONCRETE PIPE STORM DRAIN
TRENCH AND EMBANKMENT INSTALLATIONS
SCALE: NTS




△ REINFORCED CONCRETE PIPE SIDE DRAIN
TRENCH AND EMBANKMENT INSTALLATIONS
SCALE: NTS



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

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DESIGNED BY: M. LOKER
DRAWN BY: J. HITT
CHECKED BY: J. CATLANOTTO
SUBMITTED BY: FAIRWAY CE
PROJECT No.: DU 168,170.
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SHEET SIZE: ANSI D 34x22
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BREWSTER ROAD SEWER
CONSOLIDATION
DRAINAGE STRUCTURES BEDDING AND
BACKFILL - II

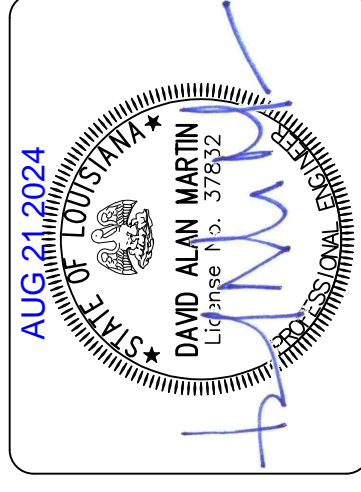
SHEET NO.
BM-02



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

No.	DESCRIPTION OF REVISION	DATE:
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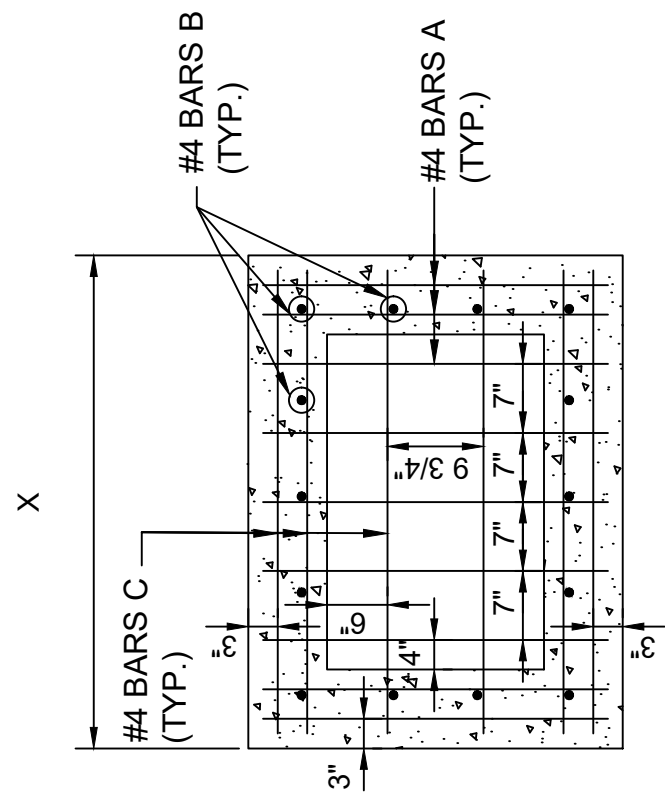
DESIGNED BY: M. LOKER
DRAWN BY: J. HITT
CHECKED BY: J. CATLANOTTO
PROJECT No.: DU 168,170, 175, 177
ISSUE DATE: 08/20/2024
APPROVED BY: D. MARTIN
SHEET SIZE: ANSI D 34x22
SCALE: AS NOTED



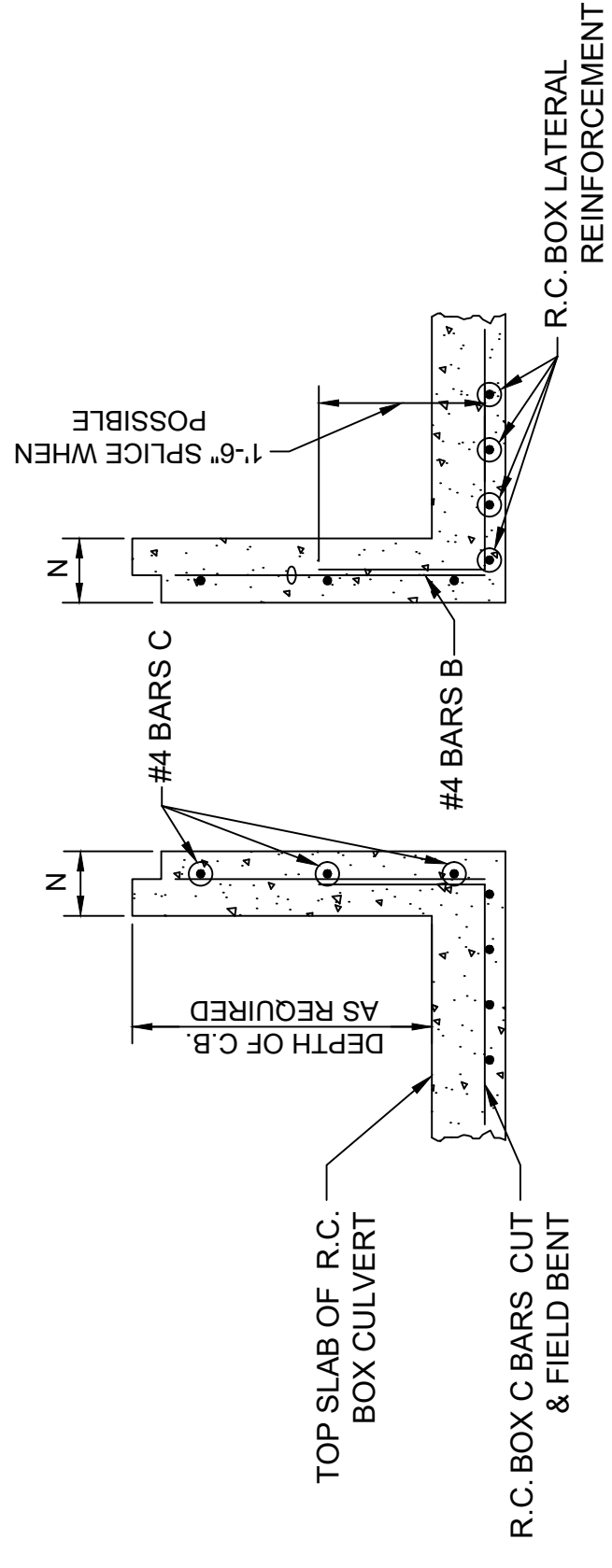
BREWSTER ROAD SEWER
CONSOLIDATION
CATCH BASIN DETAILS

SHEET NO.
CB-01

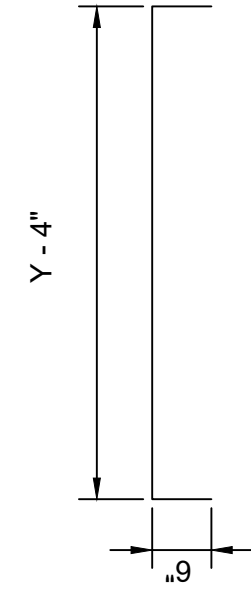
DIMENSIONS				
DEPTH OF BASIN	N	X	Y	
FT.	IN.	FT. - IN.	FT. - IN.	FT. - IN.
0 - 8	7	4-2	3-2 1/4	
8.1 - 12	8	4-4	3-4 1/4	



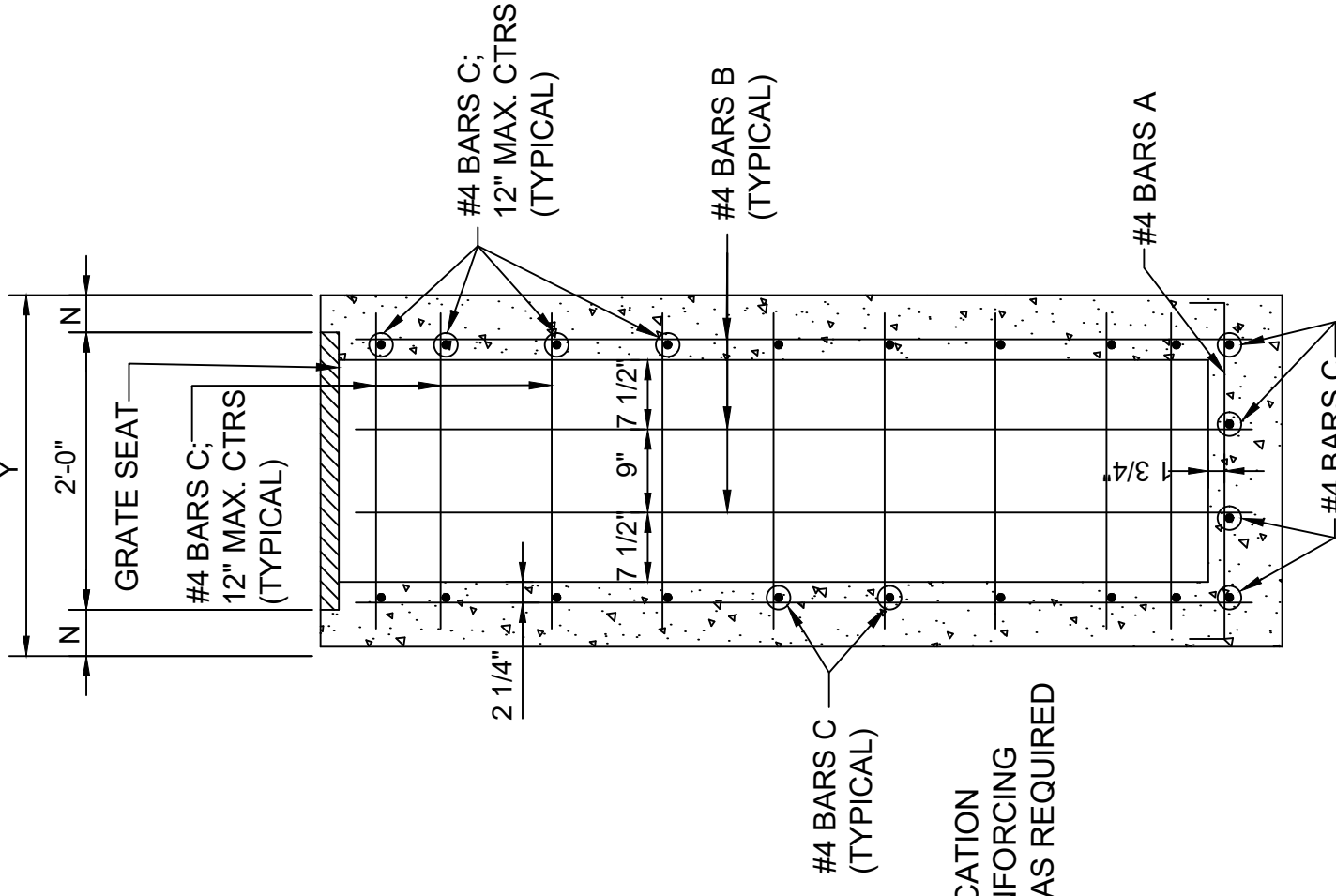
HORIZONTAL SECTION
SHOWING BOTTOM SLAB REINFORCING STEEL
SCALE: N.T.S.



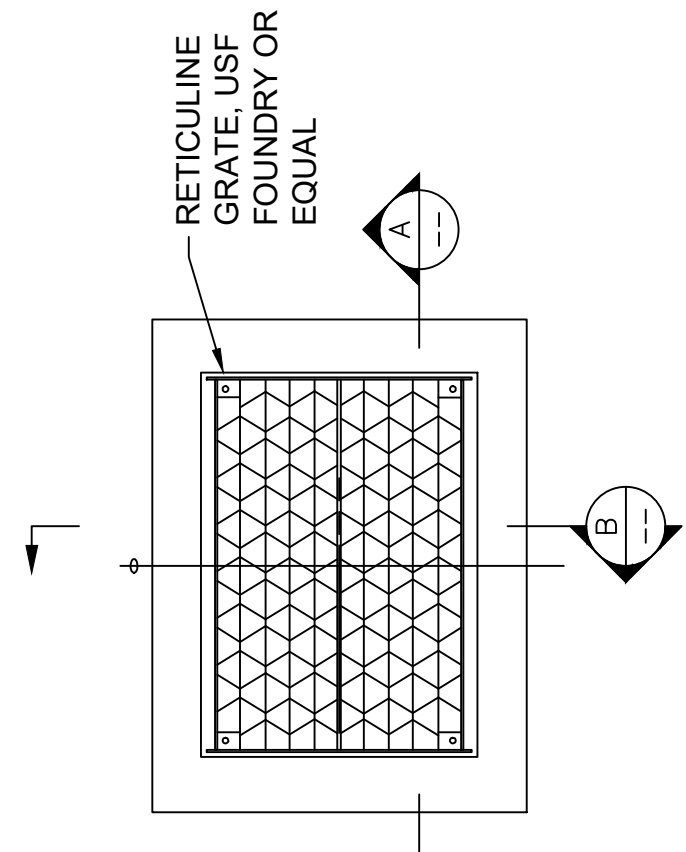
LONGITUDINAL SECTION
SHOWING CATCH BASIN USED
WITH R.C. BOX CULVERT
SCALE: N.T.S.



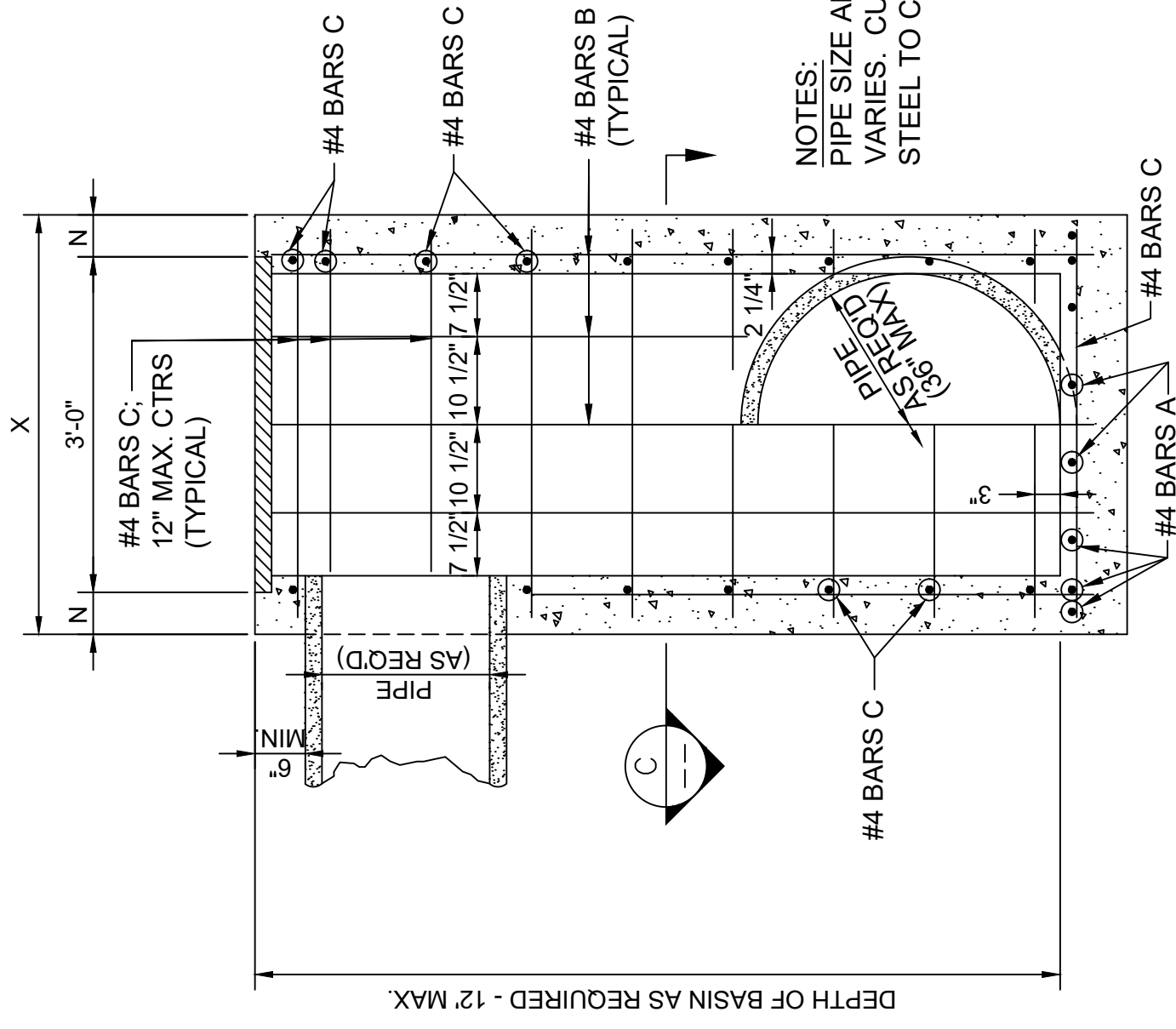
#4 BARS A



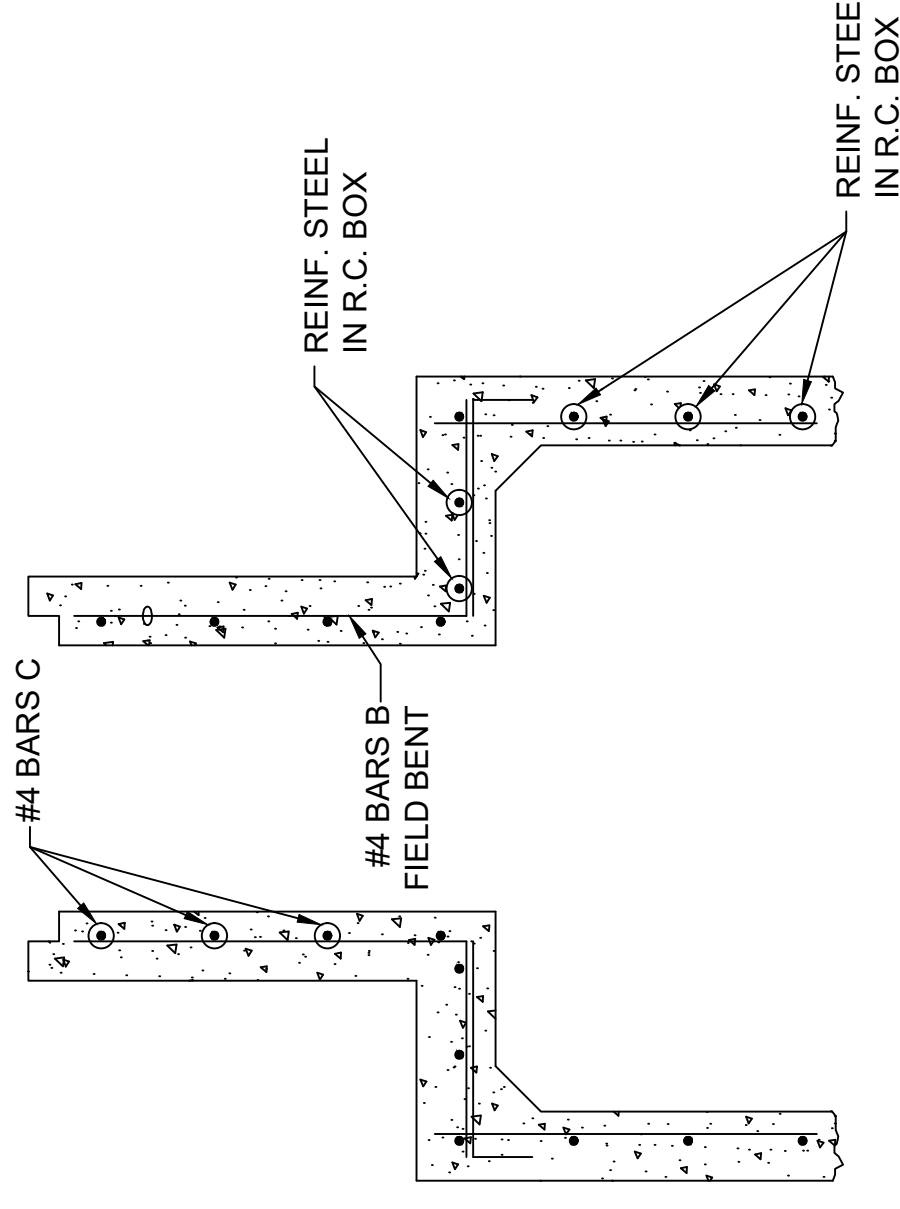
SECTION B
SCALE: N.T.S.



PLAN
SCALE: N.T.S.



SECTION A
SCALE: N.T.S.




TRANSVERSE SECTION
SHOWING CATCH BASIN USED
WITH R.C. BOX CULVERT
SCALE: N.T.S.

- NOTES:
- 1) DIMENSIONS RELATING TO REINFORCING STEEL ARE TO BAR CENTERS
 - 2) VERTICAL REINFORCING STEEL MAY BE SPLICED. SPLICE LENGTH IS 40 DIAMETERS

GENERAL NOTES

1. EXHIBIT SITE PLAN IS DEVELOPED BASED UPON SURVEY PREPARED BY ALL SOUTH CONSULTING ENGINEERS, L.L.C. TITLED "FAIRFIELD OAKS TO CHEFUNCTE PARC. & THREE RIVERS WWTP SEWER CONSOLIDATION PROJECT," AND DATED 08/2023.
2. REFER TO MECHANICAL, CIVIL, STRUCTURAL, AND ELECTRICAL DRAWINGS FOR ADDITIONAL REQUIREMENTS.
3. REFER TO SURVEY FOR ADDITIONAL GEOMETRIC CONTROL.
4. REFER TO SPECIFICATIONS FOR CONSTRUCTION LAYOUT REQUIREMENTS.
5. REFER TO SPECIFICATIONS FOR CONSTRUCTION CONSTRAINS AND SEWER FLOW CONTROL REQUIREMENTS.
6. LOCATE ALL SEWER FLOW EQUIPMENT WITHIN THE RIGHTS OF WAY.
7. SEE DEMOLITION DRAWINGS FOR ADDITIONAL REQUIREMENTS.

KEYNOTES NOTES 

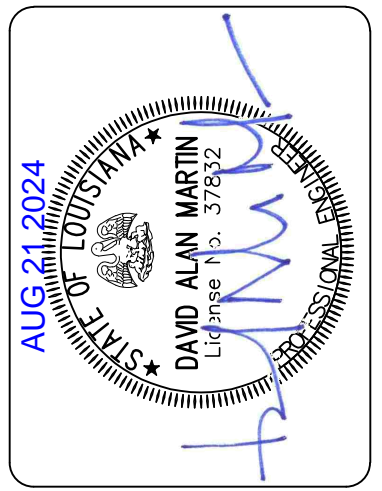
- A. EXISTING SEWER STATION WET WELL RECOMMENDED FLOW CONTROL SUCTION LOCATION.
- B. RECOMMEND PUMP SETUP LOCATION.
- C. CONSTRUCTION OF NEW STATION WILL REQUIRE DEMOLITION OF EXISTING THREE RIVERS WWTP FURNISH PROVISIONS FOR HAULING SEWER FOR THE DURATION OF CONSTRUCTION OPERATIONS NECESSARY TO CONSTRUCT PUMPING STATION AND DISCHARGE VIA THE BREWSTER ROAD FORCE MAIN.
- D. RECOMMEND BYPASS HOSE ARRANGEMENT.
- E. EXISTING THREE RIVERS PLANT TO BE DEMOLISHED.
- F. REQUIRED MANHOLE.



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

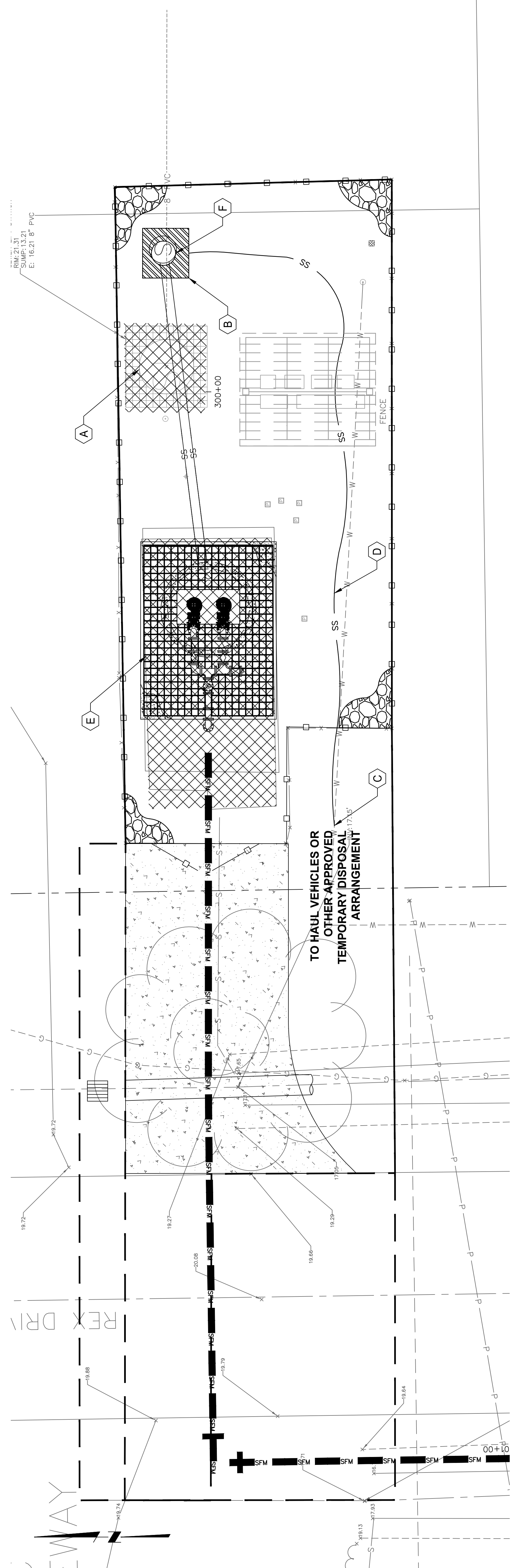
No.	DESCRIPTION OF REVISION	DATE:

DESIGNED BY: M. LOKER	AS NOTED [R]
DRAWN BY: J. HITT	
CHECKED BY: J. CATALANOTTO	
PROJECT No.: DU 168,170.	
ISSUE DATE: 08/20/2024	
APPROVED BY: D. MARTIN	
SHEET SIZE: ANSI D 34x22	
SCALE:	



BREWSTER ROAD SEWER
CONSOLIDATION
THREE RIVERS - RECOMMENDED
BYPASS ARRANGEMENT AND
OVERALL SCOPE OF WORK

SHEET NO.
30C-01

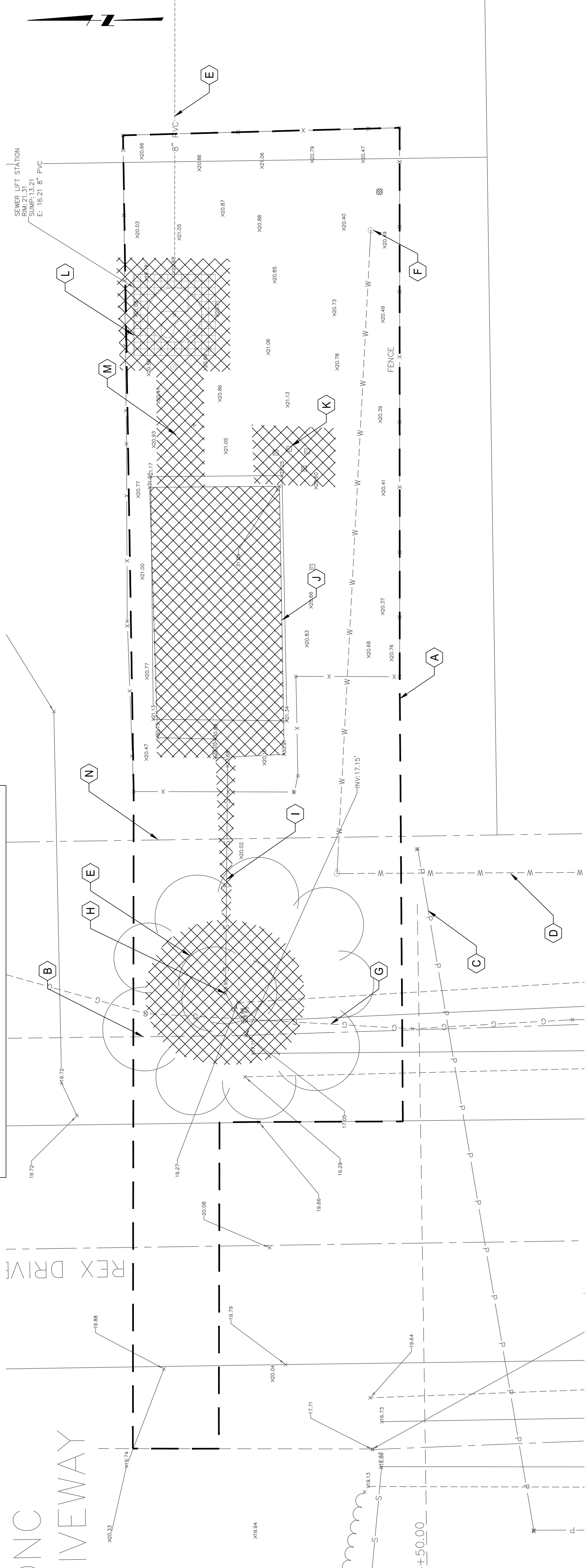


GENERAL NOTES

- EXISTING SITE PLAN IS DEVELOPED BASED UPON SURVEY PREPARED BY ALL SOUTH CONSULTING ENGINEERS, L.L.C. TITLED "FAIRFIELD OAKS TO CHEVUNTE PARC. & THREE RIVERS WWTP SEWER CONSOLIDATION PROJECT," AND DATED 08/2023.
- REFER TO MECHANICAL, CIVIL, STRUCTURAL, AND ELECTRICAL DRAWINGS FOR ADDITIONAL REQUIREMENTS.
- REFER TO SURVEY FOR ADDITIONAL GEOMETRIC CONTROL.
- REFER TO SPECIFICATIONS FOR CONSTRUCTION LAYOUT REQUIREMENTS.
- REFER TO SPECIFICATIONS AND SHEET 30C-01 FOR CONSTRUCTION CONSTRAINTS AND SEWER FLOW CONTROL REQUIREMENTS.
- SEE DEMOLITION DRAWINGS FOR ADDITIONAL REQUIREMENTS.

SHEET KEY NOTES

- APPROXIMATE LIMITS OF CONSTRUCTION
- REMOVE EXISTING CMP SIDE DRAIN. SEE REHABILITATED SITE PLAN FOR RECONSTRUCTION REQUIREMENTS.
- EXISTING OVERHEAD POWER LINES (TO REMAIN)
- EXISTING WATER MAIN (TO REMAIN)
- EXISTING GRAVITY SEWER (TO REMAIN)
- EXISTING METER AND SERVICE TO BE RELOCATED
- EXISTING GAS MAIN (TO REMAIN)
- EXISTING PINE TREE AND STUMP TO BE REMOVED AND DISPOSED OF
- LOCATE AND DEMOLISH EXISTING WWTP EFFLUENT PIPELINE
- DEMOLISH AND DISPOSE OF EXISTING THREE RIVERS WWTP.
- DEMOLISH AND DISPOSE OF EXISTING ELECTRICAL AND CONTROL EQUIPMENT
- EXISTING THREE RIVERS PUMP STATION TO BE BACKFILLED FOLLOWING CONSTRUCTION OF NEW THREE RIVERS PUMP STATION
- LOCATE, DEMOLISH AND DISPOSE OF EXISTING 4" SEWER FORCE MAIN.
- DEMOLISH AND DISPOSE OF EXISTING WOODEN PICKET FENCE. SEE REHABILITATED SITE PLAN FOR RECONSTRUCTION REQUIREMENTS.



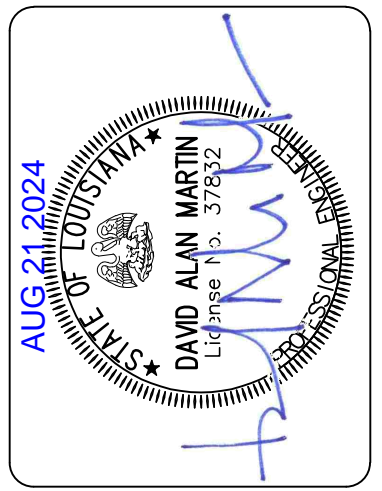
THREE RIVERS - EXISTING SITE PLAN
SCALE: 1/4" = 1'



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

No.	DESCRIPTION OF REVISION	DATE:

DESIGNED BY:	M. LOKER
CHECKED BY:	J. CATLANOTTO
PROJECT No.:	DU 168,170.
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED [RMS]



BREWSTER ROAD SEWER
CONSOLIDATION
THREE RIVERS EXISTING SITE
PLAN

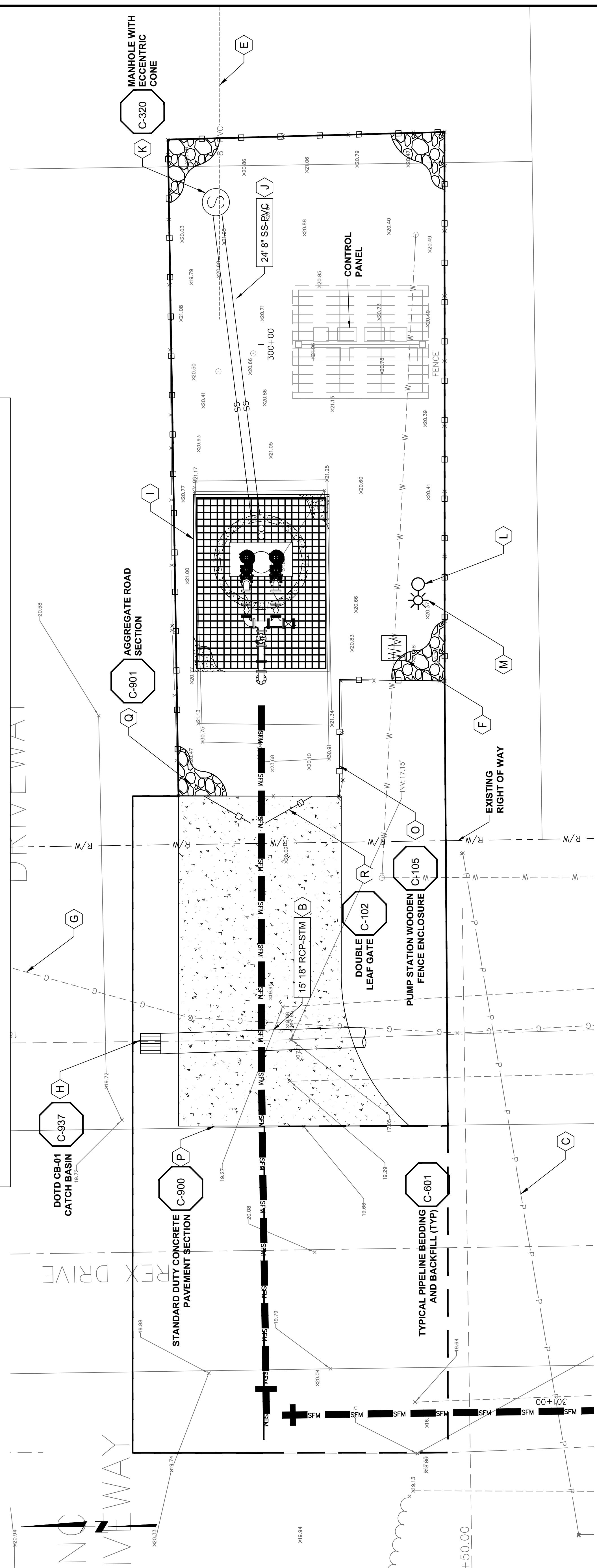
SHEET NO.
30C-02

GENERAL NOTES

1. PROPOSED SITE PLAN IS DEVELOPED BASED UPON SURVEY PREPARED BY ALL SOUTH CONSULTING ENGINEERS, L.L.C. TITLED, "FAIRFIELD OAKS, TCHREUNCTE, PARC. & THREE RIVERS WWTP SEWER CONSOLIDATION PROJECT", AND DATED 08/2023.
2. REFER TO MECHANICAL, CIVIL, STRUCTURAL, AND ELECTRICAL DRAWINGS FOR ADDITIONAL REQUIREMENTS.
3. REFER TO SURVEY FOR ADDITIONAL GEOMETRIC CONTROL.
4. REFER TO SPECIFICATIONS FOR CONSTRUCTION LAYOUT REQUIREMENTS.
5. REFER TO SPECIFICATIONS AND SHEET 30C-01 FOR CONSTRUCTION CONSTRAINTS AND SEWER CONTROL REQUIREMENTS.

SHEET KEY NOTES

- A. APPROXIMATE LIMITS OF CONSTRUCTION
- B. REQ'D 18" RCP SIDE DRAIN (+/- 15.00 LF), TIE INTO CB-01. DISCHARGE INVERT TO MATCH EXISTING GRADE (+/- 17.07)
- C. EXISTING OVERHEAD POWER LINES (TO REMAIN)
- D. EXISTING WATER MAIN (TO REMAIN)
- E. EXISTING GRAVITY SEWER (TO REMAIN)
- F. RELOCATED WATER METER
- G. EXISTING GAS MAIN (TO REMAIN)
- H. REQ'D CB-01 DROP INLET. INV = 17.05. T.C. = MATCH EXISTING GRADE (+/- 19.72)
- I. REQ'D THREE RIVERS PUMP STATION (SEE MECHANICAL, CIVIL, STRUCTURAL, AND ELECTRICAL SHEETS)
- J. REQ'D SANITARY SEWER PIPE LINE (+/- 23.75 LF)
- K. REQ'D DOGHOUSE MANHOLE
- L. REQ'D SERVICE POLE (SEE ELECTRICAL)
- M. REQ'D SITE LIGHT ON SERVICE POLE (SEE ELECTRICAL)
- N. REQ'D WOODEN FENCE (+/- 127.48 LF)
- O. REQ'D 6" THICK AGGREGATE SURFACE COURSE (+/- 929.52 SQ. YD)
- P. REQ'D 4" SEWER FORCE MAIN TO BREWSTER ROAD FORCE MAIN. SEE PLAN AND PROFILES FOR CONTINUATION.
- Q. REQ'D PORTLAND CEMENT CONCRETE DRIVEWAY, 6" THICK (+/- 309.18 SQ. YD)
- R. REQ'D DOUBLE LEAF WOODEN GATE



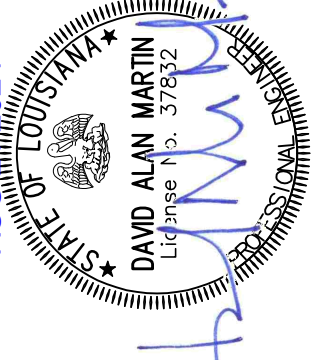
THREE RIVERS - REHABILITATED SITE PLAN
SCALE: 1/4" = 1'



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

No.	DESCRIPTION OF REVISION	DATE:
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DESIGNED BY: M. LOKER	AS NOTED [R]
CHECKED BY: J. CATLANOTTO	175, 177
PROJECT No.: DU 168,170.	ISSUE DATE: 08/20/2024
SUBMITTED BY: FAIRWAY CE	APPROVED BY: D. MARTIN
SCALE: 1/4" = 1'	SHEET SIZE: ANSI D 34x22



AUG 21 2024

BREWSTER ROAD SEWER
CONSOLIDATION
SITE PLAN
THREE RIVERS - REHABILITATED

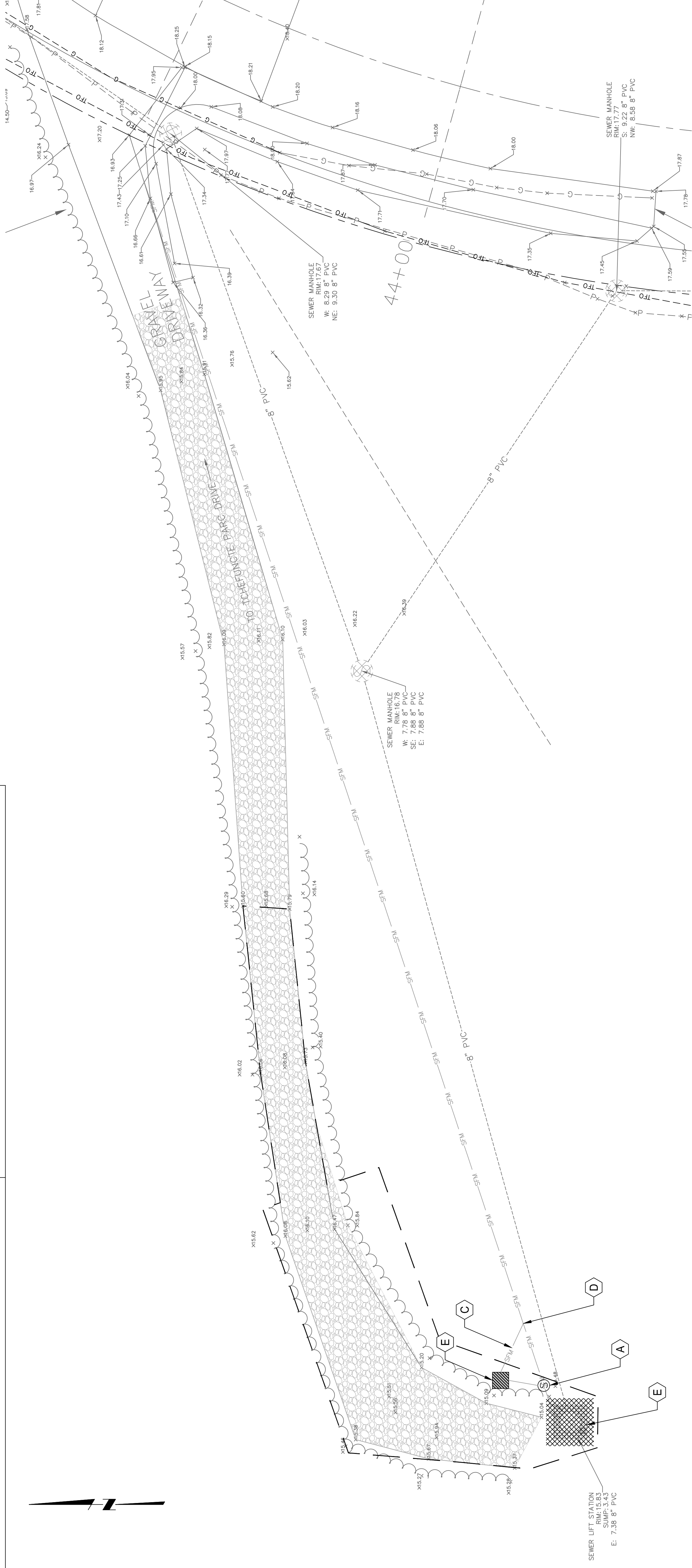
SHEET NO.
30C-03

GENERAL NOTES

1. PROPOSED SITE PLAN IS DEVELOPED BASED UPON SURVEY PREPARED BY ALL SOUTH CONSULTING ENGINEERS, L.L.C. TITLED, "FAIRFIELD OAKS, TCHEFUNCTE PARC, & THREE RIVERS WWTP SEWER CONSOLIDATION PROJECT", AND DATED 08/2023.
2. REFER TO MECHANICAL, CIVIL, STRUCTURAL, AND ELECTRICAL DRAWINGS FOR ADDITIONAL REQUIREMENTS.
3. REFER TO SURVEY FOR ADDITIONAL GEOMETRIC CONTROL.
4. REFER TO SPECIFICATIONS FOR CONSTRUCTION LAYOUT REQUIREMENTS.
5. REFER TO SPECIFICATIONS FOR CONSTRUCTION CONSTRAINTS AND SEWER FLOW CONTROL REQUIREMENTS.
6. LOCATE ALL SEWER FLOW EQUIPMENT WITHIN THE RIGHT OF WAY.
7. SEE DEMOLITION DRAWINGS FOR ADDITIONAL REQUIREMENTS.

SHEET KEY NOTES

- A. REOID DOGHOUSE MANHOLE UPSTREAM OF EXISTING STATION (RECOMMENDED BYPASS SUCTION LOCATION)
- B. RECOMMENDED BYPASS PUMPING LOCATION
- C. RECOMMENDED BYPASS PIPING ROUTE
- D. RECOMMENDED DISCHARGE LOCATION. CUT INTO EXISTING SFM DOWNSTREAM OF STATION
- E. DEMOLISH AND BACKFILL EXISTING TCHEFUNCTE PARC LIFT STATION FOLLOWING ACCEPTANCE OF NEW TCHEFUNCTE PARC PUMP STATION AND FORCE MAIN.



TCHEFUNCTE PARC - RECOMMENDED BYPASS ARRANGEMENT AND OVERALL SCOPE OF WORK
SCALE: 1" = 10'

BREWSTER ROAD SEWER CONSOLIDATION
THEFUNCTE PARC - RECOMMENDED BYPASS ARRANGEMENT AND OVERALL SCOPE OF WORK

DESIGNED BY: M LOKER
DRAWN BY: J. HITT
CHECKED BY: FAIRWAY CE
PROJECT No.: DU 168,170,
175, 177
ISSUE DATE: 08/20/2024
APPROVED BY: D. MARTIN
SHEET SIZE: ANSI D 34x22
SCALE: AS NOTED

AUG 21 2024
STATE OF LOUISIANA
DAVID ALAN MARTIN
Lic. No. 37932

No.	DESCRIPTION OF REVISION	DATE:
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DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

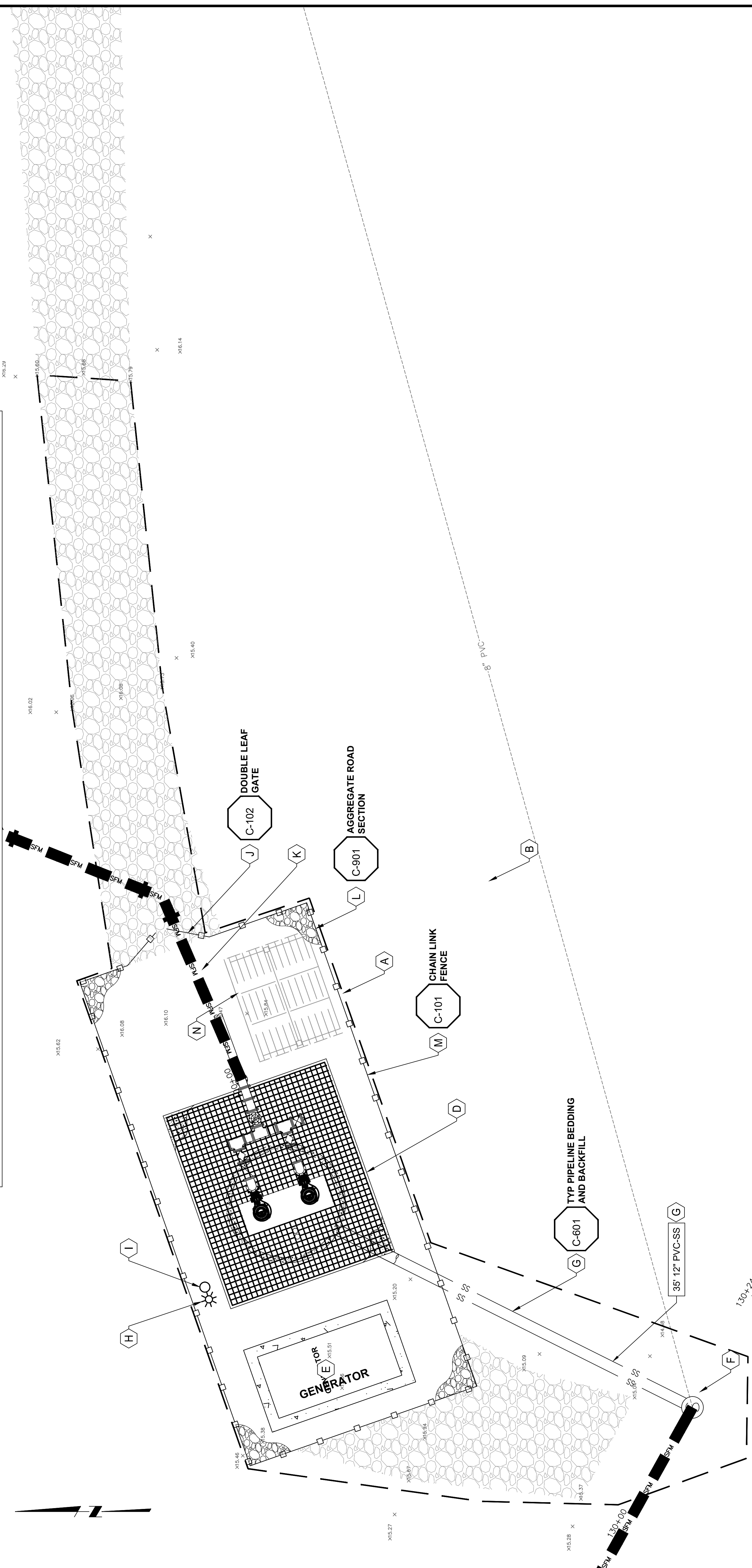
GENERAL NOTES

- REHABILITATED SITE PLAN IS DEVELOPED BASED UPON SURVEY PREPARED BY ALL SOUTH CONSULTING ENGINEERS, L.L.C. TITLED "FAIRFIELD OAKS, TCHEFUNCTE PARC, & THREE RIVERS WWTP SEWER CONSOLIDATION PROJECT", AND DATED 08/2023.
- REFER TO MECHANICAL, CIVIL, STRUCTURAL, AND ELECTRICAL DRAWINGS FOR ADDITIONAL REQUIREMENTS.
- REFER TO SURVEY FOR ADDITIONAL GEOMETRIC CONTROL.
- REFER TO SPECIFICATIONS FOR CONSTRUCTION LAYOUT REQUIREMENTS.

SHEET KEYNOTES

- APPROXIMATE LIMITS OF CONSTRUCTION
- EXISTING SEWER FORCE MAIN (ABANDONED IN PLACE)
- REQ'D GRAVITY SANITARY SEWER FORCE MAIN (SEE PLAN AND PROFILE SHEETS)
- REQ'D NEW TCHEFUNCTE PARC SEWER PUMP STATION (SEE CIVIL, STRUCTURAL, MECHANICAL, AND ELECTRICAL SHEETS)
- REQ'D EMERGENCY GENERATOR (SEE ELECTRICAL)
- REHABILITATED SUMP
- REQ'D SANITARY SEWER PIPELINES (+/- 35 LF)
- REQ'D SITE LIGHT
- REQ'D SERVICE POLE (COORDINATE LOCATION WITH SERVING UTILITY)
- REQ'D DOUBLE LEAF CHAIN LINK GATE

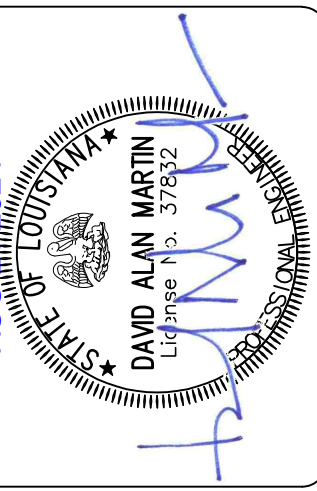
- REQ'D SEWER FORCE MAIN TO BREWSTER ROAD FORCE MAIN. SEE PLAN AND PROFILES FOR CONTINUATION.
- REQ'D 6" THICK AGGREGATE SURFACE COURSE (+/- 1046.57 SQ. YARD)
- REQ'D 8' TALL CHAIN LINK FENCE (+/- 130.79 LF)
- REQ'D ELECTRICAL CONTROL RACK (SEE ELECTRICAL)




DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

No.	DESCRIPTION OF REVISION	DATE:
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DESIGNED BY:	M. LOKER
DRAWN BY:	J. HITT
CHECKED BY:	J. CATLANOTTO
PROJECT No.:	DU 168,170.
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED



BREWSTER ROAD SEWER
CONSOLIDATION
TCHEFUNCTE PARC
REHABILITATED SITE PLAN

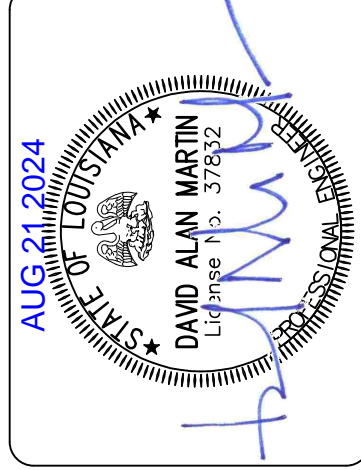
SHEET NO.
40C-03



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

NO.	DATE	DESCRIPTION OF REVISION
1		
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DESIGNED BY: M. LOKER	CHECKED BY: J. CATLANOTTO	DRAWN BY: J. HITT	PROJECT NO.: FAIRWAY CE 175, 177	ISSUE DATE: 08/20/2024	APPROVED BY: D. MARTIN	SHEET SIZE: ANSI D 34x22	SCALE: AS NOTED
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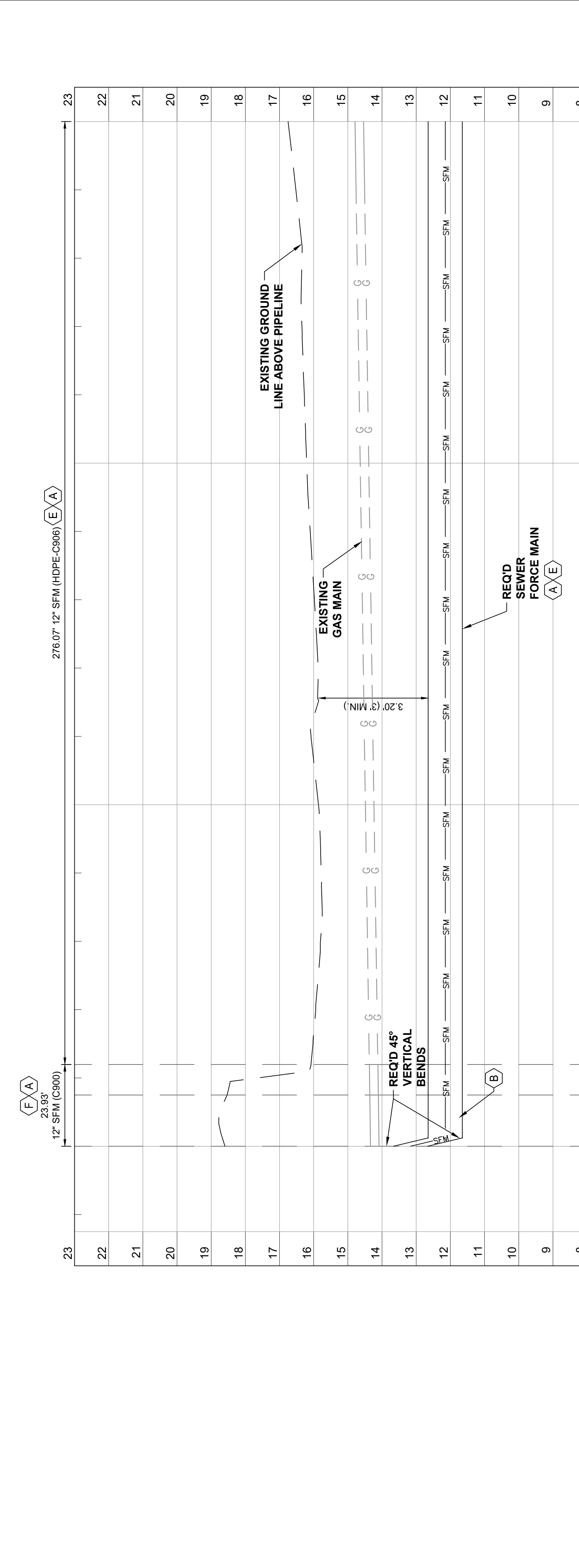
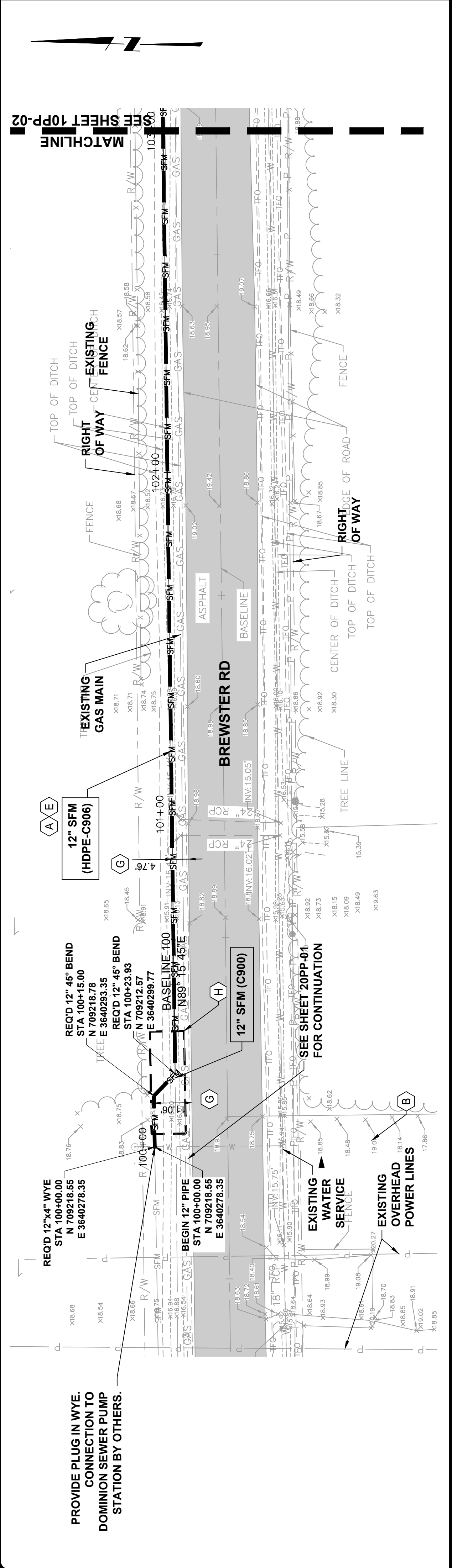
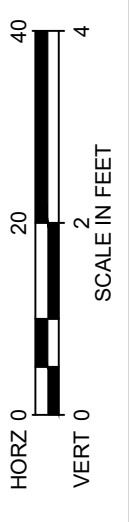


BREWSTER ROAD SEWER
CONSOLIDATION
FORCE MAIN PLAN & PROFILES - BASELINE 100 - I

SHEET NO.
10PP-01

- PLAN AND PROFILE GENERAL NOTES**
- PLAN AND PROFILE DRAWING BASED UPON SURVEY TITLED "ST. TAMMANY SEWER CONSOLIDATION SURVEY - FAIRFIELD OAKS, THREE RIVERS, AND TCHEFUNCTE PARK" PREPARED BY ALL - SOUTH CONSULTING ENGINEERS, DATED JULY 2023 AND AS-BUILT DRAINAGE PLAN FOR ARUNDEL SUBDIVISION
 - AT EACH LOCATION WHERE THE REQUIRED SEWER FORCE MAIN CROSSES AN EXISTING UTILITY, OR TIES INTO AN EXISTING UTILITY, CONDUCT EXPLORATORY EXCAVATIONS AS NECESSARY TO POSITIVELY DETERMINE LOCATION, ELEVATION, AND SIZE OF UTILITY CONDUIT SUCH AS EXPLORATORY EXCAVATIONS AND REPORT FINDINGS TO ENGINEER PRIOR TO ANY HORIZONTAL DIRECTIONAL DRILLING OPERATIONS. COORDINATE WITH THE ENGINEER IN ADJUSTING THE ALIGNMENT OF THE REQUIRED PIPELINE TO MAINTAIN REQUIRED CLEARANCES. THE CONTRACTOR WILL NOT BE ENTITLED TO ANY ADJUSTMENT IN PAY FOR SUCH ADJUSTMENTS EXCEPT FOR ADDITIONAL QUANTITIES.
 - PROVIDE TEMPORARY TRAFFIC CONTROLS PER THE ACCEPTED TEMPORARY TRAFFIC CONTROL PLAN. SEE SPECIFICATIONS AND MINIMUM STANDARDS FOR ADDITIONAL REQUIREMENTS.
 - PIPE SIZES NOTED ON PLANS REFERENCE NOMINAL PIPE DIAMETER.
 - REFER TO PIPE SCHEDULE FOR ADDITIONAL REQUIREMENTS.
 - CONTRACTOR TO MAINTAIN A MINIMUM 6" HORIZONTAL AND 18" VERTICAL SEPARATION BETWEEN SEWER FORCE MAIN AND WATER MAIN.
 - NOT ALL NOTES BY SYMBOL USED ON THIS SHEET.

- PLAN AND PROFILE NOTES BY SYMBOLS**
- REQ'D 12" BREWSTER RD. SFM TO DISCHARGE INTO TCHEFUNCTE PARC SPS
 - REQ'D 4" FAIRFIELD OAKS SEWER FORCE MAIN TO DISCHARGE INTO BREWSTER RD. SFM
 - REQ'D 4" THREE RIVERS SFM TO DISCHARGE INTO BREWSTER RD. SFM
 - REQ'D 12" TCHEFUNCTE PARC SFM TO DISCHARGE TO FAUBOURG NO 2 SPS.
 - PIPE TO BE INSTALLED BY HORIZONTALLY DIRECTIONALLY DRILLING
 - PIPE TO BE INSTALLED BY OPEN CUT
 - HORIZONTAL DISTANCE FROM EDGE OF ROADWAY
 - REQ'D LAUNCHING AND RECEIVING PIT FOR HORIZONTAL DIRECTIONAL DRILLING
 - REQ'D FULLY RESTRAINED GATE VALVE WITH STEM EXTENSION PER DETAIL
 - REQ'D AIR RELEASE VALVE AND VAULT PER DETAIL
 - REQ'D VERTICAL CURVE. SEE CURVE TABLE ON SHEET G-102 FOR ADDITIONAL REQUIREMENTS AND INFORMATION.
 - REQUIRED 3" ARUNDEL SEWER FORCE MAIN (BY OTHERS) TO DISCHARGE IN BREWSTER FORCE MAIN
 - REQ'D 14" TCHEFUNCTE PARC SFM TO DISCHARGE INTO FAUBORG NO. 2 LIFT STATION



STATION	EXIST GND EL	VERTICAL PIPE GEOMETRY	PIPE ELEV DATA (COVER INV)
99+75	18.67	100+00.00	4.94(C) 12.67(I)
100+00	18.60	100+00.00	6.02(C) 11.65(I)
101+00	15.86	101+00	3.21(C) 11.65(I)
102+00	16.20	102+00	3.55(C) 11.65(I)
103+00	16.75	103+00	4.10(C) 11.65(I)

PROVIDE PLUG IN WYE CONNECTION TO DOMINION SEWER PUMP STATION BY OTHERS.

SEE SHEET 10PP-02
MATCHLINE

REQ'D 12" 45° BEND
STA 100+00.00
N 709218.55
E 3640278.35

REQ'D 12" 45° BEND
STA 100+25.35
N 709218.55
E 3640278.35

REQ'D 12" 45° BEND
STA 100+45.00
N 709218.55
E 3640278.35

SEE SHEET 20PP-01
FOR CONTINUATION



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

NO.	DATE	DESCRIPTION OF REVISION
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DESIGNED BY: M. LOKER	DRAWN BY: J. HITT
CHECKED BY: J. CATLANOTTO	PROJECT No.: FAIRWAY CE
ISSUE DATE: 08/20/2024	AS NOTED
APPROVED BY: D. MARTIN	
SHEET SIZE: ANSI D 34x22	

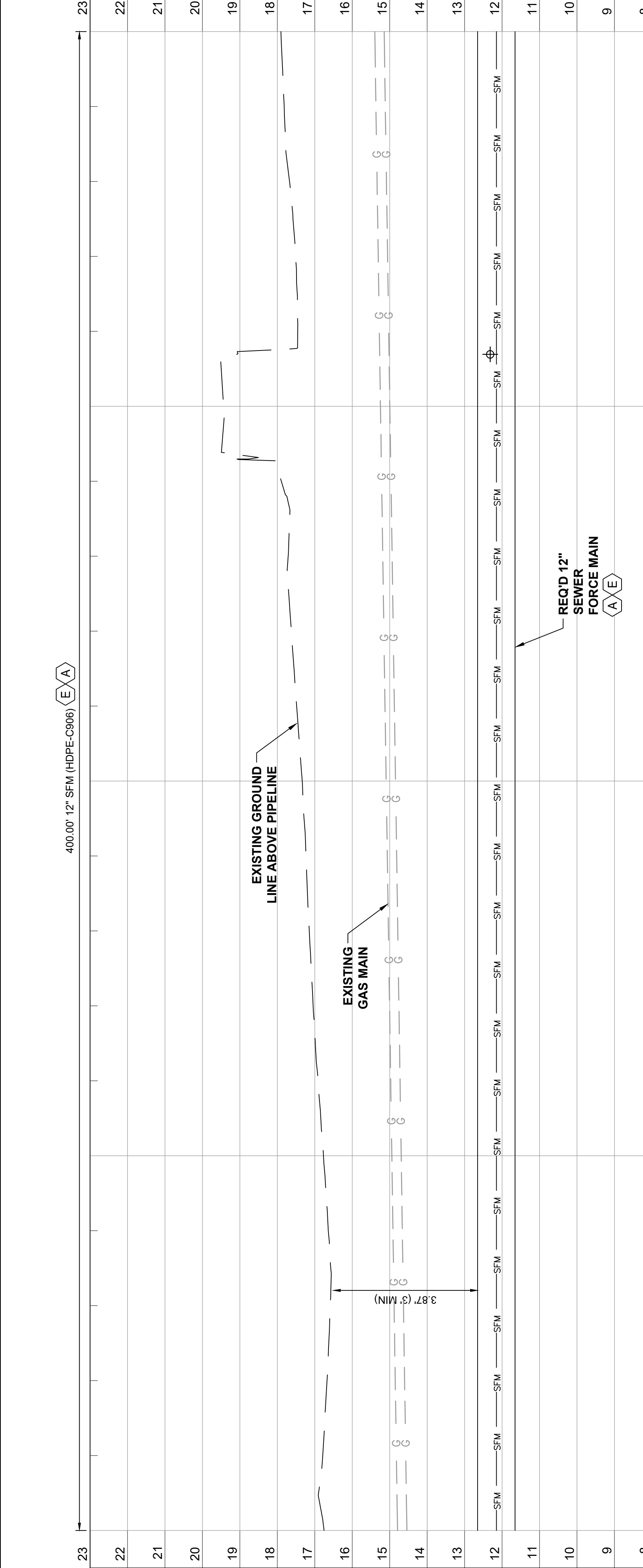
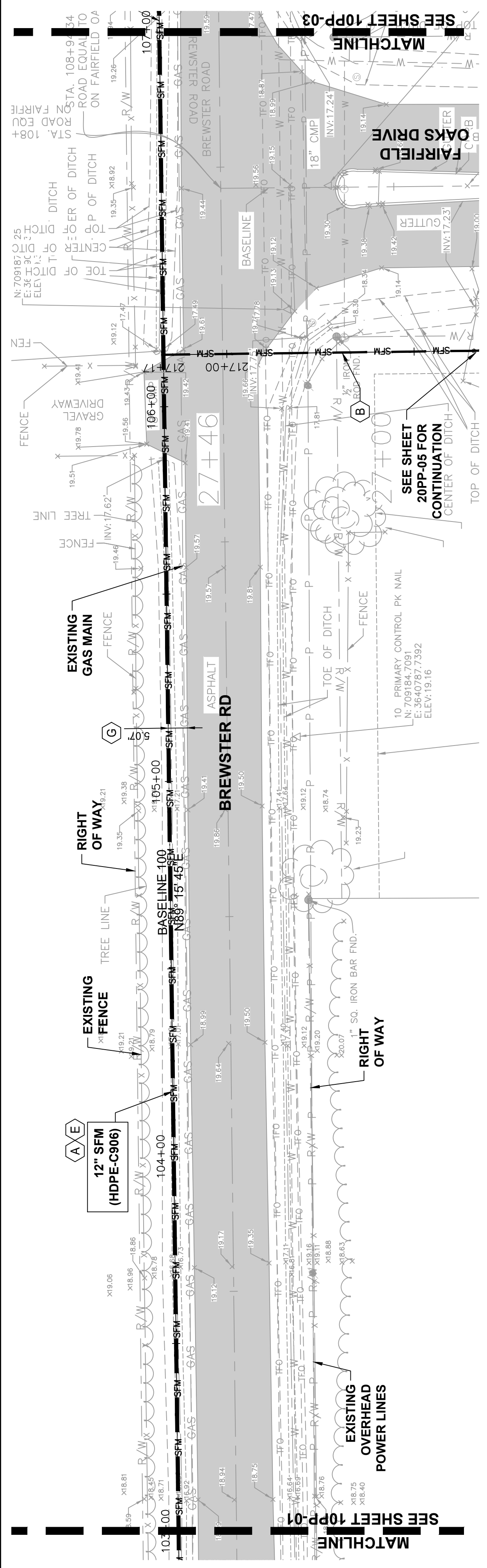


BREWSTER ROAD SEWER
CONSOLIDATION
FORCE MAIN PLAN & PROFILES - BASELINE 100 - II

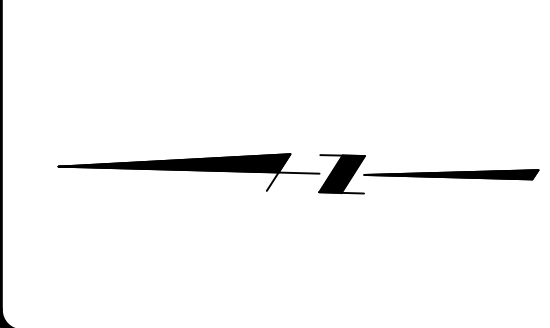
SHEET NO.
10PP-02

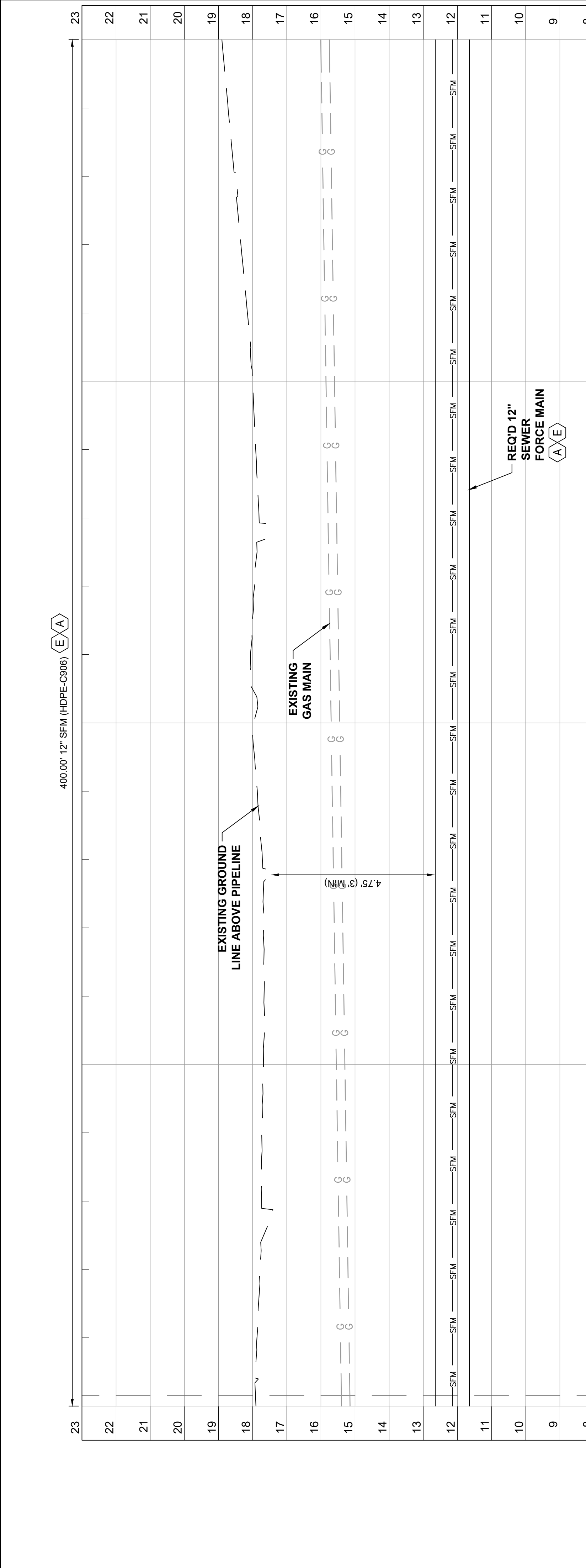
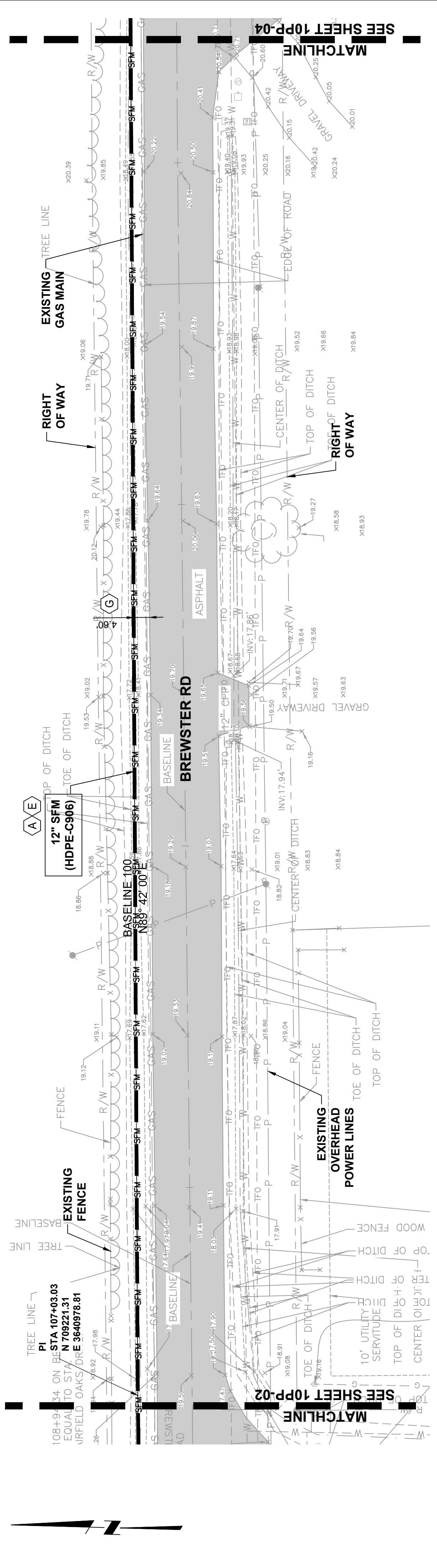
- PLAN AND PROFILE GENERAL NOTES**
- PLAN AND PROFILE DRAWING DRAWINGS BASED UPON SURVEY TITLED "ST. TAMMANY SEWER CONSOLIDATION SURVEY - FAIRFIELD OAKS, THREE RIVERS, AND TCHEFUNCTE PARK" PREPARED BY ALL - SOUTH CONSULTING ENGINEERS, DATED JULY 2023 AND AS-BUILT DRAINAGE PLAN FOR ARUNDEL SUBDIVISION
 - AT EACH LOCATION WHERE THE REQUIRED SEWER FORCE MAIN CROSSES AN EXISTING UTILITY, OR TIES INTO AN EXISTING UTILITY CONDUIT EXPLORATORY EXCAVATIONS AS NECESSARY TO POSITIVELY DETERMINE LOCATION, ELEVATION, AND SIZE OF UTILITY CONDUIT SUCH EXPLORATORY EXCAVATIONS AND REPORT FINDINGS TO ENGINEER PRIOR TO ANY HORIZONTAL DIRECTIONAL DRILLING OPERATIONS. COORDINATE WITH THE ENGINEER IN ADJUSTING THE ALIGNMENT OF THE REQUIRED PIPELINE TO MAINTAIN REQUIRED CLEARANCES. THE CONTRACTOR WILL NOT BE ENTITLED TO ANY ADJUSTMENT IN PAY FOR SUCH ADJUSTMENTS EXCEPT FOR ADDITIONAL QUANTITIES. PROVIDE TEMPORARY TRAFFIC CONTROLS PER THE ACCEPTED TEMPORARY TRAFFIC CONTROL PLAN. SEE SPECIFICATIONS AND MINIMUM STANDARDS FOR ADDITIONAL REQUIREMENTS.
 - PIPE SIZES NOTED ON PLANS REFERENCE NOMINAL PIPE DIAMETER.
 - REFER TO PIPE SCHEDULE FOR ADDITIONAL REQUIREMENTS.
 - CONTRACTOR TO MAINTAIN A MINIMUM 6' HORIZONTAL AND 18" VERTICAL SEPARATION BETWEEN SEWER FORCE MAIN AND WATER MAIN.
 - NOT ALL NOTES BY SYMBOL USED ON THIS SHEET.

- PLAN AND PROFILE NOTES BY SYMBOLS**
- REQ'D 12" BREWSTER RD. SFM TO DISCHARGE INTO TCHEFUNCTE PARC SPS
 - REQ'D 4" FAIRFIELD OAKS SEWER FORCE MAIN TO DISCHARGE INTO BREWSTER RD. SFM
 - REQ'D 4" THREE RIVERS SFM TO DISCHARGE INTO BREWSTER RD. SFM.
 - REQ'D 12" TCHEFUNCTE PARC SFM TO DISCHARGE TO FAUBOURG NO 2 SPS.
 - PIPE TO BE INSTALLED BY HORIZONTALLY DIRECTIONALLY DRILLING
 - PIPE TO BE INSTALLED BY OPEN CUT
 - HORIZONTAL DISTANCE FROM EDGE OF ROADWAY
 - REQ'D LAUNCHING AND RECEIVING PIT FOR HORIZONTAL DIRECTIONAL DRILLING
 - REQ'D FULLY RESTRAINED GATE VALVE WITH STEM EXTENSION PER DETAIL
 - REQ'D AIR RELEASE VALVE AND VAULT PER DETAIL
 - REQ'D VERTICAL CURVE. SEE CURVE TABLE ON SHEET G-102 FOR ADDITIONAL REQUIREMENTS AND INFORMATION.
 - REQUIRED 3" ARUNDEL SEWER FORCE MAIN (BY OTHERS) TO DISCHARGE IN BREWSTER FORCE MAIN
 - REQ'D 14" TCHEFUNCTE PARC SFM TO DISCHARGE INTO FAUBORG NO. 2 LIFT STATION



STATION	EXIST GND EL	VERTICAL PIPE GEOMETRY	PIPE ELEV DATA (COVER INV)
103+00	16.75		4.10(C) 11.65(I)
104+00	16.77		4.12(C) 11.65(I)
105+00	17.34	2009' @ 0.00%	4.68(C) 11.65(I)
106+00	19.43		6.78(C) 11.65(I)
107+00	17.90		5.25(C) 11.65(I)





STATION	107+00	108+00	109+00	110+00	111+00
EXIST GND EL	17.90	17.68	17.97	18.01	18.90
VERTICAL PIPE GEOMETRY	2009' @ 0.00%				
PIPE ELEV DATA (COVER INV)	5.25(C) 11.65(I)	5.03(C) 11.65(I)	5.32(C) 11.65(I)	5.36(C) 11.65(I)	6.25(C) 11.65(I)

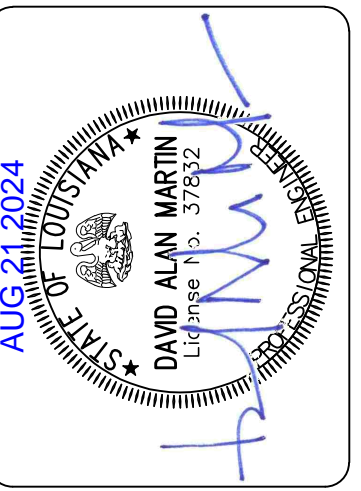
- PLAN AND PROFILE GENERAL NOTES**
- PLAN AND PROFILE DRAWING BASED UPON SURVEY TITLED "ST. TAMMANY SEWER CONSOLIDATION SURVEY - FAIRFIELD OAKS, THREE RIVERS, AND TCHEFUNCTE PARK" PREPARED BY ALL - SOUTH CONSULTING ENGINEERS, DATED JULY 2023 AND AS-BUILT DRAINAGE PLAN FOR ARUNDEL SUBDIVISION
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 - PIPE SIZES NOTED ON PLANS REFERENCE NOMINAL PIPE DIAMETER.
 - REFER TO PIPE SCHEDULE FOR ADDITIONAL REQUIREMENTS.
 - CONTRACTOR TO MAINTAIN A MINIMUM 6' HORIZONTAL AND 18" VERTICAL SEPARATION BETWEEN SEWER FORCE MAIN AND WATER MAIN.
 - NOT ALL NOTES BY SYMBOL USED ON THIS SHEET.

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 - PIPE TO BE INSTALLED BY OPEN CUT
 - HORIZONTAL DISTANCE FROM EDGE OF ROADWAY
 - REQ'D LAUNCHING AND RECEIVING PIT FOR HORIZONTAL DIRECTIONAL DRILLING
 - REQ'D FULLY RESTRAINED GATE VALVE WITH STEM EXTENSION PER DETAIL
 - REQ'D AIR RELEASE VALVE AND VAULT PER DETAIL
 - REQ'D VERTICAL CURVE. SEE CURVE TABLE ON SHEET G-102 FOR ADDITIONAL REQUIREMENTS AND INFORMATION.
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 - REQ'D 14" TCHEFUNCTE PARC SFM TO DISCHARGE INTO FAUBORG NO. 2 LIFT STATION



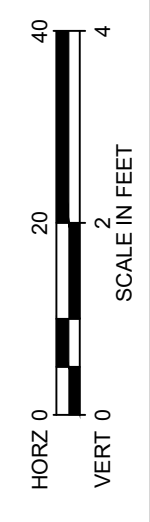
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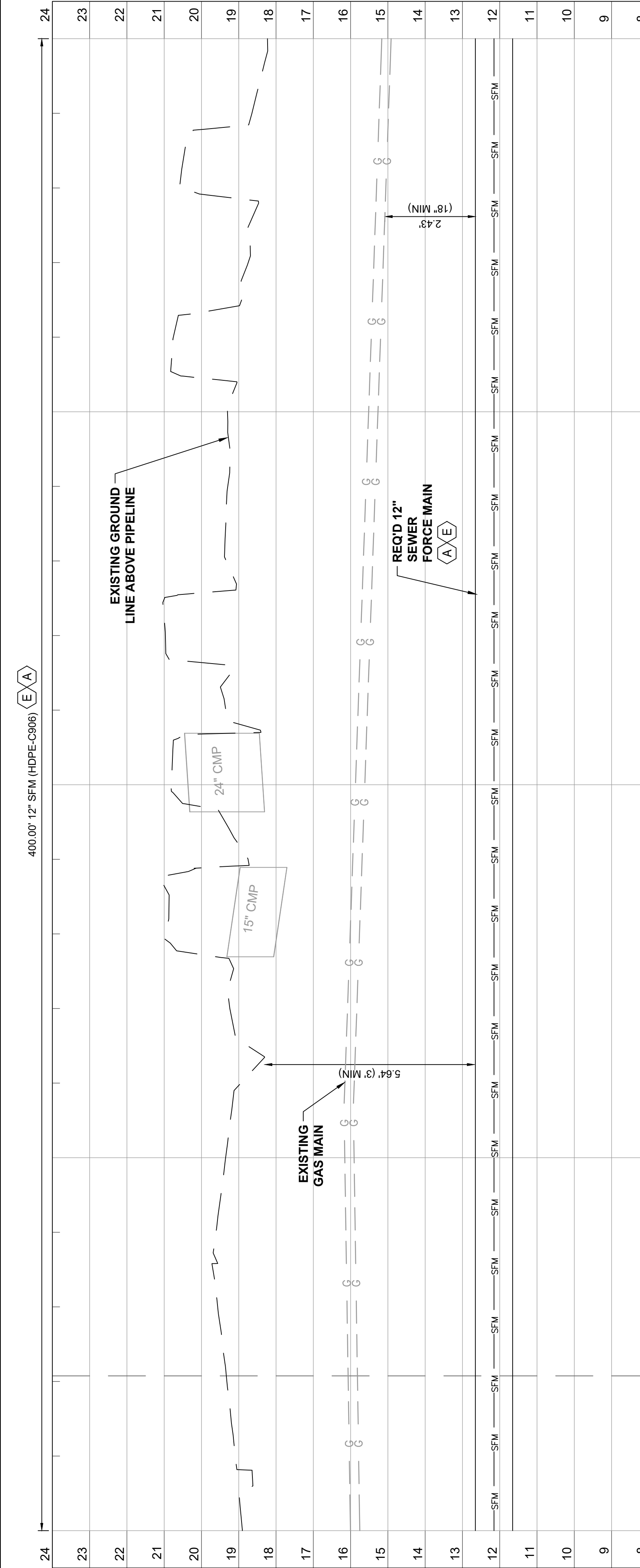
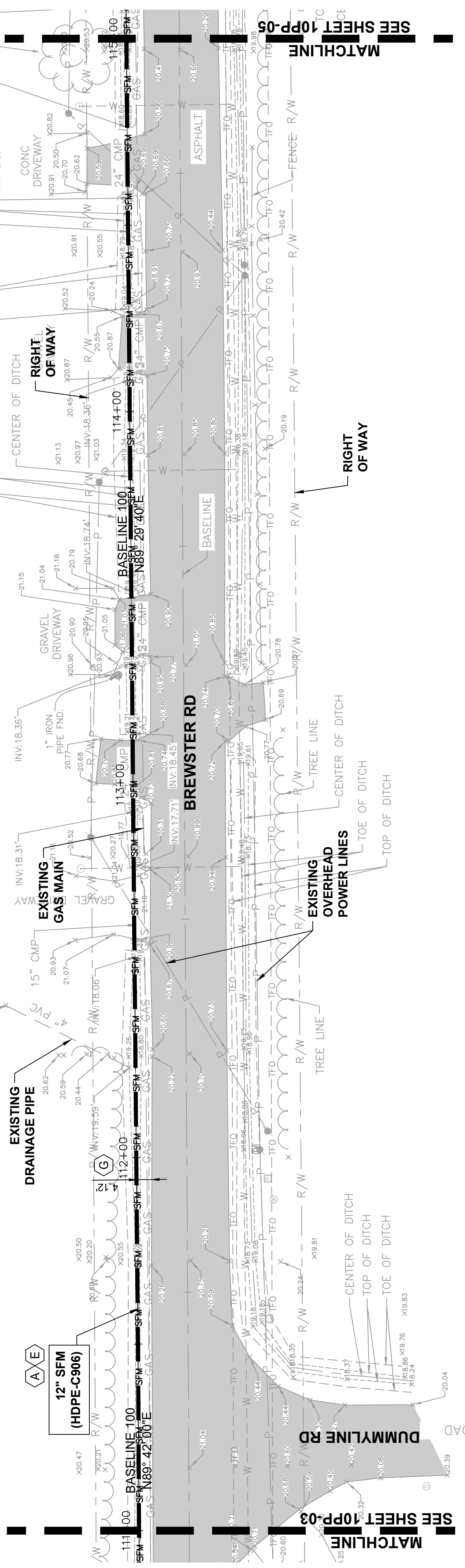
DESIGNED BY: M. LOKER	CHECKED BY: J. CATLANOTTO	PROJECT No.: FAIRWAY CE 175, 177	ISSUE DATE: 08/20/2024	APPROVED BY: D. MARTIN	SHEET SIZE: ANSI D 34x22	SCALE: AS NOTED
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BREWSTER ROAD SEWER
CONSOLIDATION
FORCE MAIN PLAN & PROFILES - BASELINE 100 - III

SHEET NO.
10PP-03





STATION	EXIST GND EL	VERTICAL PIPE GEOMETRY	PIPE ELEV DATA (COVER INV)
111+00	112+00		6.70(C) 11.65(I)
112+00	113+00		8.17(C) 11.65(I)
113+00	114+00		6.65(C) 11.65(I)
114+00	115+00		5.58(C) 11.65(I)

2009' @ 0.0%

PLAN AND PROFILE GENERAL NOTES

- PLAN AND PROFILE DRAWING BASED UPON SURVEY TITLED "ST. TAMMANY SEWER CONSOLIDATION SURVEY - FAIRFIELD OAKS, THREE RIVERS, AND TCHEFUNCTE PARK" PREPARED BY ALL - SOUTH CONSULTING ENGINEERS, DATED JULY 2023 AND AS-BUILT DRAINAGE PLAN FOR ARUNDEL SUBDIVISION
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- PROVIDE TEMPORARY TRAFFIC CONTROL THE ACCEPTED TEMPORARY TRAFFIC CONTROL STANDARDS FOR ADDITIONAL REQUIREMENTS.
- PIPE SIZES NOTED ON PLANS REFERENCE NOMINAL PIPE DIAMETER.
- REFER TO PIPE SCHEDULE FOR ADDITIONAL REQUIREMENTS.
- CONTRACTOR TO MAINTAIN A MINIMUM 6' HORIZONTAL AND 18" VERTICAL SEPARATION BETWEEN SEWER FORCE MAIN AND WATER MAIN.
- NOT ALL NOTES BY SYMBOL USED ON THIS SHEET.

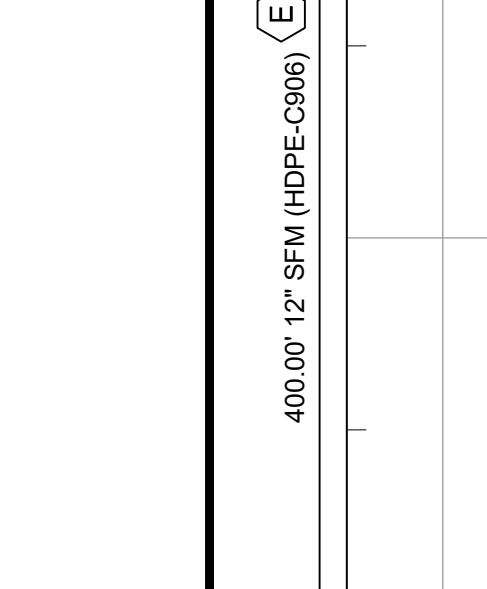
PLAN AND PROFILE NOTES BY SYMBOLS

- REQ'D 12" BREWSTER RD. SFM TO DISCHARGE INTO TCHEFUNCTE PARC SPS
- REQ'D 4" FAIRFIELD OAKS SEWER FORCE MAIN TO DISCHARGE INTO BREWSTER RD. SFM
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- REQ'D 12" TCHEFUNCTE PARC SFM TO DISCHARGE TO FAUBOURG NO 2 SPS.
- PIPE TO BE INSTALLED BY HORIZONTALLY DIRECTIONALLY DRILLING
- PIPE TO BE INSTALLED BY OPEN CUT
- HORIZONTAL DISTANCE FROM EDGE OF ROADWAY REQ'D LAUNCHING AND RECEIVING PIT FOR HORIZONTAL DIRECTIONAL DRILLING
- REQ'D FULLY RESTRAINED GATE VALVE WITH STEM EXTENSION PER DETAIL
- REQ'D AIR RELEASE VALVE AND VAULT PER DETAIL
- REQ'D VERTICAL CURVE. SEE CURVE TABLE ON SHEET G-102 FOR ADDITIONAL REQUIREMENTS AND INFORMATION.
- REQUIRED 3" ARUNDEL SEWER FORCE MAIN (BY OTHERS) TO DISCHARGE IN BREWSTER FORCE MAIN
- REQ'D 14" TCHEFUNCTE PARC SFM TO DISCHARGE INTO FAUBORG NO. 2 LIFT STATION

**DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433**

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DESIGNED BY: M. LOKER	CHECKED BY: J. CATLANOTTO	ISSUE DATE: 08/20/2024	APPROVED BY: D. MARTIN	SHEET SIZE: ANSI D 34x22	AS NOTED
DRAWN BY: J. HITT	PROJECT No.: DU 168,170.	ISSUE DATE: 08/20/2024	APPROVED BY: D. MARTIN	SHEET SIZE: ANSI D 34x22	AS NOTED
SCALE: AS NOTED	PROJECT No.: DU 168,170.	ISSUE DATE: 08/20/2024	APPROVED BY: D. MARTIN	SHEET SIZE: ANSI D 34x22	AS NOTED



BREWSTER ROAD SEWER CONSOLIDATION

FORCE MAIN PLAN & PROFILES - BASELINE 100 - IV

SHEET NO. 10PP-04

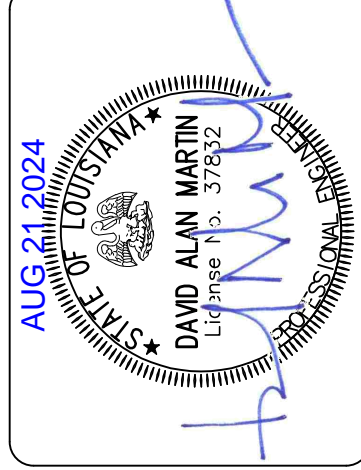




DEPT. OF UTILITIES
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620 N. TYLER STREET
COVINGTON, LA 70433

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DESIGNED BY: M. LOKER	CHECKED BY: J. CATLANOTTO	PROJECT NO.: DU 168,170, 175, 177	ISSUE DATE: 08/20/2024	APPROVED BY: D. MARTIN	SHEET SIZE: ANSI D 34x22	SCALE: AS NOTED
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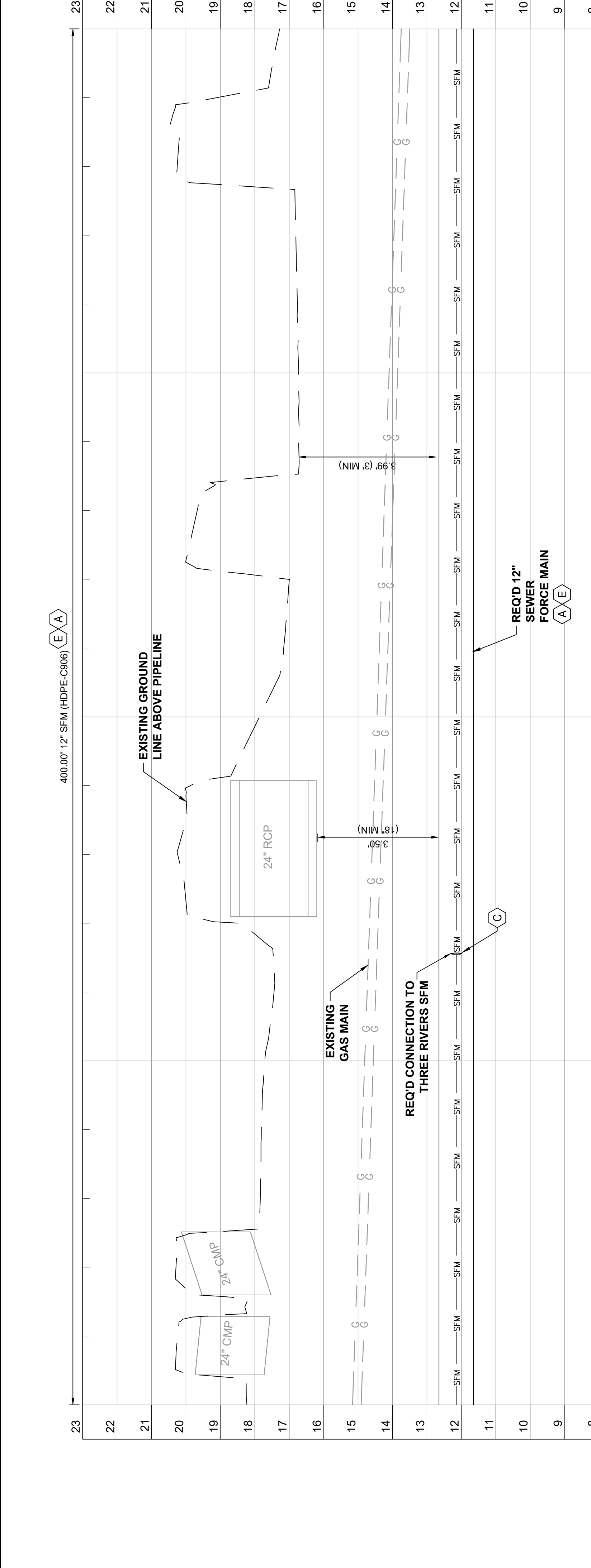
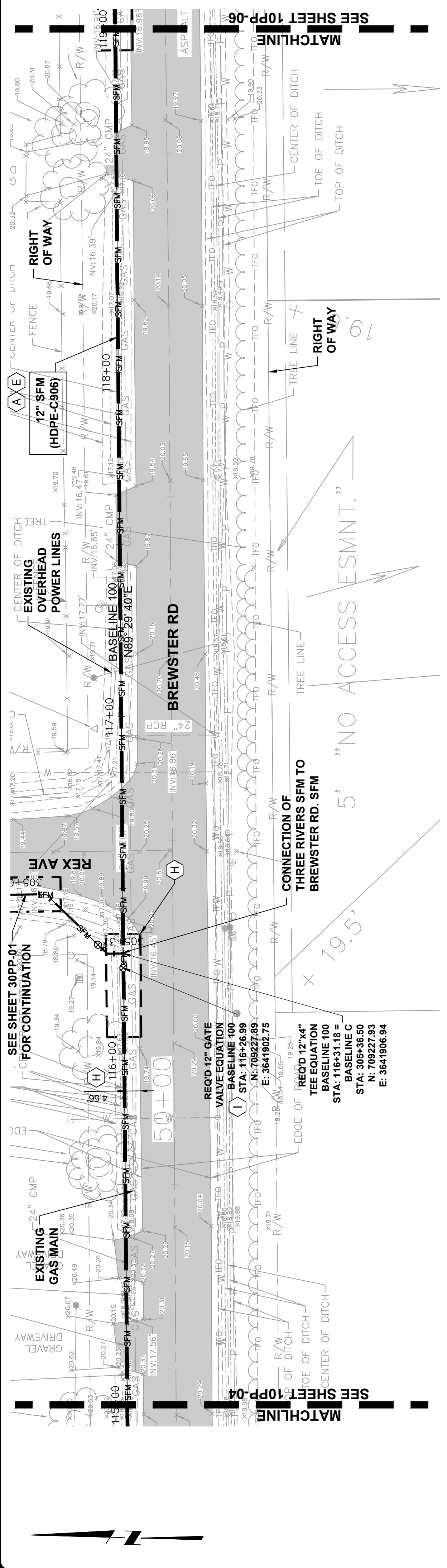
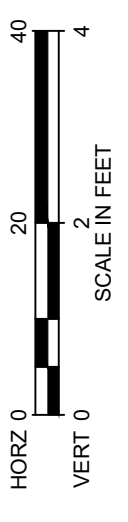


BREWSTER ROAD SEWER
CONSOLIDATION
FORCE MAIN PLAN & PROFILES - BASELINE 100 - V

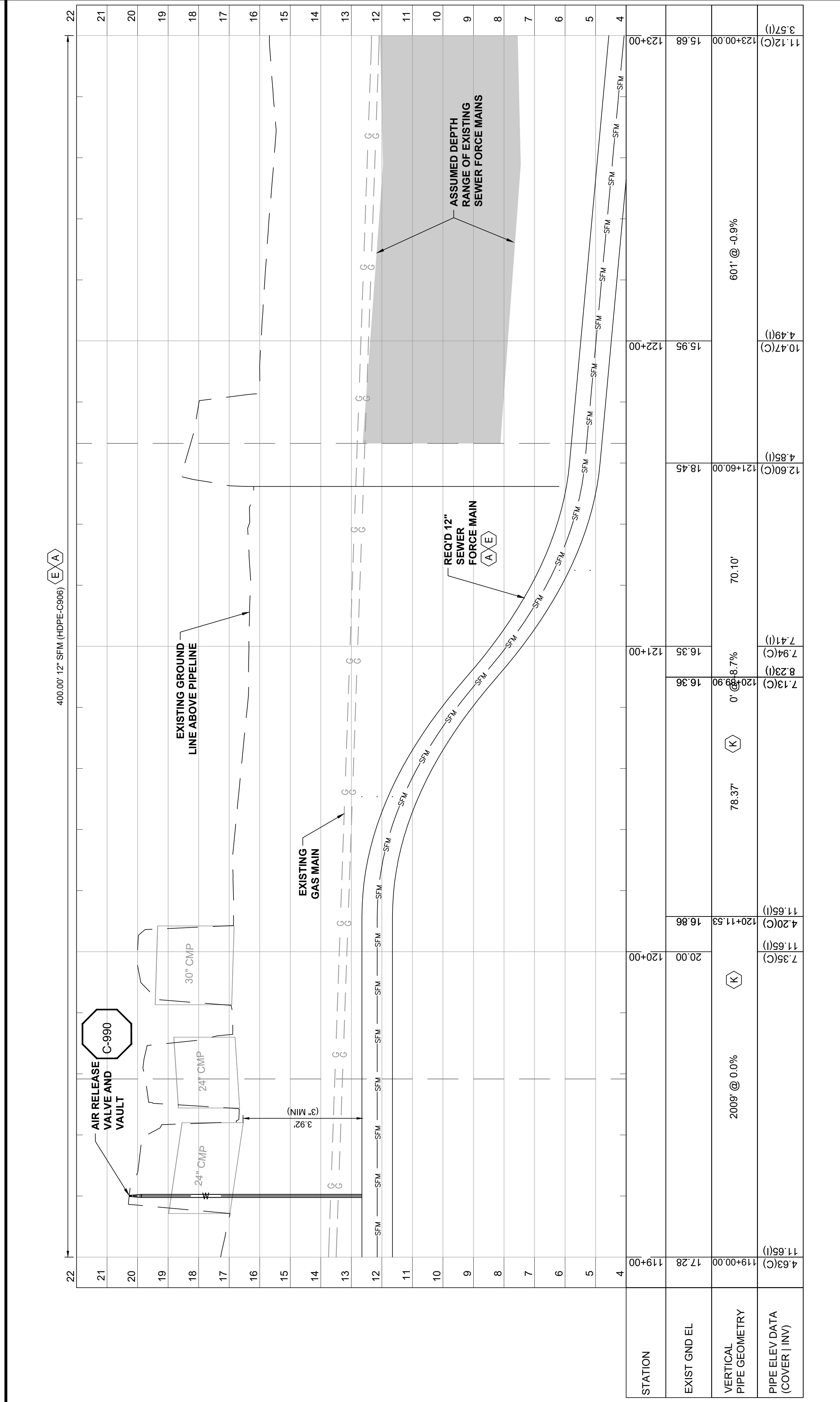
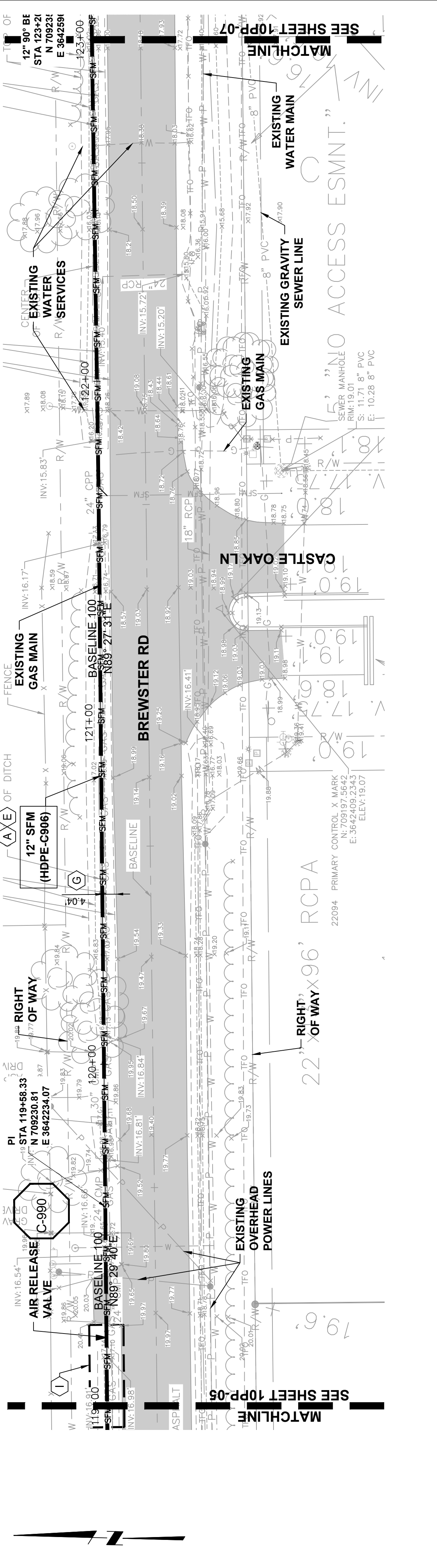
SHEET NO.
10PP-05

- PLAN AND PROFILE GENERAL NOTES**
- PLAN AND PROFILE DRAWING BASED UPON SURVEY TITLED "ST. TAMMANY SEWER CONSOLIDATION SURVEY - FAIRFIELD OAKS, THREE RIVERS, AND TCHEFUNCTE PARK" PREPARED BY ALL - SOUTH CONSULTING ENGINEERS, DATED JULY 2023 AND AS-BUILT DRAINAGE PLAN FOR ARUNDEL SUBDIVISION
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 - REQ'D FULLY RESTRAINED GATE VALVE WITH STEM EXTENSION PER DETAIL
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 - REQ'D 14" TCHEFUNCTE PARC SFM TO DISCHARGE INTO FAUBORG NO. 2 LIFT STATION



STATION	EXIST GND EL	VERTICAL PIPE GEOMETRY	PIPE ELEV DATA (COVER INV)
115+00	17.22		5.06(C) 11.65(I)
116+00	17.22		5.06(C) 11.65(I)
117+00	17.87	2009' @ 0.0%	5.22(C) 11.65(I)
118+00	16.73		4.07(C) 11.65(I)
119+00	17.28		4.63(C) 11.65(I)



PLAN AND PROFILE GENERAL NOTES

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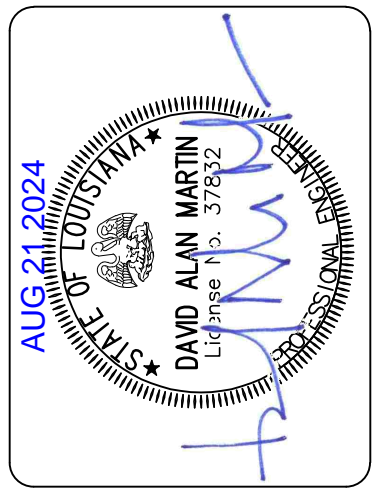
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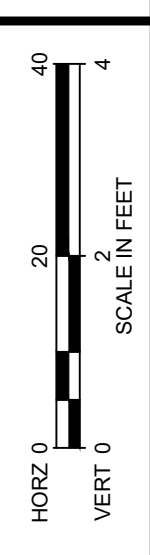
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DESIGNED BY: M. LOKER	CHECKED BY: J. CATLANOTTO	PROJECT No.: FAIRWAY CE	ISSUE DATE: 08/20/2024	APPROVED BY: D. MARTIN	SHEET SIZE: ANSI D 34x22	SCALE: AS NOTED
DRAWN BY: J. HITT	SUBMITTED BY: J. CATLANOTTO	PROJECT No.: DU 168,170, 175, 177	ISSUE DATE: 08/20/2024	APPROVED BY: D. MARTIN	SHEET SIZE: ANSI D 34x22	SCALE: AS NOTED



BREWSTER ROAD SEWER CONSOLIDATION
FORCE MAIN PLAN & PROFILES - BASELINE 100 - VI

SHEET NO. 10PP-06

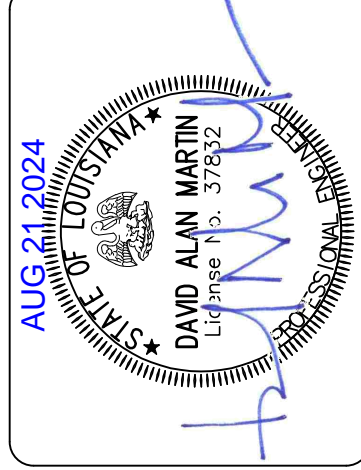




DEPT. OF UTILITIES
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GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

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DESIGNED BY: M. LOKER	DRAWN BY: J. HITT
CHECKED BY: J. CATLANOTTO	SUBMITTED BY: FAIRWAY CE
PROJECT No.: DU 168,170, 175, 177	ISSUE DATE: 08/20/2024
APPROVED BY: D. MARTIN	SHEET SIZE: ANSI D 34x22
AS NOTED	

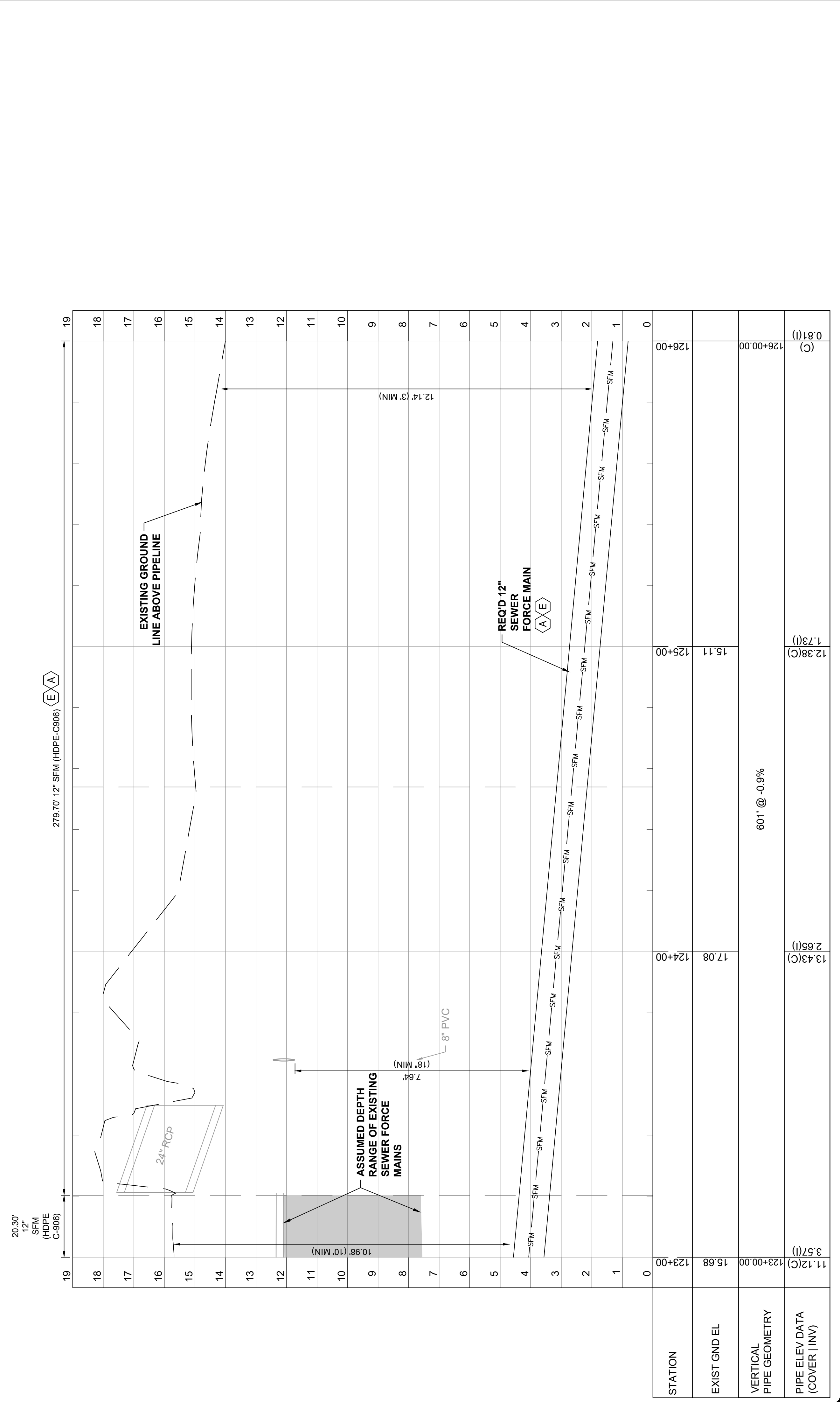
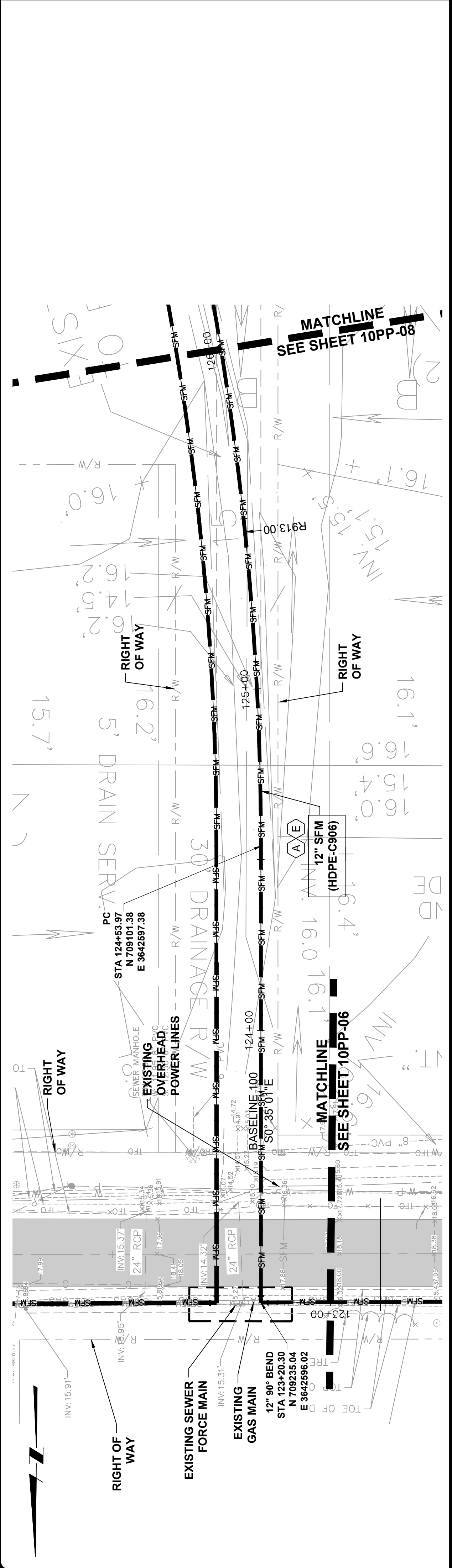
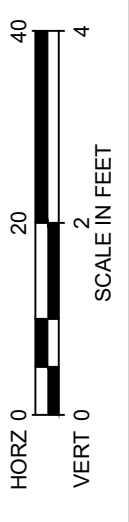


BREWSTER ROAD SEWER
CONSOLIDATION
FORCE MAIN PLAN & PROFILES - BASELINE 100 - VII

SHEET NO.
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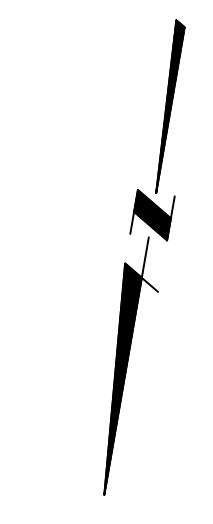
- PLAN AND PROFILE GENERAL NOTES**
- PLAN AND PROFILE DRAWING DRAWINGS BASED UPON SURVEY TITLED "ST. TAMMANY SEWER CONSOLIDATION SURVEY - FAIRFIELD OAKS, THREE RIVERS, AND TCHEFUNCTE PARK" PREPARED BY ALL - SOUTH CONSULTING ENGINEERS, DATED JULY 2023 AND AS-BUILT DRAINAGE PLAN FOR ARUNDEL SUBDIVISION
 - AT EACH LOCATION WHERE THE REQUIRED SEWER FORCE MAIN CROSSES AN EXISTING UTILITY, OR TIES INTO AN EXISTING UTILITY, CONDUCT EXPLORATORY EXCAVATIONS AS NECESSARY TO POSITIVELY DETERMINE LOCATION, ELEVATION, AND SIZE OF UTILITY, CONDUCT SUCH EXPLORATORY EXCAVATIONS AND REPORT FINDINGS TO ENGINEER PRIOR TO ANY HORIZONTAL DIRECTIONAL DRILLING OPERATIONS. COORDINATE WITH THE ENGINEER IN ADJUSTING THE ALIGNMENT OF THE REQUIRED PIPELINE TO MAINTAIN REQUIRED CLEARANCES. THE CONTRACTOR WILL NOT BE ENTITLED TO ANY ADJUSTMENT IN PAY FOR SUCH ADJUSTMENTS EXCEPT FOR ADDITIONAL QUANTITIES.
 - PROVIDE TEMPORARY TRAFFIC CONTROLS PER THE ACCEPTED TEMPORARY TRAFFIC CONTROL PLAN. SEE SPECIFICATIONS AND MINIMUM STANDARDS FOR ADDITIONAL REQUIREMENTS.
 - PIPE SIZES NOTED ON PLANS REFERENCE NOMINAL PIPE DIAMETER.
 - REFER TO PIPE SCHEDULE FOR ADDITIONAL REQUIREMENTS.
 - CONTRACTOR TO MAINTAIN A MINIMUM 6' HORIZONTAL AND 18" VERTICAL SEPARATION BETWEEN SEWER FORCE MAIN AND WATER MAIN.
 - NOT ALL NOTES BY SYMBOL USED ON THIS SHEET.

- PLAN AND PROFILE NOTES BY SYMBOLS**
- REQ'D 12" BREWSTER RD. SFM TO DISCHARGE INTO TCHEFUNCTE PARC SPS
 - REQ'D 4" FAIRFIELD OAKS SEWER FORCE MAIN TO DISCHARGE INTO BREWSTER RD. SFM
 - REQ'D 4" THREE RIVERS SFM TO DISCHARGE INTO BREWSTER RD. SFM.
 - REQ'D 12" TCHEFUNCTE PARC SFM TO DISCHARGE TO FAUBOURG NO 2 SPS.
 - PIPE TO BE INSTALLED BY HORIZONTALLY DIRECTIONALLY DRILLING
 - PIPE TO BE INSTALLED BY OPEN CUT
 - HORIZONTAL DISTANCE FROM EDGE OF ROADWAY
 - REQ'D LAUNCHING AND RECEIVING PIT FOR HORIZONTAL DIRECTIONAL DRILLING
 - REQ'D FULLY RESTRAINED GATE VALVE WITH STEM EXTENSION PER DETAIL
 - REQ'D AIR RELEASE VALVE AND VAULT PER DETAIL
 - REQ'D VERTICAL CURVE. SEE CURVE TABLE ON SHEET G-102 FOR ADDITIONAL REQUIREMENTS AND INFORMATION.
 - REQUIRED 3" ARUNDEL SEWER FORCE MAIN (BY OTHERS) TO DISCHARGE IN BREWSTER FORCE MAIN
 - REQ'D 14" TCHEFUNCTE PARC SFM TO DISCHARGE INTO FAUBORG NO. 2 LIFT STATION



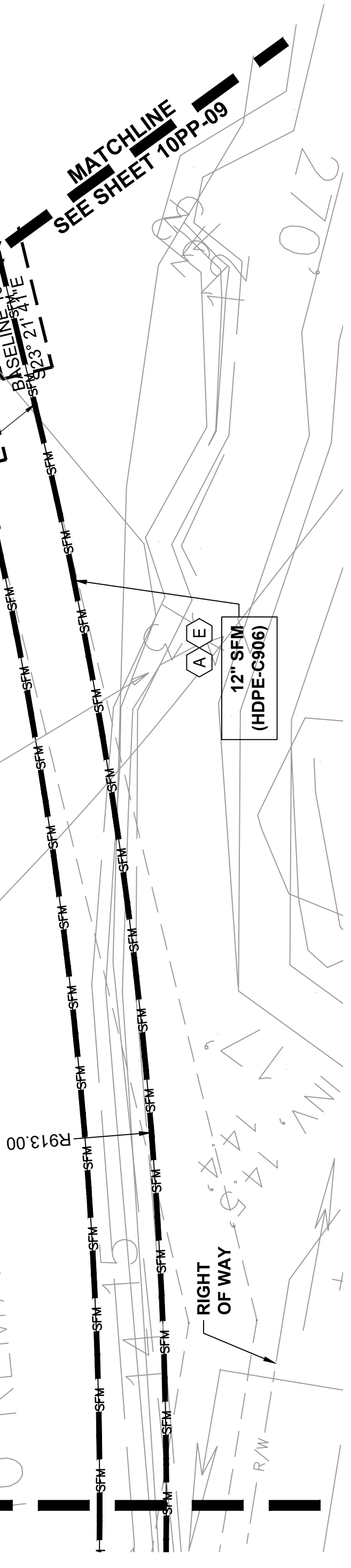
STATION	EXIST GND EL	VERTICAL PIPE GEOMETRY	PIPE ELEV DATA (COVER INV)
123+00	15.68		11.12(C) 3.57(I)
124+00	17.08		13.43(C) 2.65(I)
125+00	15.11		12.38(C) 1.73(I)
126+00			0.81(I) 126+00.00(C)

601' @ -0.9%

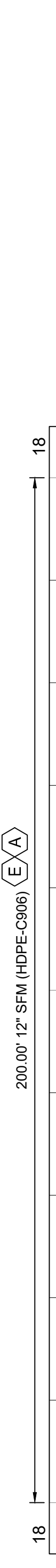


MATCHLINE
SEE SHEET 10PP-07

EXISTING DRAIN
TO REMAIN AS IS

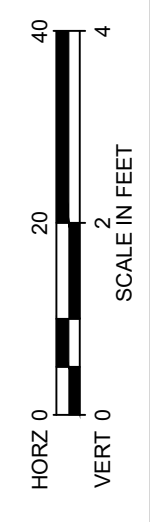


STATION	EXIST GND EL	VERTICAL PIPE GEOMETRY	PIPE ELEV DATA (COVER INV)
126+00	(C) 0.81(1)		(C) 126+00.00
127+00	14.92	60' @ -0.9%	14.15(C) 127+60.77 14.48
128+00	14.12		14.63(C) 127+64.44 14.45
128+00	14.12		12.23(C) 128+00.00 82.07
			14.83(C) 0.90(1)



- PLAN AND PROFILE GENERAL NOTES**
1. PLAN AND PROFILE DRAWING DRAWINGS BASED UPON SURVEY TITLED "ST. TAMMANY SEWER CONSOLIDATION SURVEY - FAIRFIELD OAKS, THREE RIVERS, AND TCHEFUNCTE PARK" PREPARED BY ALL - SOUTH CONSULTING ENGINEERS, DATED JULY 2023 AND AS-BUILT DRAINAGE PLAN FOR ARUNDEL SUBDIVISION.
 2. AT EACH LOCATION WHERE THE REQUIRED SEWER FORCE MAIN CROSSES AN EXISTING UTILITY, OR TIES INTO AN EXISTING UTILITY, CONDUCT EXPLORATORY EXCAVATIONS AS NECESSARY TO POSITIVELY DETERMINE LOCATION, ELEVATION, AND SIZE OF UTILITY CONDUCT SUCH EXPLORATORY EXCAVATIONS AND REPORT FINDINGS TO ENGINEER PRIOR TO ANY HORIZONTAL DIRECTIONAL DRILLING OPERATIONS. COORDINATE WITH THE ENGINEER IN ADJUSTING THE ALIGNMENT OF THE REQUIRED PIPELINE TO MAINTAIN REQUIRED CLEARANCES. THE CONTRACTOR WILL NOT BE ENTITLED TO ANY ADJUSTMENT IN PAY FOR SUCH ADJUSTMENTS EXCEPT FOR ADDITIONAL QUANTITIES.
 3. PROVIDE TEMPORARY TRAFFIC CONTROLS PER THE ACCEPTED TEMPORARY TRAFFIC CONTROL PLAN. SEE SPECIFICATIONS AND MINIMUM STANDARDS FOR ADDITIONAL REQUIREMENTS.
 4. PIPE SIZES NOTED ON PLANS REFERENCE NOMINAL PIPE DIAMETER.
 5. REFER TO PIPE SCHEDULE FOR ADDITIONAL REQUIREMENTS.
 6. CONTRACTOR TO MAINTAIN A MINIMUM 6' HORIZONTAL AND 18" VERTICAL SEPARATION BETWEEN SEWER FORCE MAIN AND WATER MAIN.
 7. NOT ALL NOTES BY SYMBOL USED ON THIS SHEET.

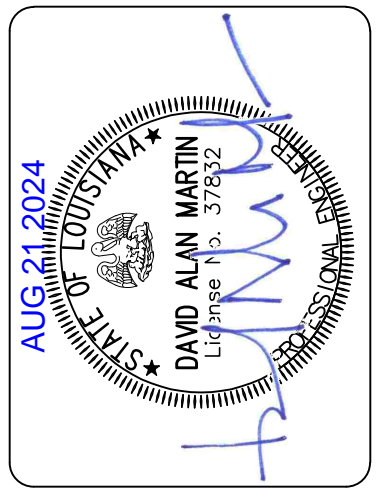
- PLAN AND PROFILE NOTES BY SYMBOLS**
- A. REQ'D 12" BREWSTER RD. SFM TO DISCHARGE INTO TCHEFUNCTE PARC SPS
 - B. REQ'D 4" FAIRFIELD OAKS SEWER FORCE MAIN TO DISCHARGE INTO BREWSTER RD. SFM
 - C. REQ'D 4" THREE RIVERS SFM TO DISCHARGE INTO BREWSTER RD. SFM.
 - D. REQ'D 12" TCHEFUNCTE PARC SFM TO DISCHARGE TO FAUBOURG NO 2 SPS.
 - E. PIPE TO BE INSTALLED BY HORIZONTALLY DIRECTIONALLY DRILLING
 - F. PIPE TO BE INSTALLED BY OPEN CUT
 - G. HORIZONTAL DISTANCE FROM EDGE OF ROADWAY
 - H. REQ'D LAUNCHING AND RECEIVING PIT FOR HORIZONTAL DIRECTIONAL DRILLING
 - I. REQ'D FULLY RESTRAINED GATE VALVE WITH STEM EXTENSION PER DETAIL
 - J. REQ'D AIR RELEASE VALVE AND VAULT PER DETAIL
 - K. REQ'D VERTICAL CURVE. SEE CURVE TABLE ON SHEET G-102 FOR ADDITIONAL REQUIREMENTS AND INFORMATION.
 - L. REQUIRED 3" ARUNDEL SEWER FORCE MAIN (BY OTHERS) TO DISCHARGE IN BREWSTER FORCE MAIN
 - M. REQ'D 14" TCHEFUNCTE PARC SFM TO DISCHARGE INTO FAUBORG NO. 2 LIFT STATION



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

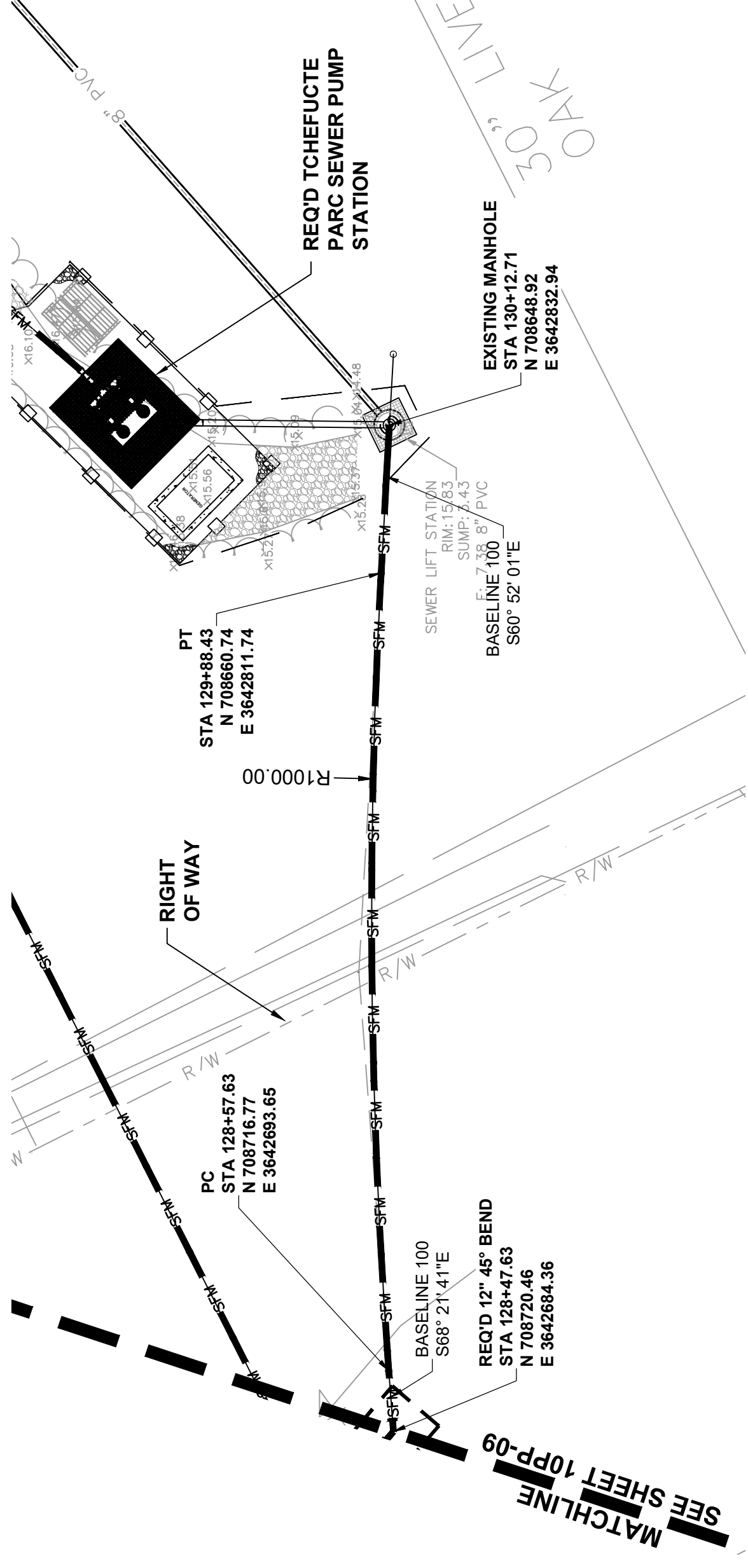
DESCRIPTION OF REVISION	DATE:

DESIGNED BY: M. LOKER	DRAWN BY: J. HITT
CHECKED BY: J. CATLANOTTO	SUBMITTED BY: FAIRWAY CE
PROJECT No.: DU 168,170,	175, 177
ISSUE DATE: 08/20/2024	APPROVED BY: D. MARTIN
SHEET SIZE: ANSI D 34x22	AS NOTED

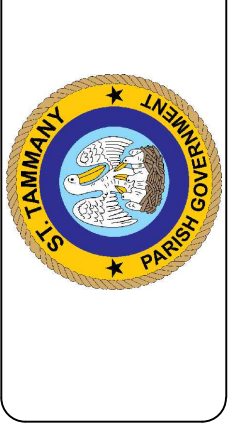


BREWSTER ROAD SEWER
CONSOLIDATION
FORCE MAIN PLAN & PROFILES - BASELINE 100 - VIII

SHEET NO.
10PP-08



- PLAN AND PROFILE GENERAL NOTES**
- PLAN AND PROFILE DRAWING DRAWINGS BASED UPON SURVEY TITLED "ST. TAMMANY SEWER CONSOLIDATION SURVEY - FAIRFIELD OAKS, THREE RIVERS, AND TCHÉFUNCTE PARK" PREPARED BY ALL - SOUTH CONSULTING ENGINEERS, DATED JULY 2023 AND AS-BUILT DRAINAGE PLAN FOR ARUNDEL SUBDIVISION
 - AT EACH LOCATION WHERE THE REQUIRED SEWER FORCE MAIN CROSSES AN EXISTING UTILITY, OR TIES INTO AN EXISTING UTILITY, CONDUCT EXPLORATORY EXCAVATIONS AS NECESSARY TO POSITIVELY DETERMINE LOCATION, ELEVATION, AND SIZE OF UTILITY CONDUCT SUCH AS EXPLORATORY EXCAVATIONS AND REPORT FINDINGS TO ENGINEER PRIOR TO ANY HORIZONTAL DIRECTIONAL DRILLING OPERATIONS. COORDINATE WITH THE ENGINEER IN ADJUSTING THE ALIGNMENT OF THE REQUIRED PIPELINE TO MAINTAIN REQUIRED CLEARANCES. THE CONTRACTOR WILL NOT BE ENTITLED TO ANY ADJUSTMENT IN PAY FOR SUCH ADJUSTMENTS EXCEPT FOR ADDITIONAL QUANTITIES.
 - PROVIDE TEMPORARY TRAFFIC CONTROLS PER THE ACCEPTED TEMPORARY TRAFFIC CONTROL PLAN. SEE SPECIFICATIONS AND MINIMUM STANDARDS FOR ADDITIONAL REQUIREMENTS.
 - PIPE SIZES NOTED ON PLANS REFERENCE NOMINAL PIPE DIAMETER.
 - REFER TO PIPE SCHEDULE FOR ADDITIONAL REQUIREMENTS.
 - CONTRACTOR TO MAINTAIN A MINIMUM 6' HORIZONTAL AND 18" VERTICAL SEPARATION BETWEEN SEWER FORCE MAIN AND WATER MAIN.
 - NOT ALL NOTES BY SYMBOL USED ON THIS SHEET.



DEPT. OF UTILITIES
 ST. TAMMANY PARISH
 GOVERNMENT
 620 N. TYLER STREET
 COVINGTON, LA 70433

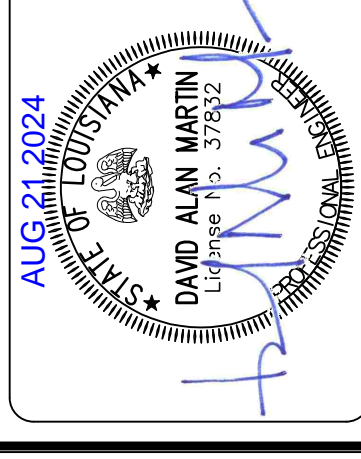
DESCRIPTION OF REVISION	DATE:

STATION	EXIST GND EL	VERTICAL PIPE GEOMETRY	PIPE ELEV DATA (COVER INV)
128+00	14.12	82.07'	12.23(C) 0.90(I)
128+00	14.53		5.81(C) 7.00(I)
129+00	14.53		6.53(C) 7.00(I)
130+00		-167' @ 0.0%	7.00(C) 7.00(I)
130+00			7.00(C) 7.00(I)
131+00			7.00(C) 7.00(I)

PLAN AND PROFILE NOTES BY SYMBOLS

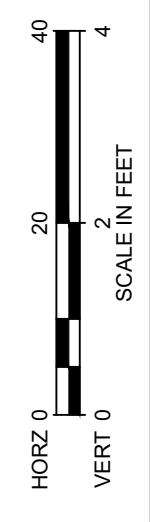
- REQ'D 12" BREWSTER RD. SFM TO DISCHARGE INTO TCHÉFUNCTE PARC SPS
- REQ'D 4" FAIRFIELD OAKS SEWER FORCE MAIN TO DISCHARGE INTO BREWSTER RD. SFM
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- REQ'D 12" TCHÉFUNCTE PARC SFM TO DISCHARGE TO FAUBORG NO 2 SPS.
- PIPE TO BE INSTALLED BY HORIZONTALLY DIRECTIONALLY DRILLING
- PIPE TO BE INSTALLED BY OPEN CUT
- HORIZONTAL DISTANCE FROM EDGE OF ROADWAY
- REQ'D LAUNCHING AND RECEIVING PIT FOR HORIZONTAL DIRECTIONAL DRILLING
- REQ'D FULLY RESTRAINED GATE VALVE WITH STEM EXTENSION PER DETAIL
- REQ'D AIR RELEASE VALVE AND VAULT PER DETAIL
- REQ'D VERTICAL CURVE. SEE CURVE TABLE ON SHEET G-102 FOR ADDITIONAL REQUIREMENTS AND INFORMATION.
- REQUIRED 3" ARUNDEL SEWER FORCE MAIN (BY OTHERS) TO DISCHARGE IN BREWSTER FORCE MAIN
- REQ'D 14" TCHÉFUNCTE PARC SFM TO DISCHARGE INTO FAUBORG NO. 2 LIFT STATION

DESIGNED BY: M. LOKER
DRAWN BY: J. HITT
CHECKED BY: J. CATLANOTTO
PROJECT NO.: DU 168,170, 175, 177
ISSUE DATE: 08/20/2024
APPROVED BY: D. MARTIN
SHEET SIZE: ANSI D 34x22
SCALE: AS NOTED



BREWSTER ROAD SEWER
 CONSOLIDATION
 FORCE MAIN PLAN & PROFILES - BASELINE 100 - IX

SHEET NO.
 10PP-09

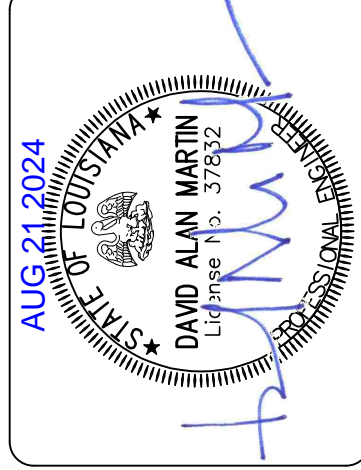




DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

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DESIGNED BY: M. LOKER
DRAWN BY: J. HITT
CHECKED BY: J. CATALANOTTO
PROJECT No.: FAIRWAY CE
ISSUE DATE: 08/20/2024
APPROVED BY: D. MARTIN
SHEET SIZE: ANSI D 34x22
SCALE: AS NOTED

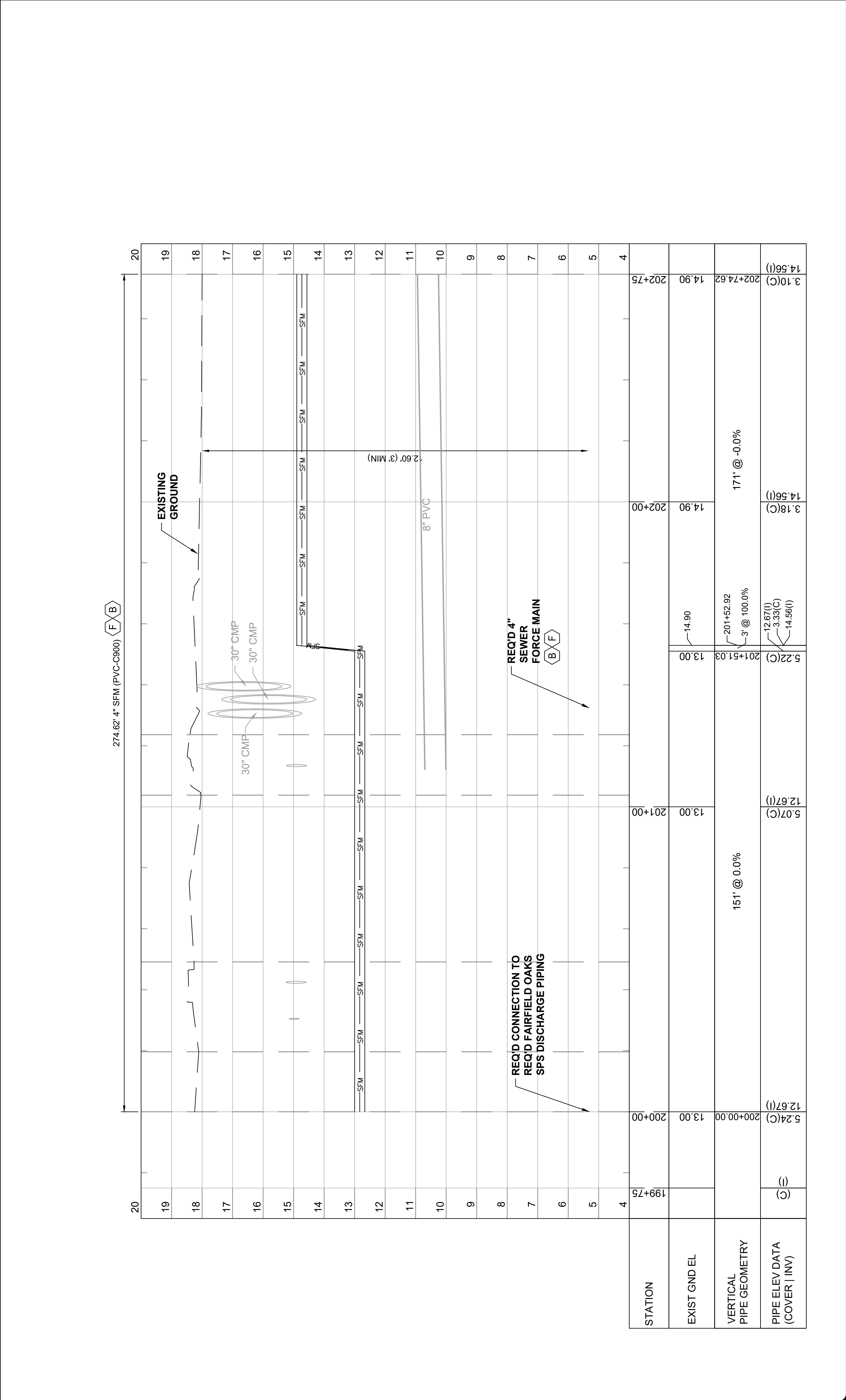
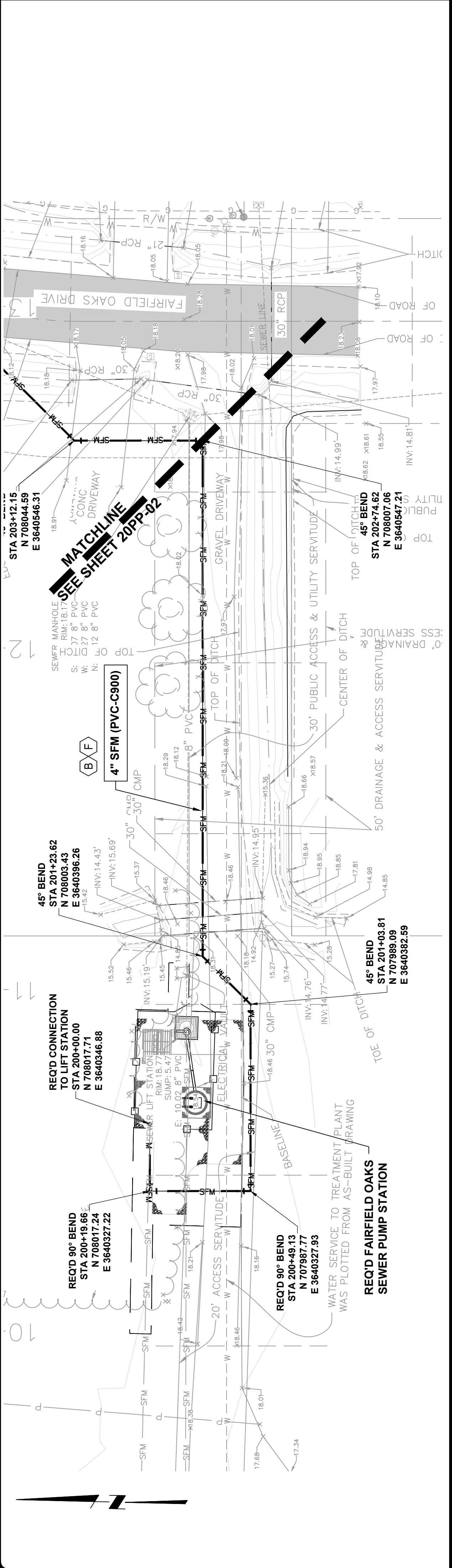


BREWSTER ROAD SEWER
CONSOLIDATION
FORCE MAIN PLAN & PROFILES - BASELINE 200 - 1

SHEET NO.
20PP-01

- PLAN AND PROFILE GENERAL NOTES**
- PLAN AND PROFILE DRAWING BASED UPON SURVEY TITLED "ST. TAMMANY SEWER CONSOLIDATION SURVEY - FAIRFIELD OAKS, THREE RIVERS, AND TCHEFUNCTE PARK" PREPARED BY ALL - SOUTH CONSULTING ENGINEERS, DATED JULY 2023 AND AS-BUILT DRAINAGE PLAN FOR ARUNDEL SUBDIVISION
 - AT EACH LOCATION WHERE THE REQUIRED SEWER FORCE MAIN CROSSES AN EXISTING UTILITY, OR TIES INTO AN EXISTING UTILITY CONDUIT EXPLORATORY EXCAVATIONS AS NECESSARY TO POSITIVELY DETERMINE LOCATION, ELEVATION, AND SIZE OF UTILITY CONDUIT SUCH EXPLORATORY EXCAVATIONS AND REPORT FINDINGS TO ENGINEER PRIOR TO ANY HORIZONTAL DIRECTIONAL DRILLING OPERATIONS. COORDINATE WITH THE ENGINEER IN ADJUSTING THE ALIGNMENT OF THE REQUIRED PIPELINE TO MAINTAIN REQUIRED CLEARANCES. THE CONTRACTOR WILL NOT BE ENTITLED TO ANY ADJUSTMENT IN PAY FOR SUCH ADJUSTMENTS EXCEPT FOR ADDITIONAL QUANTITIES.
 - PROVIDE TEMPORARY TRAFFIC CONTROLS PER THE ACCEPTED TEMPORARY TRAFFIC CONTROL PLAN. SEE SPECIFICATIONS AND MINIMUM STANDARDS FOR ADDITIONAL REQUIREMENTS.
 - PIPE SIZES NOTED ON PLANS REFERENCE NOMINAL PIPE DIAMETER.
 - REFER TO PIPE SCHEDULE FOR ADDITIONAL REQUIREMENTS.
 - CONTRACTOR TO MAINTAIN A MINIMUM 6' HORIZONTAL AND 18" VERTICAL SEPARATION BETWEEN SEWER FORCE MAIN AND WATER MAIN.
 - NOT ALL NOTES BY SYMBOL USED ON THIS SHEET.

- PLAN AND PROFILE NOTES BY SYMBOLS**
- REQ'D 12" BREWSTER RD. SFM TO DISCHARGE INTO TCHEFUNCTE PARC SPS
 - REQ'D 4" FAIRFIELD OAKS SEWER FORCE MAIN TO DISCHARGE INTO BREWSTER RD. SFM
 - REQ'D 4" THREE RIVERS SFM TO DISCHARGE INTO BREWSTER RD. SFM.
 - REQ'D 12" TCHEFUNCTE PARC SFM TO DISCHARGE TO FAUBORG NO 2 SPS.
 - PIPE TO BE INSTALLED BY HORIZONTALLY DIRECTIONALLY DRILLING
 - PIPE TO BE INSTALLED BY OPEN CUT
 - HORIZONTAL DISTANCE FROM EDGE OF ROADWAY
 - REQ'D LAUNCHING AND RECEIVING PIT FOR HORIZONTAL DIRECTIONAL DRILLING
 - REQ'D FULLY RESTRAINED GATE VALVE WITH STEM EXTENSION PER DETAIL
 - REQ'D AIR RELEASE VALVE AND VAULT PER DETAIL
 - REQ'D VERTICAL CURVE. SEE CURVE TABLE ON SHEET G-102 FOR ADDITIONAL REQUIREMENTS AND INFORMATION.
 - REQUIRED 3" ARUNDEL SEWER FORCE MAIN (BY OTHERS) TO DISCHARGE IN BREWSTER FORCE MAIN INTO FAUBORG NO. 2 LIFT STATION

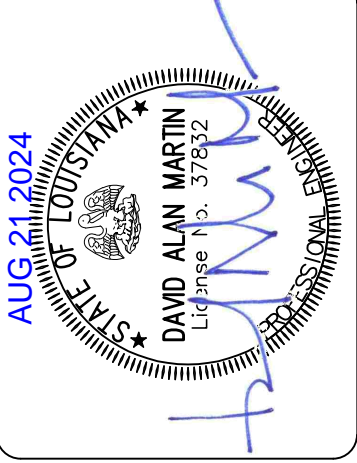




DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

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DESIGNED BY: M. LOKER	CHECKED BY: J. CATLANOTTO	PROJECT No.: DU 168,170.	ISSUE DATE: 08/20/2024	APPROVED BY: D. MARTIN	SHEET SIZE: ANSI D 34x22	SCALE: AS NOTED
DRAWN BY: J. HITT	SUBMITTED BY: FAIRWAY CE	175, 177				

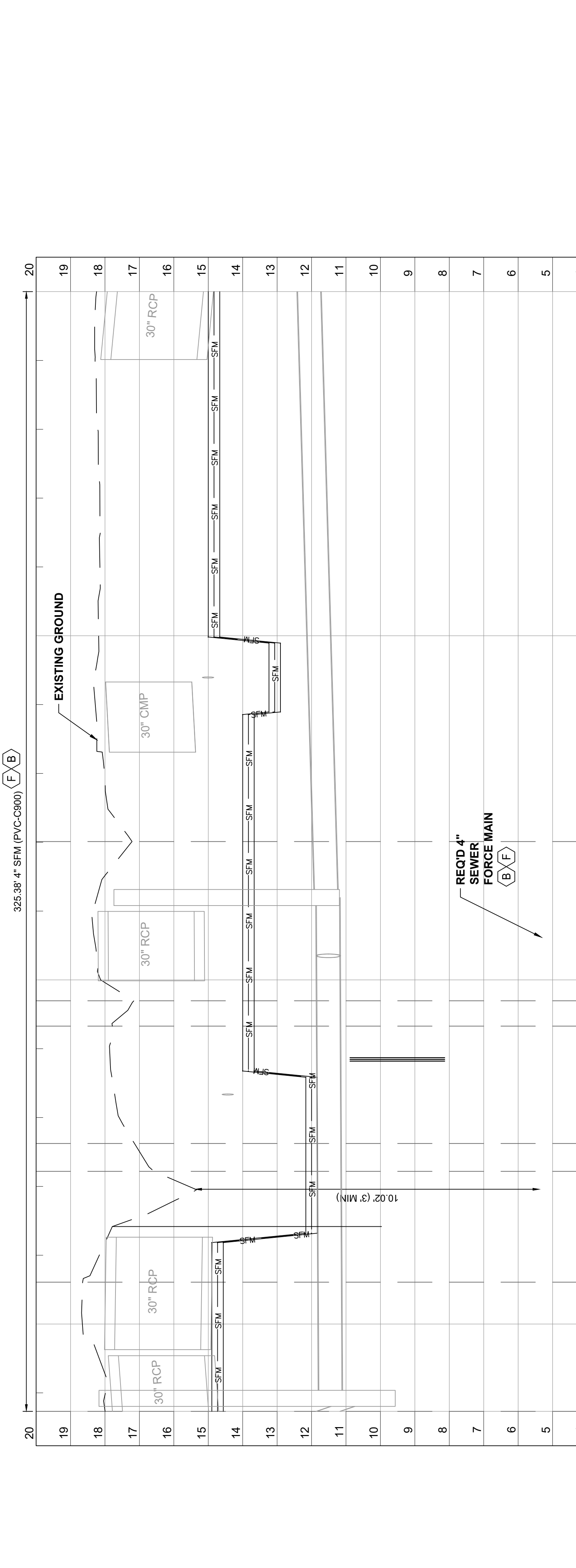
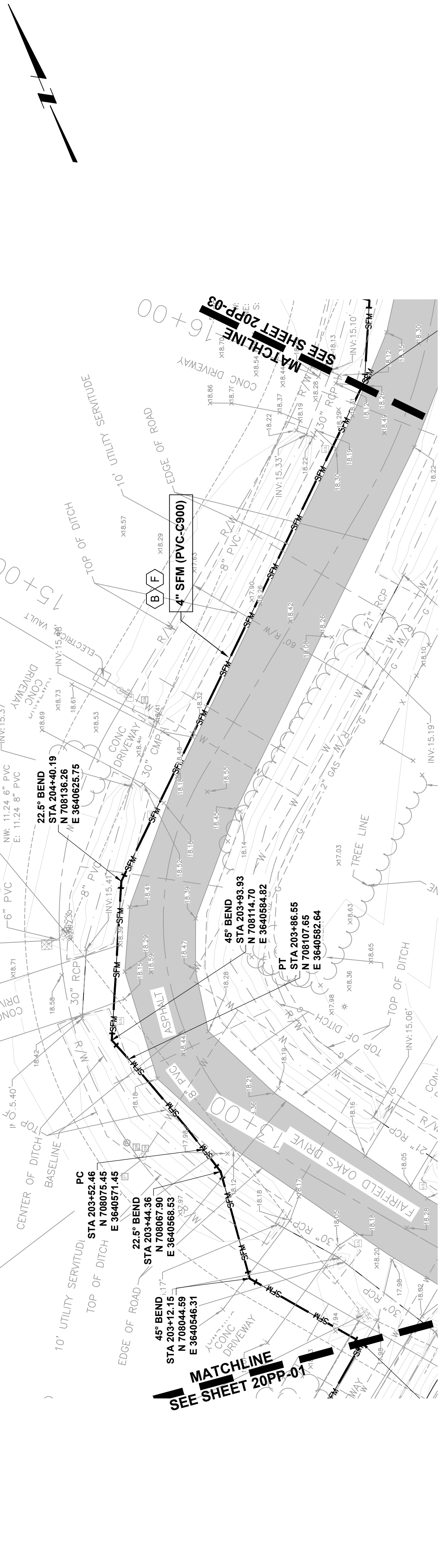
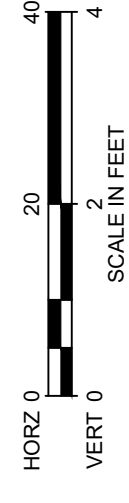


BREWSTER ROAD SEWER
CONSOLIDATION
FORCE MAIN PLAN & PROFILES - BASELINE 200 - II

SHEET NO.
20PP-02

- PLAN AND PROFILE GENERAL NOTES**
- PLAN AND PROFILE DRAWING DRAWINGS BASED UPON SURVEY TITLED "ST. TAMMANY SEWER CONSOLIDATION SURVEY - FAIRFIELD OAKS, THREE RIVERS, AND TCHEFUNCTE PARK" PREPARED BY ALL - SOUTH CONSULTING ENGINEERS, DATED JULY 2023 AND AS-BUILT DRAINAGE PLAN FOR ARUNDEL SUBDIVISION
 - AT EACH LOCATION WHERE THE REQUIRED SEWER FORCE MAIN CROSSES AN EXISTING UTILITY, OR TIES INTO AN EXISTING UTILITY, CONDUCT EXPLORATORY EXCAVATIONS AS NECESSARY TO POSITIVELY DETERMINE LOCATION, ELEVATION, AND SIZE OF UTILITY CONDUCT SUCH EXPLORATORY EXCAVATIONS AND REPORT FINDINGS TO ENGINEER PRIOR TO ANY HORIZONTAL DIRECTIONAL DRILLING OPERATIONS. COORDINATE WITH THE ENGINEER IN ADJUSTING THE ALIGNMENT OF THE REQUIRED PIPELINE TO MAINTAIN REQUIRED CLEARANCES. THE CONTRACTOR WILL NOT BE ENTITLED TO ANY ADJUSTMENT IN PAY FOR SUCH ADJUSTMENTS EXCEPT FOR ADDITIONAL QUANTITIES.
 - PROVIDE TEMPORARY TRAFFIC CONTROLS PER THE ACCEPTED TEMPORARY TRAFFIC CONTROL PLAN. SEE SPECIFICATIONS AND MINIMUM STANDARDS FOR ADDITIONAL REQUIREMENTS.
 - PIPE SIZES NOTED ON PLANS REFERENCE NOMINAL PIPE DIAMETER.
 - REFER TO PIPE SCHEDULE FOR ADDITIONAL REQUIREMENTS.
 - CONTRACTOR TO MAINTAIN A MINIMUM 6" HORIZONTAL AND 18" VERTICAL SEPARATION BETWEEN SEWER FORCE MAIN AND WATER MAIN.
 - NOT ALL NOTES BY SYMBOL USED ON THIS SHEET.

- PLAN AND PROFILE NOTES BY SYMBOLS**
- REQ'D 12" BREWSTER RD. SFM TO DISCHARGE INTO TCHEFUNCTE PARC SPS
 - REQ'D 4" FAIRFIELD OAKS SEWER FORCE MAIN TO DISCHARGE INTO BREWSTER RD. SFM
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 - REQ'D 12" TCHEFUNCTE PARC SFM TO DISCHARGE TO FAUBOURG NO 2 SPS.
 - PIPE TO BE INSTALLED BY HORIZONTALLY DIRECTIONALLY DRILLING
 - PIPE TO BE INSTALLED BY OPEN CUT
 - HORIZONTAL DISTANCE FROM EDGE OF ROADWAY
 - REQ'D LAUNCHING AND RECEIVING PIT FOR HORIZONTAL DIRECTIONAL DRILLING
 - REQ'D FULLY RESTRAINED GATE VALVE WITH STEM EXTENSION PER DETAIL
 - REQ'D AIR RELEASE VALVE AND VAULT PER DETAIL
 - REQ'D VERTICAL CURVE. SEE CURVE TABLE ON SHEET G-102 FOR ADDITIONAL REQUIREMENTS AND INFORMATION.
 - REQUIRED 3" ARUNDEL SEWER FORCE MAIN (BY OTHERS) TO DISCHARGE IN BREWSTER FORCE MAIN
 - REQ'D 14" TCHEFUNCTE PARC SFM TO DISCHARGE INTO FAUBORG NO. 2 LIFT STATION



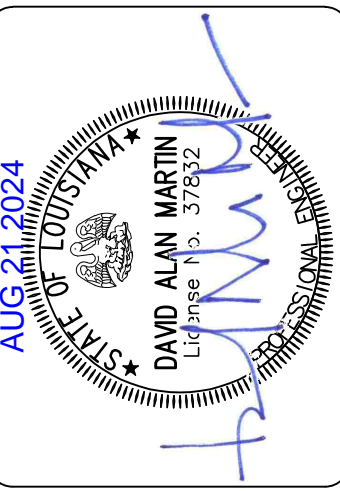
STATION	EXIST GND EL	VERTICAL PIPE GEOMETRY	PIPE ELEV DATA (COVER INV)
202+75	14.90	171' @ -0.0%	3.10(C) 14.56(I)
202+74.62	14.90		3.10(C) 14.56(I)
203+00	14.90		3.76(C) 14.56(I)
203+23.67	14.90	45' @ 0.0%	3.10(C) 14.56(I)
203+26.40	12.17	4' @ -100.0%	5.33(C) 12.17
203+71.69	12.43	3' @ 100.0%	4.13(C) 12.43
204+77.11	14.00	1' @ -100.0%	4.26(C) 14.00
204+77.87	13.24	20' @ 0.0%	13.87(I) 13.24
204+77.87	13.24	2' @ 100.0%	4.94(C) 13.24
204+99.64	15.00	109' @ 0.0%	3.24(C) 14.67(I)
206+00	15.00		14.67(I)



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

NO.	DATE	DESCRIPTION OF REVISION DATE:
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DESIGNED BY:	M. LOKER
DRAWN BY:	J. HITT
CHECKED BY:	J. CATLANOTTO
PROJECT No.:	DU 168,170.
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED

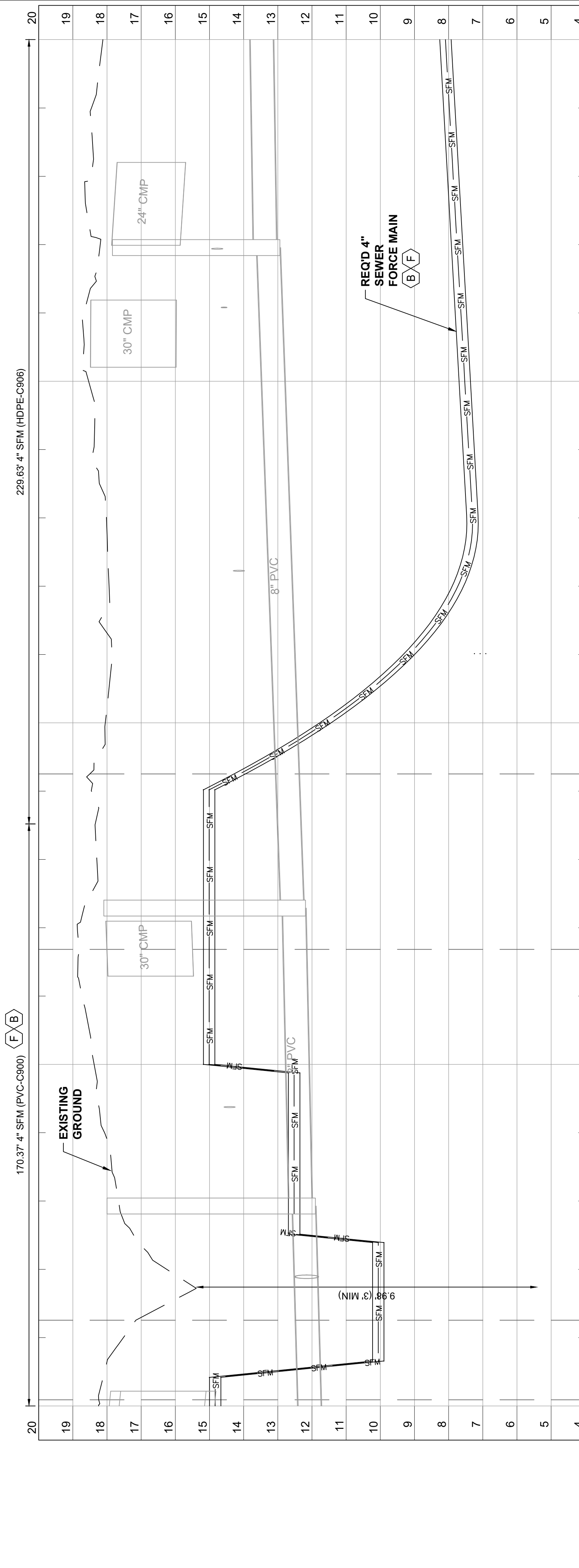
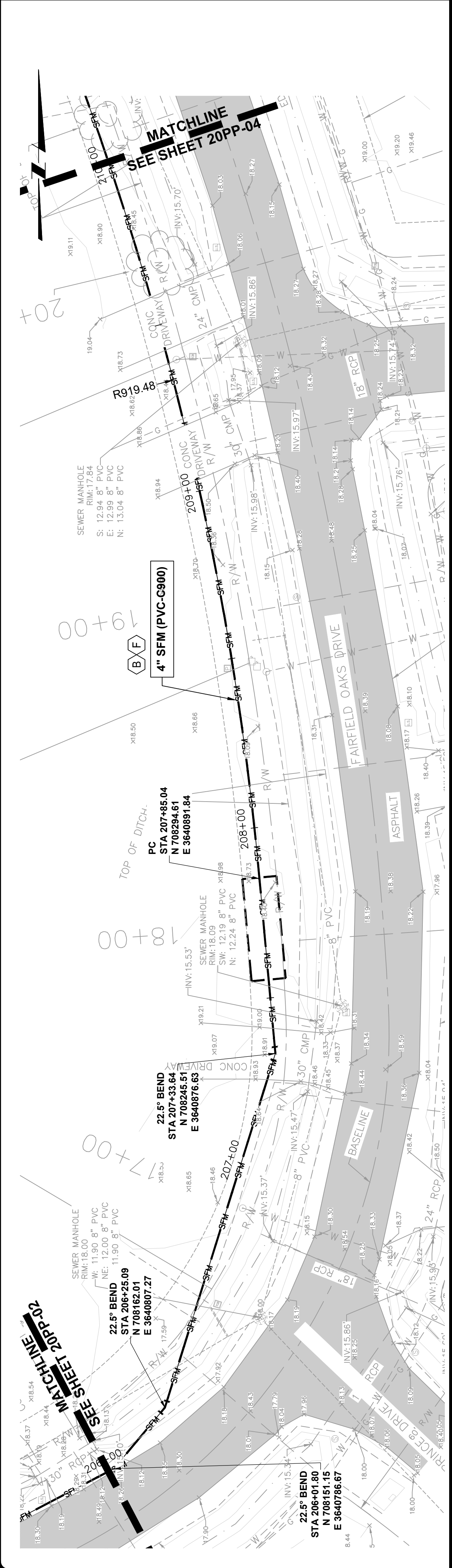
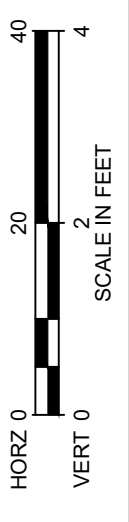


BREWSTER ROAD SEWER
CONSOLIDATION
FORCE MAIN PLAN & PROFILES - BASELINE 200 - III

SHEET NO.
20PP-03

- PLAN AND PROFILE GENERAL NOTES**
- PLAN AND PROFILE DRAWING BASED UPON SURVEY TITLED "ST. TAMMANY SEWER CONSOLIDATION SURVEY - FAIRFIELD OAKS, THREE RIVERS, AND TCHFUNCTE PARK" PREPARED BY ALL - SOUTH CONSULTING ENGINEERS, DATED JULY 2023 AND AS-BUILT DRAINAGE PLAN FOR ARUNDEL SUBDIVISION
 - AT EACH LOCATION WHERE THE REQUIRED SEWER FORCE MAIN CROSSES AN EXISTING UTILITY, OR TIES INTO AN EXISTING UTILITY, CONDUCT EXPLORATORY EXCAVATIONS AS NECESSARY TO POSITIVELY DETERMINE LOCATION, ELEVATION, AND SIZE OF UTILITY CONDUIT SUCH AS EXPLORATORY EXCAVATIONS AND REPORT FINDINGS TO ENGINEER PRIOR TO ANY HORIZONTAL DIRECTIONAL DRILLING OPERATIONS. COORDINATE WITH THE ENGINEER IN ADJUSTING THE ALIGNMENT OF THE REQUIRED PIPELINE TO MAINTAIN REQUIRED CLEARANCES. THE CONTRACTOR WILL NOT BE ENTITLED TO ANY ADJUSTMENT IN PAY FOR SUCH ADJUSTMENTS EXCEPT FOR ADDITIONAL QUANTITIES.
 - PROVIDE TEMPORARY TRAFFIC CONTROLS PER THE ACCEPTED TEMPORARY TRAFFIC CONTROL PLAN. SEE SPECIFICATIONS AND MINIMUM STANDARDS FOR ADDITIONAL REQUIREMENTS.
 - PIPE SIZES NOTED ON PLANS REFERENCE NOMINAL PIPE DIAMETER.
 - REFER TO PIPE SCHEDULE FOR ADDITIONAL REQUIREMENTS.
 - CONTRACTOR TO MAINTAIN A MINIMUM 6' HORIZONTAL AND 18" VERTICAL SEPARATION BETWEEN SEWER FORCE MAIN AND WATER MAIN.
 - NOT ALL NOTES BY SYMBOL USED ON THIS SHEET.

- PLAN AND PROFILE NOTES BY SYMBOLS**
- REQD 12" BREWSTER RD. SFM TO DISCHARGE INTO TCHFUNCTE PARC SPS
 - REQD 4" FAIRFIELD OAKS SEWER FORCE MAIN TO DISCHARGE INTO BREWSTER RD. SFM
 - REQD 4" THREE RIVERS SFM TO DISCHARGE INTO BREWSTER RD. SFM.
 - REQD 12" TCHFUNCTE PARC SFM TO DISCHARGE TO FAUBOURG NO 2 SPS.
 - PIPE TO BE INSTALLED BY HORIZONTALLY DIRECTIONALLY DRILLING
 - PIPE TO BE INSTALLED BY OPEN CUT
 - HORIZONTAL DISTANCE FROM EDGE OF ROADWAY
 - REQD LAUNCHING AND RECEIVING PIT FOR HORIZONTAL DIRECTIONAL DRILLING
 - REQD FULLY RESTRAINED GATE VALVE WITH STEM EXTENSION PER DETAIL
 - REQD AIR RELEASE VALVE AND VAULT PER DETAIL
 - REQD VERTICAL CURVE. SEE CURVE TABLE ON SHEET G-102 FOR ADDITIONAL REQUIREMENTS AND INFORMATION.
 - REQUIRED 3" ARUNDEL SEWER FORCE MAIN (BY OTHERS) TO DISCHARGE IN BREWSTER FORCE MAIN
 - REQD 14" TCHFUNCTE PARC SFM TO DISCHARGE INTO FAUBORG NO. 2 LIFT STATION



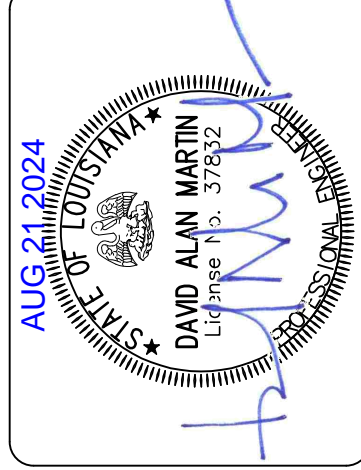
STATION	EXIST GND EL	VERTICAL PIPE GEOMETRY	PIPE ELEV DATA (COVER INV)
206+00	15.00	7 @ -100.0% 35' @ 0.0% 108' @ 0.0%	3.11(C) 14.67(I) 206+08.36 206+13.14 206+13.14
207+00	12.69	206+50.30 477' @ 0.0% 3' @ 100.0% 4 @ 100.0% 206+99.99	5.64(C) 12.35(I) 3.20(C) -14.84(I)
207+80.37	15.18	80 @ 0.0%	14.84(I) 3.28(C)
208+00	11.77	80.30'	6.28(C) 11.44(I)
208+58.54	7.47	856' @ 0.6%	10.55(C) 7.47 208+60.80
209+00	7.69		10.84(C) 7.36(I)
210+00	8.26		9.86(C) 7.93(I)



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

NO.	DATE	DESCRIPTION OF REVISION
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DESIGNED BY: M. LOKER	CHECKED BY: J. CATLANOTTO	PROJECT No.: FAIRWAY CE	ISSUE DATE: 08/20/2024	APPROVED BY: D. MARTIN	SHEET SIZE: ANSI D 34x22	SCALE: AS NOTED
DRAWN BY: J. HITT	PROJECT No.: DU 168,170,	ISSUE DATE: 08/20/2024	APPROVED BY: D. MARTIN	SHEET SIZE: ANSI D 34x22	SCALE: AS NOTED	



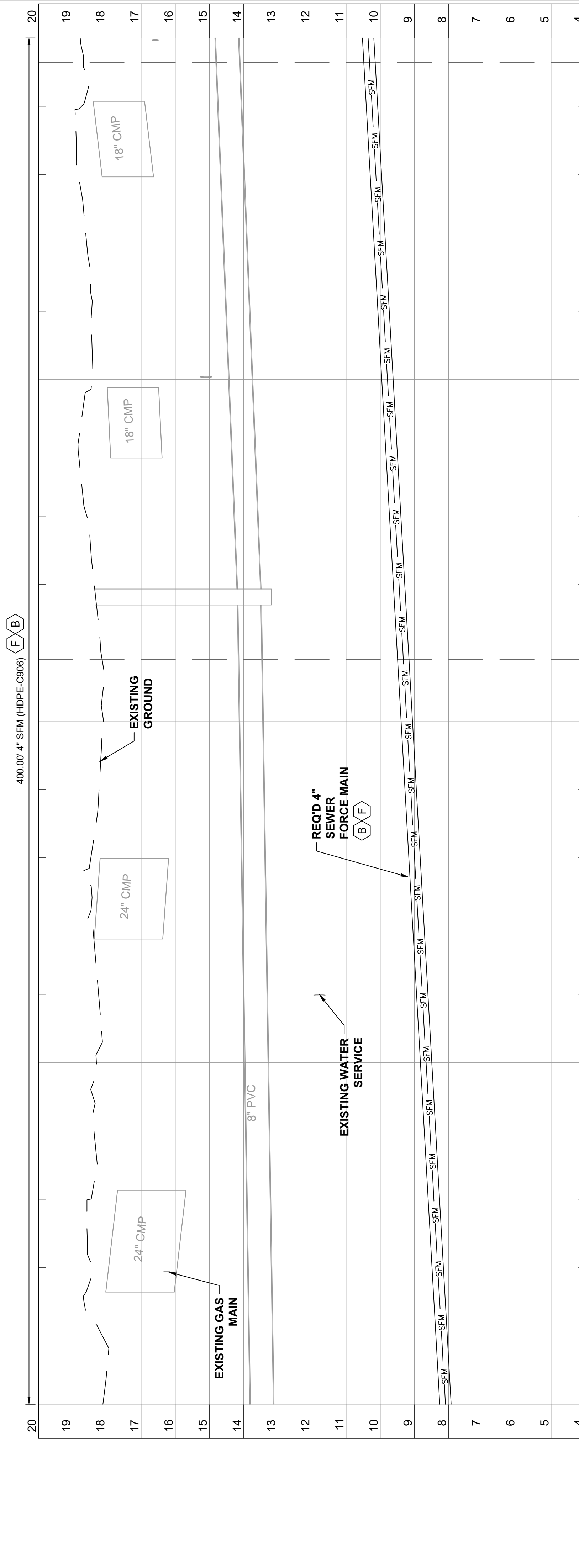
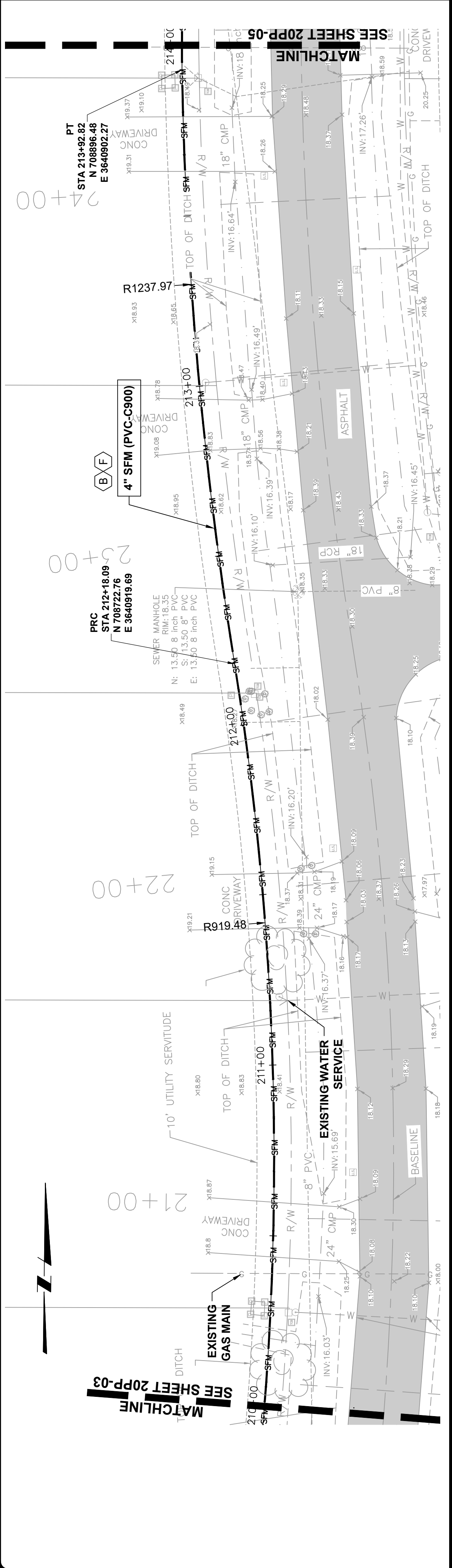
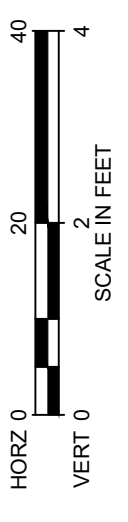
BREWSTER ROAD SEWER
CONSOLIDATION

FORCE MAIN PLAN & PROFILES - BASELINE 200 - IV

SHEET NO.
20PP-04

- PLAN AND PROFILE GENERAL NOTES**
- PLAN AND PROFILE DRAWING BASED UPON SURVEY TITLED "ST. TAMMANY SEWER CONSOLIDATION SURVEY - FAIRFIELD OAKS, THREE RIVERS, AND TCHEFUNCTE PARK" PREPARED BY ALL - SOUTH CONSULTING ENGINEERS, DATED JULY 2023 AND AS-BUILT DRAINAGE PLAN FOR ARUNDEL SUBDIVISION
 - AT EACH LOCATION WHERE THE REQUIRED SEWER FORCE MAIN CROSSES AN EXISTING UTILITY, OR TIES INTO AN EXISTING UTILITY, CONDUCT EXPLORATORY EXCAVATIONS AS NECESSARY TO POSITIVELY DETERMINE LOCATION, ELEVATION, AND SIZE OF UTILITY CONDUIT SUCH AS EXPLORATORY EXCAVATIONS AND REPORT FINDINGS TO ENGINEER PRIOR TO ANY HORIZONTAL DIRECTIONAL DRILLING OPERATIONS. COORDINATE WITH THE ENGINEER IN ADJUSTING THE ALIGNMENT OF THE REQUIRED PIPELINE TO MAINTAIN REQUIRED CLEARANCES. THE CONTRACTOR WILL NOT BE ENTITLED TO ANY ADJUSTMENT IN PAY FOR SUCH ADJUSTMENTS EXCEPT FOR ADDITIONAL QUANTITIES.
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 - REFER TO PIPE SCHEDULE FOR ADDITIONAL REQUIREMENTS.
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- REQD 12" BREWSTER RD. SFM TO DISCHARGE INTO TCHEFUNCTE PARC SPS
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 - PIPE TO BE INSTALLED BY OPEN CUT
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STATION	EXIST GND EL	VERTICAL PIPE GEOMETRY	PIPE ELEV DATA (COVER INV)
210+00	8.26		7.93(I) 8.86(C)
211+00	8.83	856' @ 0.6%	8.49(I) 9.48(C)
212+00	9.39		9.06(I) 8.71(C)
213+00	9.96		9.62(I) 8.47(C)
214+00	10.52		10.19(I) 8.24(C)



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

NO.	DATE	DESCRIPTION OF REVISION
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DESIGNED BY: M. LOKER	CHECKED BY: J. CATLANOTTO	PROJECT No.: DU 168,170.	ISSUE DATE: 08/20/2024	APPROVED BY: D. MARTIN	SHEET SIZE: ANSI D 34x22	SCALE: AS NOTED
DRAWN BY: J. HITT	SUBMITTED BY: FAIRWAY CE	DATE: 175, 177				



BREWSTER ROAD SEWER
CONSOLIDATION

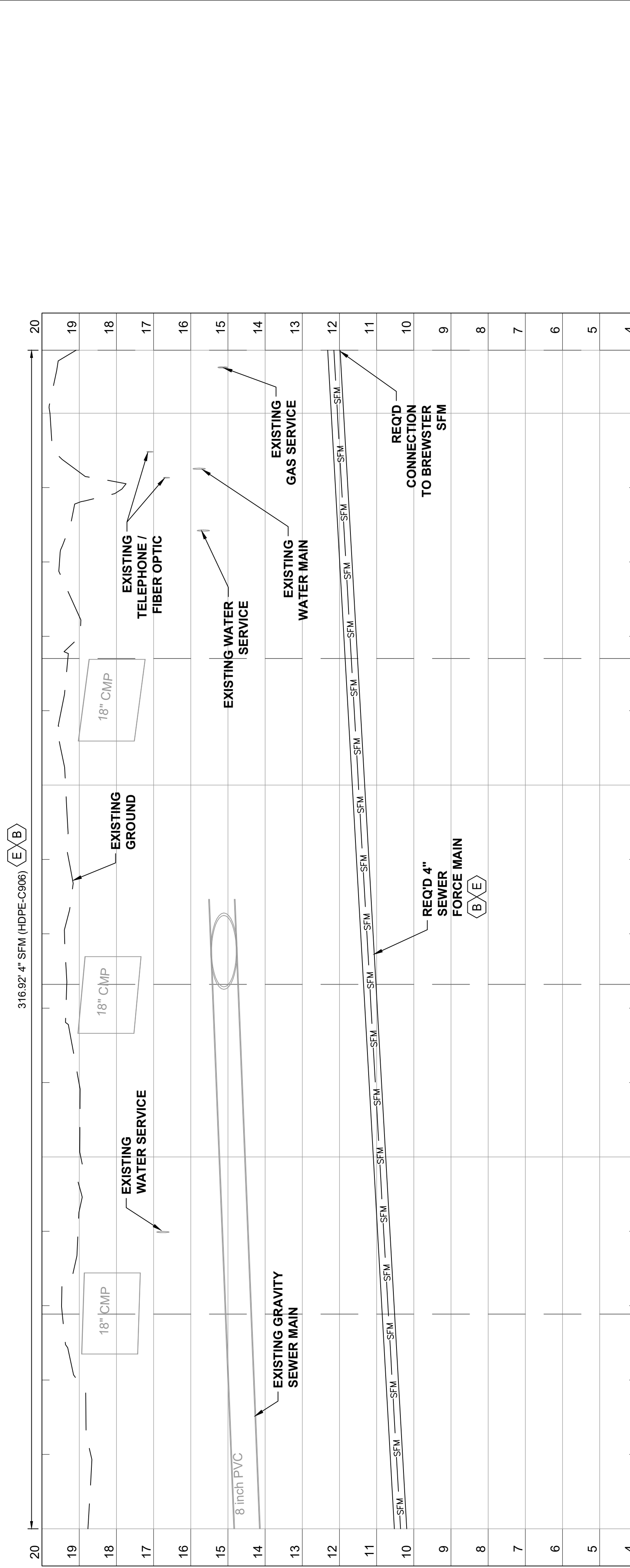
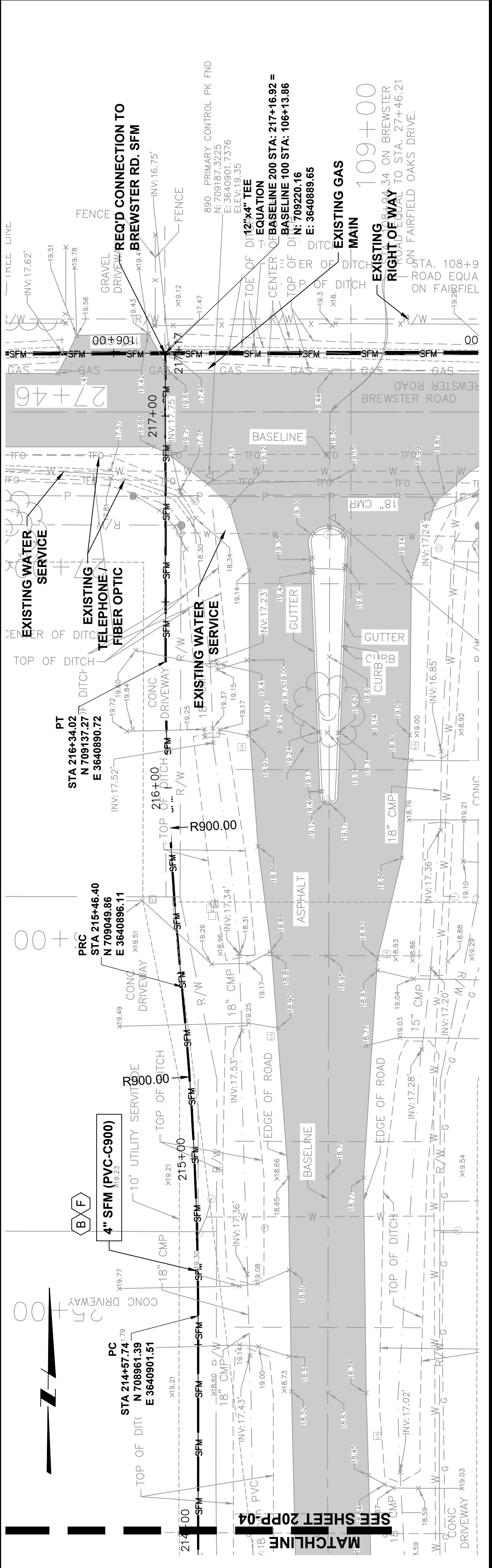
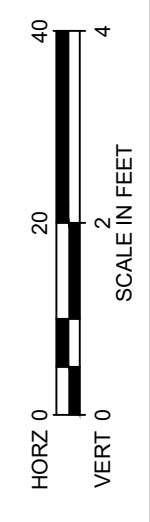
FORCE MAIN PLAN & PROFILES - BASELINE 200 - V

SHEET NO.
20PP-05

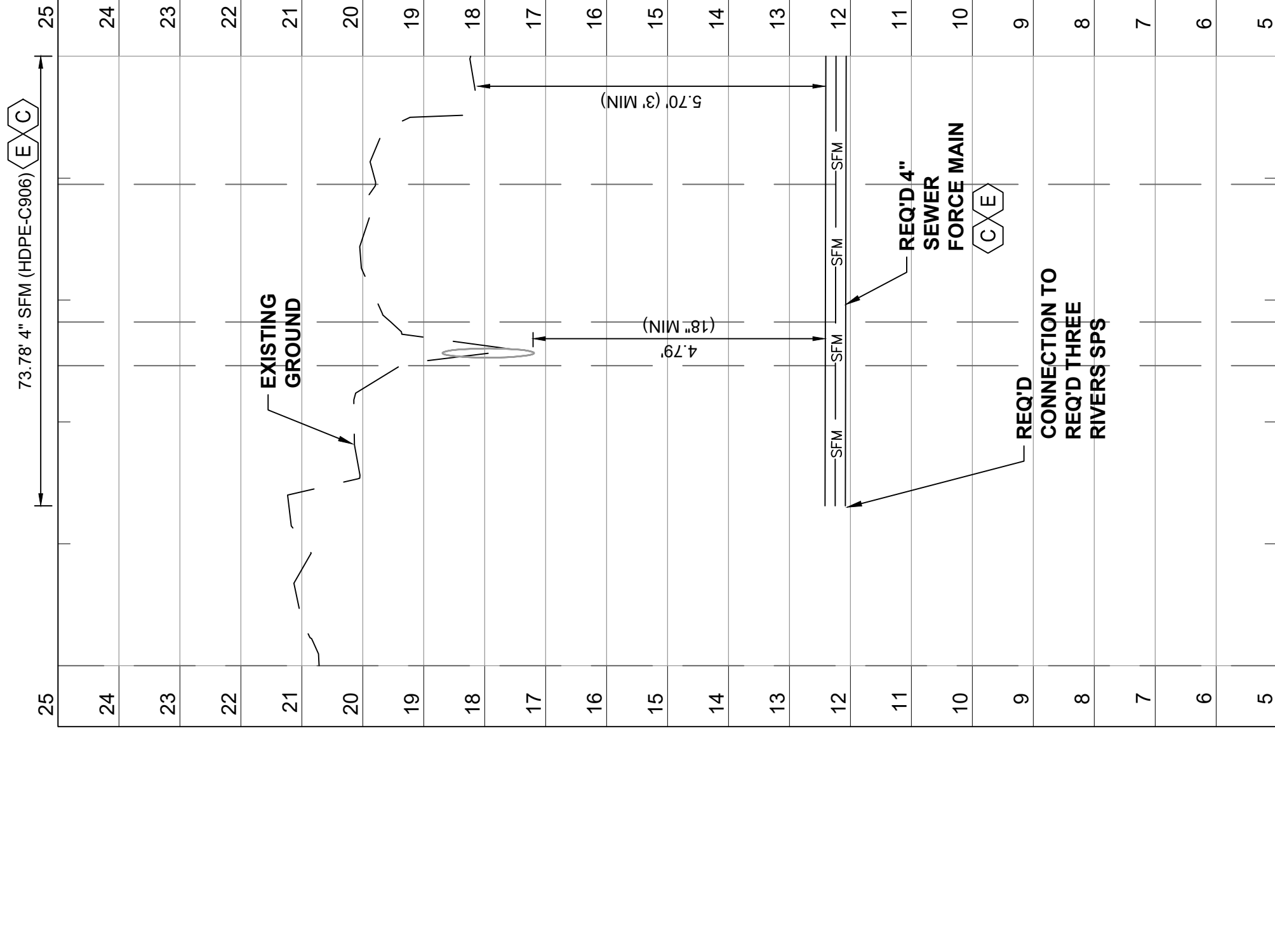
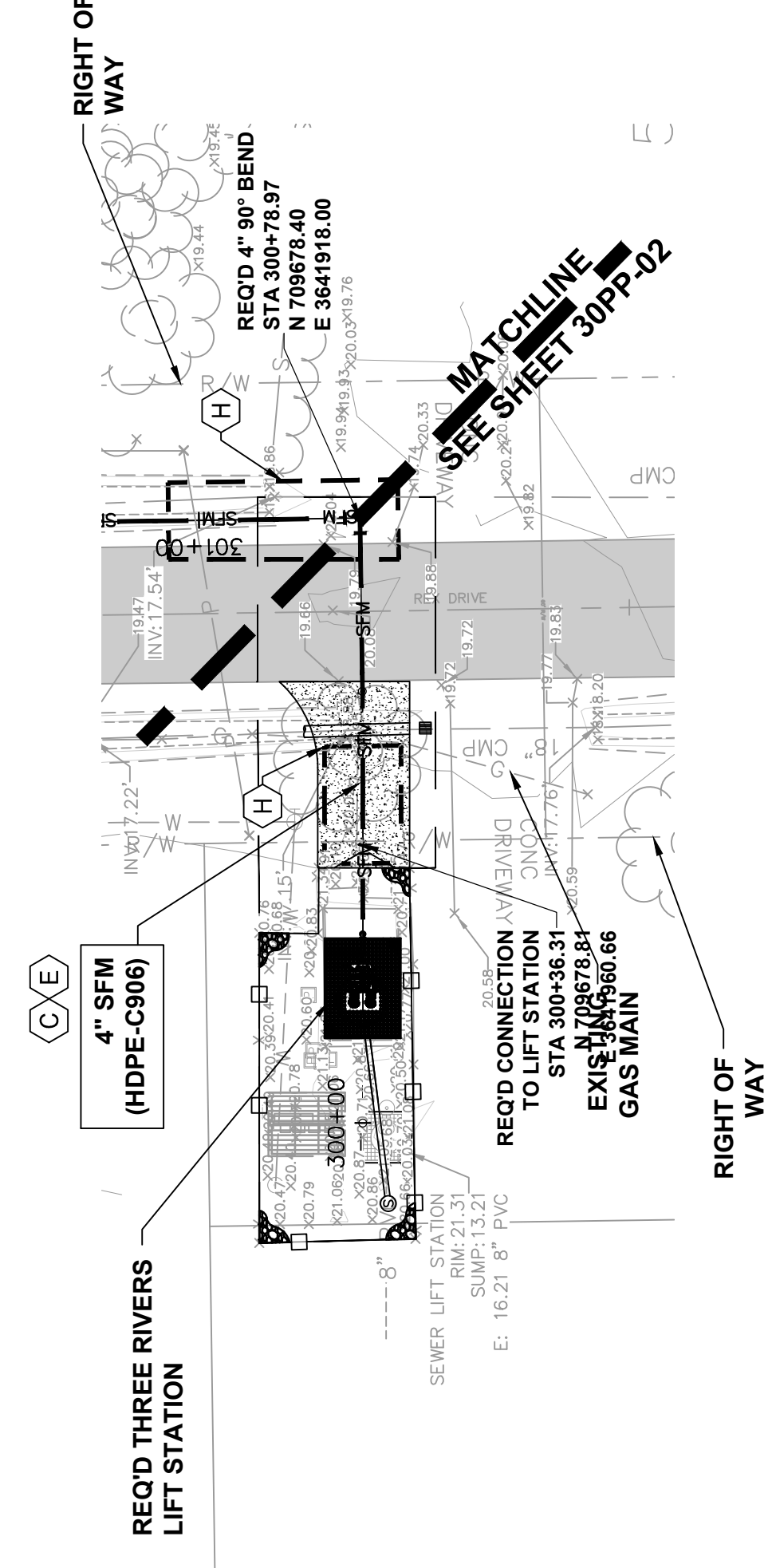
- PLAN AND PROFILE GENERAL NOTES**
- PLAN AND PROFILE DRAWING DRAWINGS BASED UPON SURVEY TITLED "ST. TAMMANY SEWER CONSOLIDATION SURVEY - FAIRFIELD OAKS, THREE RIVERS, AND TCHEFUNCTE PARK" PREPARED BY ALL - SOUTH CONSULTING ENGINEERS, DATED JULY 2023 AND AS-BUILT DRAINAGE PLAN FOR ARUNDEL SUBDIVISION
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PLAN AND PROFILE NOTES BY SYMBOLS

- REQD 12" BREWSTER RD. SFM TO DISCHARGE INTO TCHEFUNCTE PARC SPS
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- REQD 14" TCHEFUNCTE PARC SFM TO DISCHARGE INTO FAUBORG NO. 2 LIFT STATION



STATION	EXIST GND EL	VERTICAL PIPE GEOMETRY	PIPE ELEV DATA (COVER / INV)
214+00	10.52		8.24(C) / 214+00.00
215+00	11.09		7.87(C) / 215+00.00
216+00	11.65		7.71(C) / 216+00.00
217+00	12.22		7.57(C) / 217+00.00
217+16.92	12.32		6.77(C) / 217+16.92
856' @ 0.6%			



STATION	EXIST GND EL	VERTICAL PIPE GEOMETRY	PIPE ELEV DATA (COVER INV)
300+00	20.72		(C) (C)
300+26.22	21.21	510' @ -0.0%	8.79(C) 12.08(I)
301+00	18.23		5.83(C) 12.07(I)

- PLAN AND PROFILE GENERAL NOTES**
- PLAN AND PROFILE DRAWING BASED UPON SURVEY TITLED "ST. TAMMANY SEWER CONSOLIDATION SURVEY - FAIRFIELD OAKS, THREE RIVERS, AND TCHEFUNCTE PARK" PREPARED BY ALL - SOUTH CONSULTING ENGINEERS, DATED JULY 2023 AND AS-BUILT DRAINAGE PLAN FOR ARUNDEL SUBDIVISION
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- PLAN AND PROFILE NOTES BY SYMBOLS**
- REQ'D 12" BREWSTER RD. SFM TO DISCHARGE INTO TCHEFUNCTE PARC SPS
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 - HORIZONTAL DISTANCE FROM EDGE OF ROADWAY
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 - REQ'D FULLY RESTRAINED GATE VALVE WITH STEM EXTENSION PER DETAIL
 - REQ'D AIR RELEASE VALVE AND VAULT PER DETAIL
 - REQ'D VERTICAL CURVE. SEE CURVE TABLE ON SHEET G-102 FOR ADDITIONAL REQUIREMENTS AND INFORMATION.
 - REQUIRED 3" ARUNDEL SEWER FORCE MAIN (BY OTHERS) TO DISCHARGE IN BREWSTER FORCE MAIN
 - REQ'D 14" TCHEFUNCTE PARC SFM TO DISCHARGE INTO FAUBORG NO. 2 LIFT STATION



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

DESCRIPTION OF REVISION	DATE:

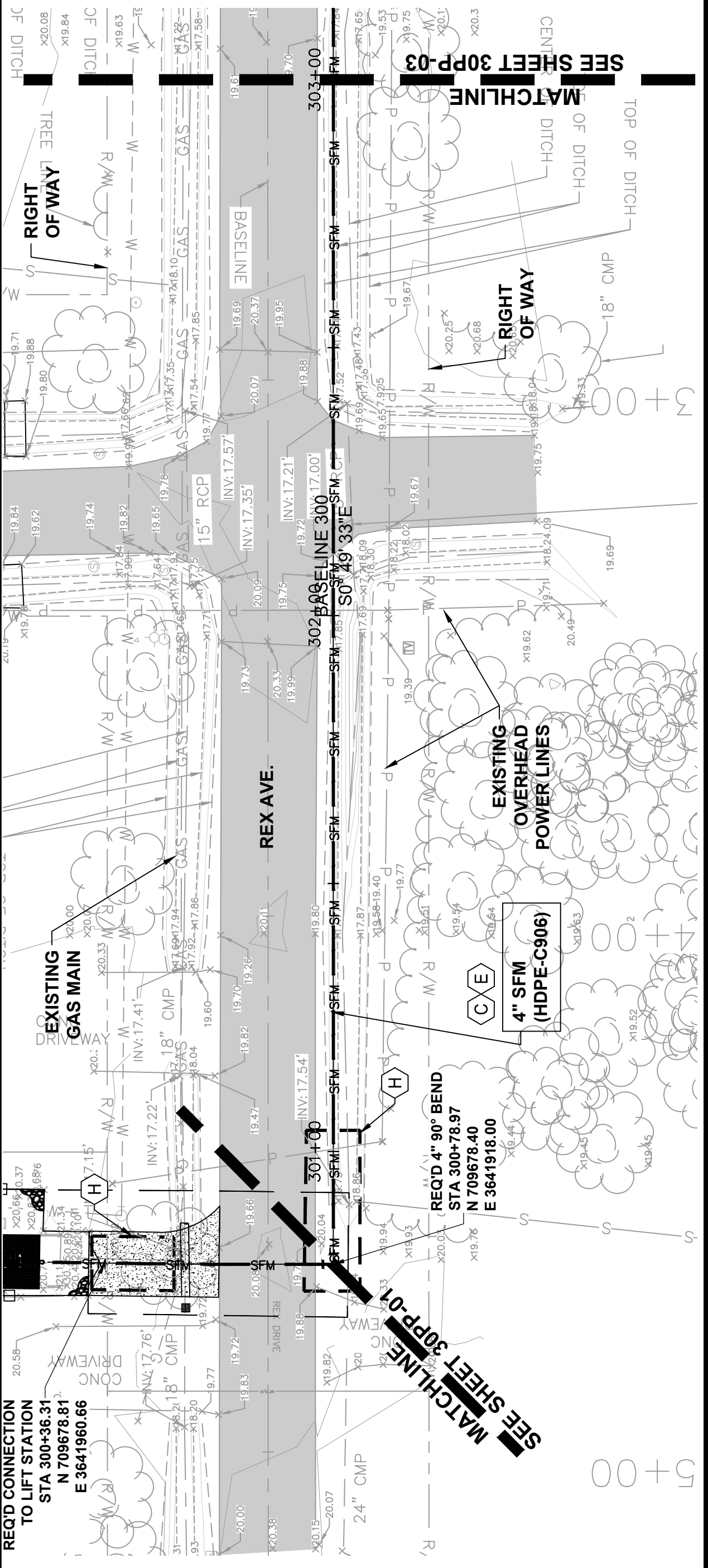
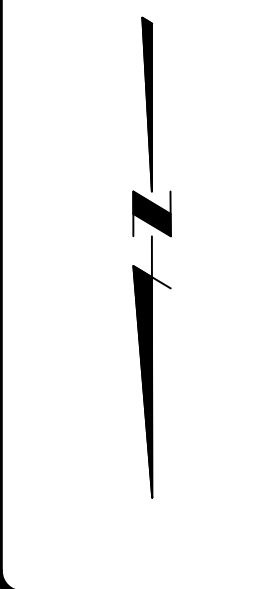
DESIGNED BY: M. LOKER
DRAWN BY: J. HITT
CHECKED BY: J. CATALANOTTO
PROJECT No.: DU 168,170, 175, 177
ISSUE DATE: 08/20/2024
APPROVED BY: D. MARTIN
SHEET SIZE: ANSI D 34x22
SCALE: AS NOTED



BREWSTER ROAD SEWER
CONSOLIDATION
FORCE MAIN PLAN & PROFILES - BASELINE 300 - I

SHEET NO.
30PP-01





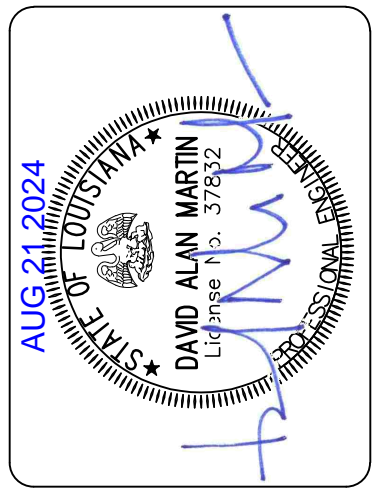
- PLAN AND PROFILE GENERAL NOTES**
- PLAN AND PROFILE DRAWING BASED UPON SURVEY TITLED "ST. TAMMANY SEWER CONSOLIDATION SURVEY - FAIRFIELD OAKS, THREE RIVERS, AND TCHEFUNCTE PARK" PREPARED BY ALL - SOUTH CONSULTING ENGINEERS, DATED JULY 2023 AND AS-BUILT DRAINAGE PLAN FOR ARUNDEL SUBDIVISION
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DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

NO.	DATE	DESCRIPTION OF REVISION
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DESIGNED BY: M. LOKER	CHECKED BY: J. CATLANOTTO	PROJECT NO.: DU 168,170.	ISSUE DATE: 08/20/2024	APPROVED BY: D. MARTIN	SHEET SIZE: ANSI D 34x22	SCALE: AS NOTED
DRAWN BY: J. HITT	SUBMITTED BY: J. CATLANOTTO	FARWAY CE	175, 177			

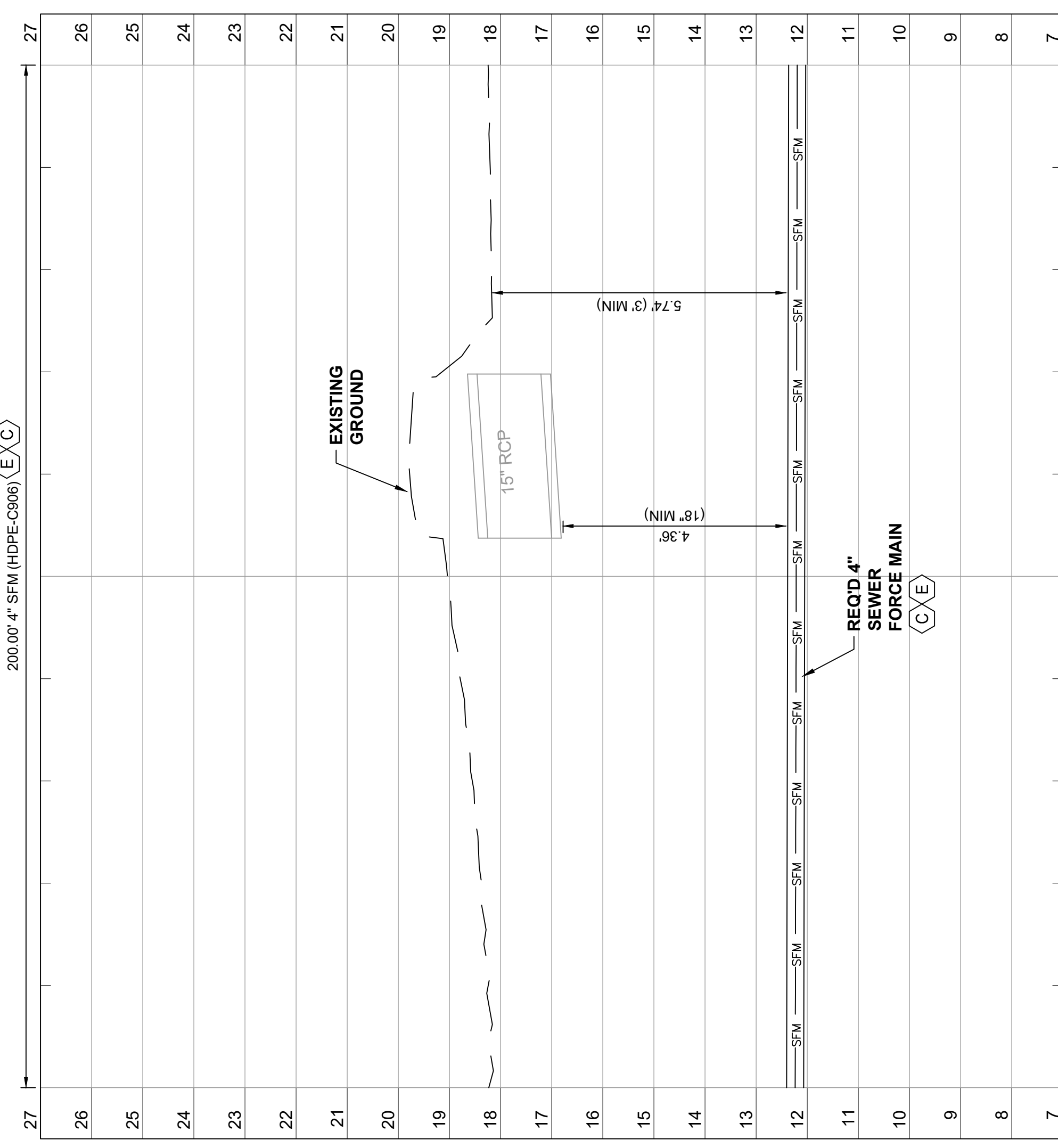


BREWSTER ROAD SEWER
CONSOLIDATION
FORCE MAIN PLAN & PROFILES - BASELINE 300 - II

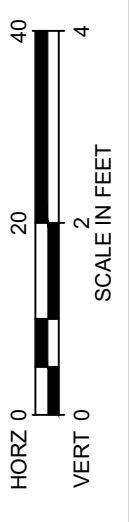
SHEET NO.
30PP-02

PLAN AND PROFILE NOTES BY SYMBOLS

- REQD 12" BREWSTER RD. SFM TO DISCHARGE INTO TCHEFUNCTE PARC SPS
- REQD 4" FAIRFIELD OAKS SEWER FORCE MAIN TO DISCHARGE INTO BREWSTER RD. SFM
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STATION	EXIST GND EL	VERTICAL PIPE GEOMETRY	PIPE ELEV DATA (COVER INV)
301+00	18.23	510' @ -0.0%	5.83(0) 301+00.00
302+00	19.04		6.65(0) 302+00.00
303+00	18.24		5.88(0) 303+00.00

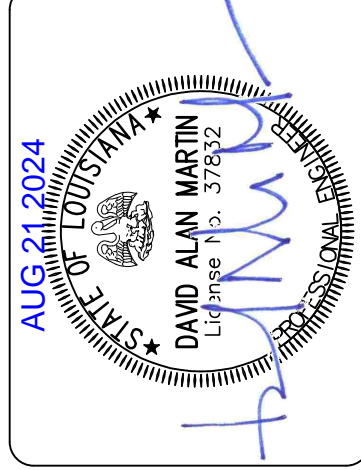




DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

NO.	DATE	DESCRIPTION OF REVISION
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DESIGNED BY:	M. LOKER
DRAWN BY:	J. HITT
CHECKED BY:	J. CATLANOTTO
PROJECT No.:	DU 168,170.
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED

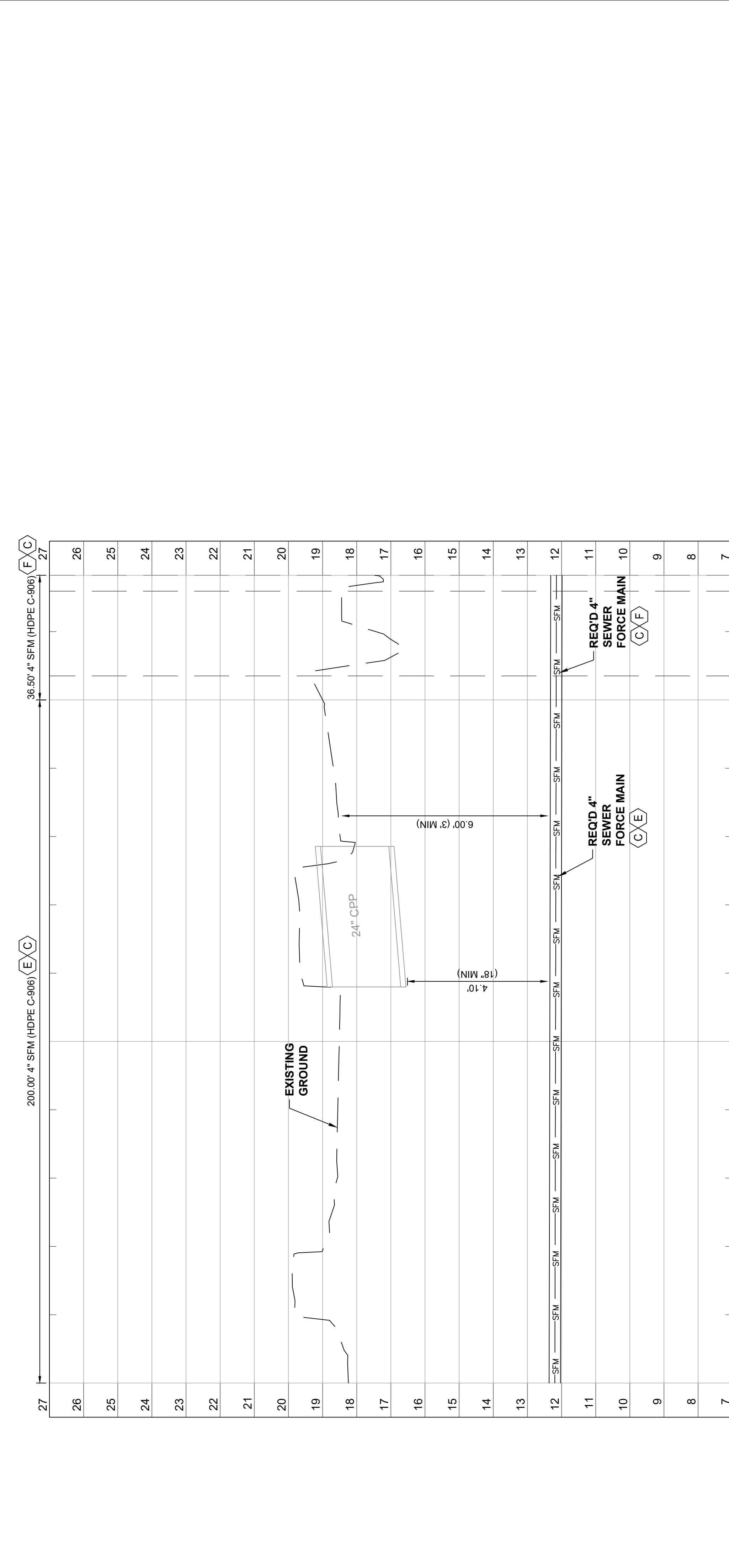
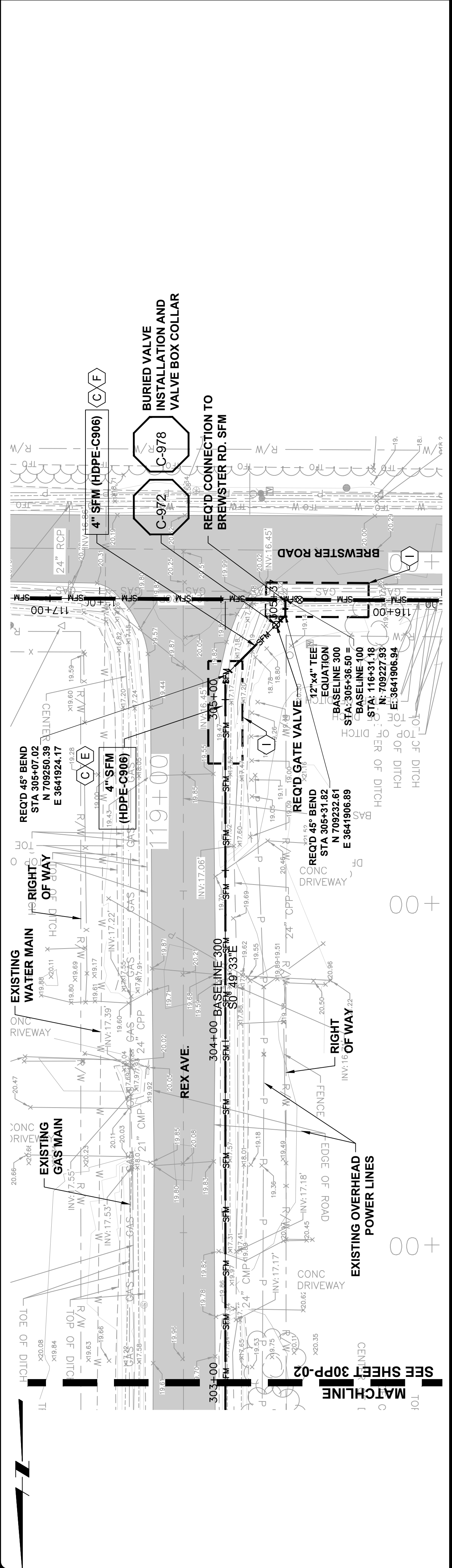
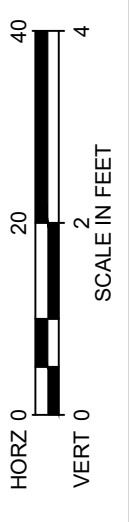


BREWSTER ROAD SEWER
CONSOLIDATION
FORCE MAIN PLAN & PROFILES - BASELINE 300 - III

SHEET NO.
30PP-03

- PLAN AND PROFILE GENERAL NOTES**
- PLAN AND PROFILE DRAWING DRAWINGS BASED UPON SURVEY TITLED "ST. TAMMANY SEWER CONSOLIDATION SURVEY - FAIRFIELD OAKS, THREE RIVERS, AND TCHEFUNCTE PARK" PREPARED BY ALL - SOUTH CONSULTING ENGINEERS, DATED JULY 2023 AND AS-BUILT DRAINAGE PLAN FOR ARUNDEL SUBDIVISION
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 - PIPE SIZES NOTED ON PLANS REFERENCE NOMINAL PIPE DIAMETER.
 - REFER TO PIPE SCHEDULE FOR ADDITIONAL REQUIREMENTS.
 - CONTRACTOR TO MAINTAIN A MINIMUM 6' HORIZONTAL AND 18" VERTICAL SEPARATION BETWEEN SEWER FORCE MAIN AND WATER MAIN.
 - NOT ALL NOTES BY SYMBOL USED ON THIS SHEET.

- PLAN AND PROFILE NOTES BY SYMBOLS**
- REQ'D 12" BREWSTER RD. SFM TO DISCHARGE INTO TCHEFUNCTE PARC SPS
 - REQ'D 4" FAIRFIELD OAKS SEWER FORCE MAIN TO DISCHARGE INTO BREWSTER RD. SFM
 - REQ'D 4" THREE RIVERS SFM TO DISCHARGE INTO BREWSTER RD. SFM.
 - REQ'D 12" TCHEFUNCTE PARC SFM TO DISCHARGE TO FAUBOURG NO 2 SPS.
 - PIPE TO BE INSTALLED BY HORIZONTALLY DIRECTIONALLY DRILLING
 - PIPE TO BE INSTALLED BY OPEN CUT
 - HORIZONTAL DISTANCE FROM EDGE OF ROADWAY
 - REQ'D LAUNCHING AND RECEIVING PIT FOR HORIZONTAL DIRECTIONAL DRILLING
 - REQ'D FULLY RESTRAINED GATE VALVE WITH STEM EXTENSION PER DETAIL
 - REQ'D AIR RELEASE VALVE AND VAULT PER DETAIL
 - REQ'D VERTICAL CURVE. SEE CURVE TABLE ON SHEET G-102 FOR ADDITIONAL REQUIREMENTS AND INFORMATION.
 - REQUIRED 3" ARUNDEL SEWER FORCE MAIN (BY OTHERS) TO DISCHARGE IN BREWSTER FORCE MAIN
 - REQ'D 14" TCHEFUNCTE PARC SFM TO DISCHARGE INTO FAUBORG NO. 2 LIFT STATION



STATION	EXIST GND EL	VERTICAL PIPE GEOMETRY	PIPE ELEV DATA (COVER INV)
303+00	18.24	5.88(C)	12.03(C)
304+00	18.51	6.17(C)	12.01(C)
305+00	19.00	6.68(C)	11.99(C)
305+37	17.47	5.15(C)	11.98(C)

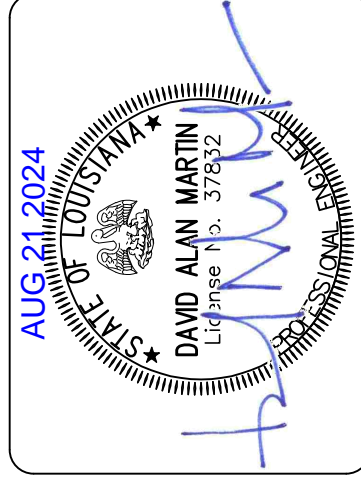
510' @ -0.0%



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

NO.	DATE	DESCRIPTION OF REVISION
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DESIGNED BY: M. LOKER	CHECKED BY: J. CATLANOTTO	DRAWN BY: J. HITT
PROJECT NO.: DU 168,170, 175, 177	ISSUE DATE: 08/20/2024	APPROVED BY: D. MARTIN
SHEET SIZE: ANSI D 34x22	AS NOTED	

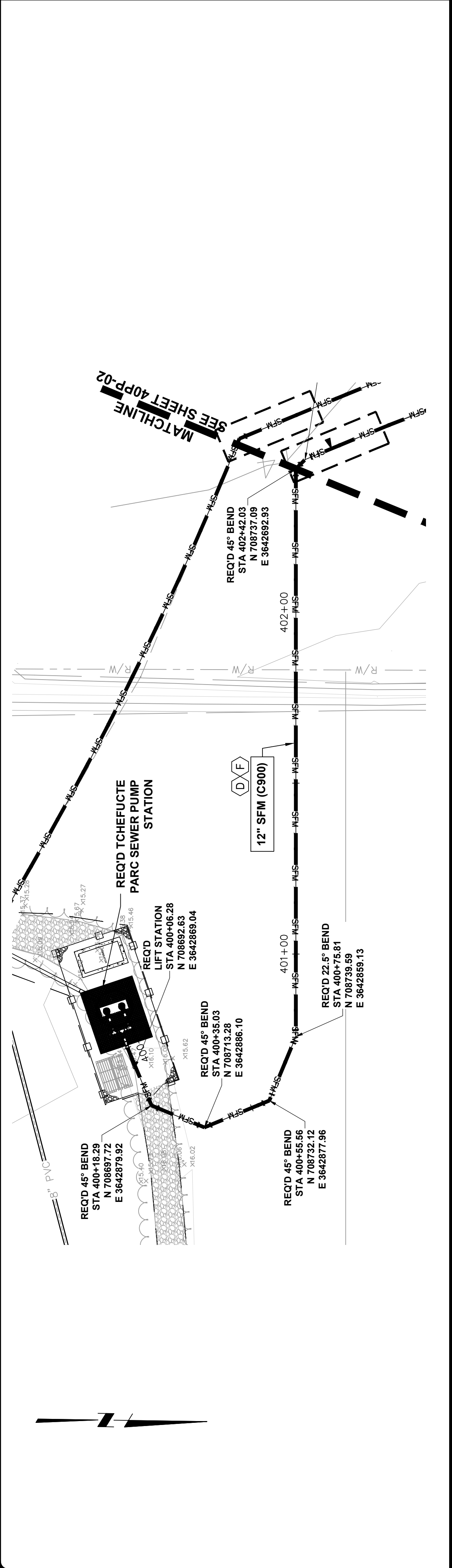


BREWSTER ROAD SEWER
CONSOLIDATION
FORCE MAIN PLAN & PROFILES - BASELINE 400 - 1

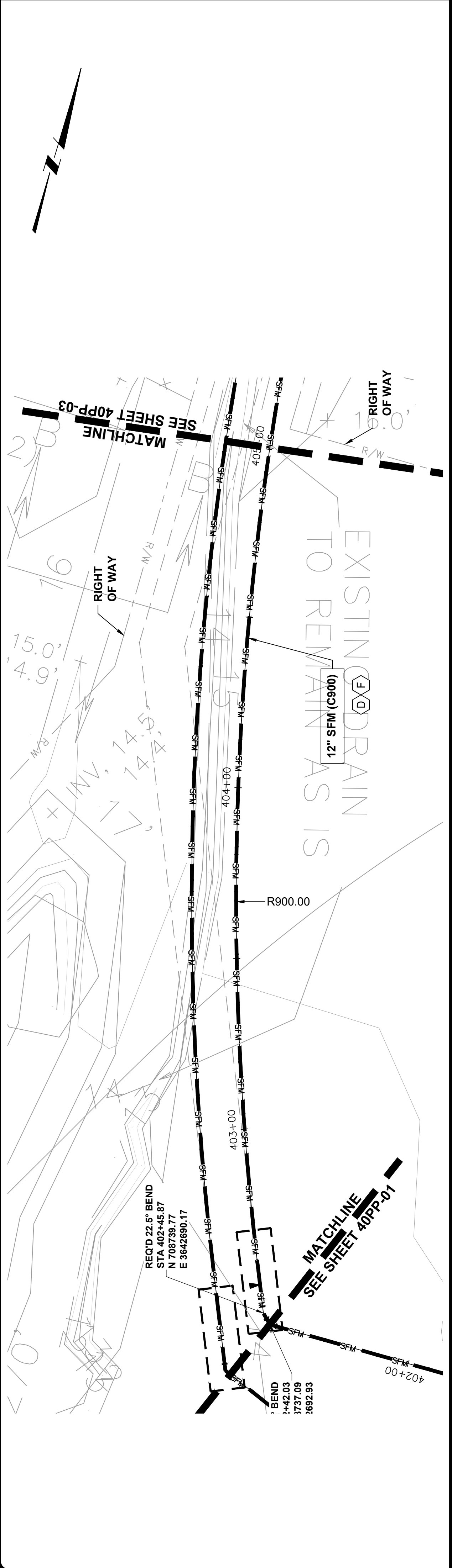
SHEET NO.
40PP-01

- PLAN AND PROFILE GENERAL NOTES**
- PLAN AND PROFILE DRAWING DRAWINGS BASED UPON SURVEY TITLED "ST. TAMMANY SEWER CONSOLIDATION SURVEY - FAIRFIELD OAKS, THREE RIVERS, AND TCHEFUNCTE PARK" PREPARED BY ALL - SOUTH CONSULTING ENGINEERS, DATED JULY 2023 AND AS-BUILT DRAINAGE PLAN FOR ARUNDEL SUBDIVISION
 - AT EACH LOCATION WHERE THE REQUIRED SEWER FORCE MAIN CROSSES AN EXISTING UTILITY, OR TIES INTO AN EXISTING UTILITY, CONDUCT EXPLORATORY EXCAVATIONS AS NECESSARY TO POSITIVELY DETERMINE LOCATION, ELEVATION, AND SIZE OF UTILITY CONDUCT SUCH EXPLORATORY EXCAVATIONS AND REPORT FINDINGS TO ENGINEER PRIOR TO ANY HORIZONTAL DIRECTIONAL DRILLING OPERATIONS. COORDINATE WITH THE ENGINEER IN ADJUSTING THE ALIGNMENT OF THE REQUIRED PIPELINE TO MAINTAIN REQUIRED CLEARANCES. THE CONTRACTOR WILL NOT BE ENTITLED TO ANY ADJUSTMENT IN PAY FOR SUCH ADJUSTMENTS EXCEPT FOR ADDITIONAL QUANTITIES.
 - PROVIDE TEMPORARY TRAFFIC CONTROL PER THE ACCEPTED TEMPORARY TRAFFIC CONTROL PLAN. SEE SPECIFICATIONS AND MINIMUM STANDARDS FOR ADDITIONAL REQUIREMENTS.
 - PIPE SIZES NOTED ON PLANS REFERENCE NOMINAL PIPE DIAMETER.
 - REFER TO PIPE SCHEDULE FOR ADDITIONAL REQUIREMENTS.
 - CONTRACTOR TO MAINTAIN A MINIMUM 6' HORIZONTAL AND 18" VERTICAL SEPARATION BETWEEN SEWER FORCE MAIN AND WATER MAIN.
 - NOT ALL NOTES BY SYMBOL USED ON THIS SHEET.

- PLAN AND PROFILE NOTES BY SYMBOLS**
- REQ'D 12" BREWSTER RD. SFM TO DISCHARGE INTO TCHEFUNCTE PARC SPS
 - REQ'D 4" FAIRFIELD OAKS SEWER FORCE MAIN TO DISCHARGE INTO BREWSTER RD. SFM
 - REQ'D 4" THREE RIVERS SFM TO DISCHARGE INTO BREWSTER RD. SFM.
 - REQ'D 12" TCHEFUNCTE PARC SFM TO DISCHARGE TO FAUBOURG NO 2 SPS.
 - PIPE TO BE INSTALLED BY HORIZONTALLY DIRECTIONALLY DRILLING
 - PIPE TO BE INSTALLED BY OPEN CUT
 - HORIZONTAL DISTANCE FROM EDGE OF ROADWAY
 - REQ'D LAUNCHING AND RECEIVING PIT FOR HORIZONTAL DIRECTIONAL DRILLING
 - REQ'D FULLY RESTRAINED GATE VALVE WITH STEM EXTENSION PER DETAIL
 - REQ'D AIR RELEASE VALVE AND VAULT PER DETAIL
 - REQ'D VERTICAL CURVE. SEE CURVE TABLE ON SHEET G-102 FOR ADDITIONAL REQUIREMENTS AND INFORMATION.
 - REQUIRED 3" ARUNDEL SEWER FORCE MAIN (BY OTHERS) TO DISCHARGE IN BREWSTER FORCE MAIN INTO FAUBORG NO. 2 LIFT STATION



STATION	EXIST GND EL	VERTICAL PIPE GEOMETRY	PIPE ELEV DATA (COVER INV)
400+00	13.19	169' @ 0.1%	4.64(C) 10.65(I)
401+00	10.87(I)		10.78(C)
401+12.71	11.77		5.41(C)
401+12.71	10.34		10.87(I)
401+77.12	10.34		5.41(C)
401+78.63	11.27		8.46(I)
401+78.63	11.70		3.98(C)
402+00	9.97(I)		3.40(C)
402+00	9.97(I)		3.97(I)
402+42	10.97		3.80(I)
402+42.03	9.97(I)		3.10(C)

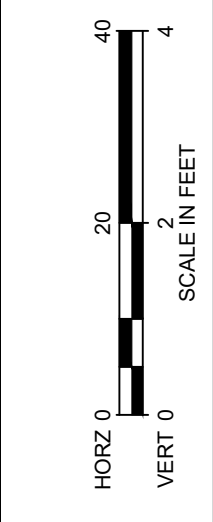


STATION	EXIST GND EL	VERTICAL PIPE GEOMETRY	PIPE ELEV./DATA (COVER INV)
402+42	14.07	14.12	3.10(C) 9.97(I) 402+42.03
403+00	14.54	14.12	3.15(C) 9.88(I) 402+51.22
404+00			(C) 9.88(I)
405+00			4.98(C) 9.88(I)

STATION	12" SFM (C900)	14" SFM (HDPE-36)
22		247'78"
21		
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19		
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17		
16		
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- ### PLAN AND PROFILE GENERAL NOTES
- PLAN AND PROFILE DRAWING DRAWINGS BASED UPON SURVEY TITLED "ST. TAMMANY SEWER CONSOLIDATION SURVEY - FAIRFIELD OAKS, THREE RIVERS, AND TCHEFUNCTE PARK" PREPARED BY ALL - SOUTH CONSULTING ENGINEERS, DATED JULY 2023 AND AS-BUILT DRAINAGE PLAN FOR ARUNDEL SUBDIVISION
 - AT EACH LOCATION WHERE THE REQUIRED SEWER FORCE MAIN CROSSES AN EXISTING UTILITY, OR TIES INTO AN EXISTING UTILITY, CONDUCT EXPLORATORY EXCAVATIONS AS NECESSARY TO POSITIVELY DETERMINE LOCATION, ELEVATION, AND SIZE OF UTILITY. CONDUCT SUCH EXPLORATORY EXCAVATIONS AND REPORT FINDINGS TO ENGINEER PRIOR TO ANY HORIZONTAL DIRECTIONAL DRILLING OPERATIONS. COORDINATE WITH THE ENGINEER IN ADJUSTING THE ALIGNMENT OF THE REQUIRED PIPELINE TO MAINTAIN REQUIRED CLEARANCES. THE CONTRACTOR WILL NOT BE ENTITLED TO ANY ADJUSTMENT IN PAY FOR SUCH ADJUSTMENTS EXCEPT FOR ADDITIONAL QUANTITIES.
 - PROVIDE TEMPORARY TRAFFIC CONTROL PER THE ACCEPTED TEMPORARY TRAFFIC CONTROL PLAN. SEE SPECIFICATIONS AND MINIMUM STANDARDS FOR ADDITIONAL REQUIREMENTS.
 - PIPE SIZES NOTED ON PLANS REFERENCE NOMINAL PIPE DIAMETER.
 - REFER TO PIPE SCHEDULE FOR ADDITIONAL REQUIREMENTS.
 - CONTRACTOR TO MAINTAIN A MINIMUM 6' HORIZONTAL AND 18" VERTICAL SEPARATION BETWEEN SEWER FORCE MAIN AND WATER MAIN.
 - NOT ALL NOTES BY SYMBOL USED ON THIS SHEET.

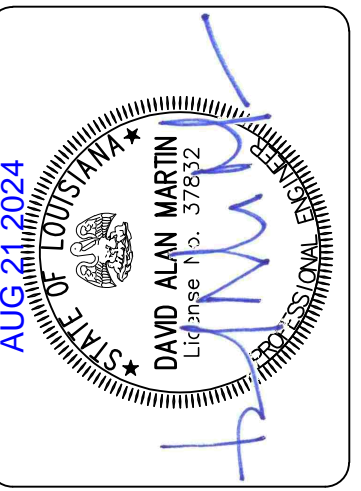
- ### PLAN AND PROFILE NOTES BY SYMBOLS
- REQ'D 12" BREWSTER RD. SFM TO DISCHARGE INTO TCHEFUNCTE PARC SPS
 - REQ'D 4" FAIRFIELD OAKS SEWER FORCE MAIN TO DISCHARGE INTO BREWSTER RD. SFM
 - REQ'D 4" THREE RIVERS SFM TO DISCHARGE INTO BREWSTER RD. SFM
 - REQ'D 12" TCHEFUNCTE PARC SFM TO DISCHARGE TO FAUBOURG NO 2 SPS.
 - PIPE TO BE INSTALLED BY HORIZONTALLY DIRECTIONALLY DRILLING
 - PIPE TO BE INSTALLED BY OPEN CUT
 - HORIZONTAL DISTANCE FROM EDGE OF ROADWAY
 - REQ'D LAUNCHING AND RECEIVING PIT FOR HORIZONTAL DIRECTIONAL DRILLING
 - REQ'D FULLY RESTRAINED GATE VALVE WITH STEM EXTENSION PER DETAIL
 - REQ'D AIR RELEASE VALVE AND VAULT PER DETAIL
 - REQ'D VERTICAL CURVE. SEE CURVE TABLE ON SHEET G-102 FOR ADDITIONAL REQUIREMENTS AND INFORMATION.
 - REQUIRED 3" ARUNDEL SEWER FORCE MAIN (BY OTHERS) TO DISCHARGE IN BREWSTER FORCE MAIN INTO FAUBORG NO. 2 LIFT STATION



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

DESCRIPTION OF REVISION	DATE

DESIGNED BY: M. LOKER
DRAWN BY: J. HITT
CHECKED BY: J. CATLANOTTO
PROJECT NO.: DU 168,170, 175, 177
ISSUE DATE: 08/20/2024
APPROVED BY: D. MARTIN
SHEET SIZE: ANSI D 34x22
SCALE: AS NOTED



BREWSTER ROAD SEWER
CONSOLIDATION
FORCE MAIN PLAN & PROFILES - BASELINE 400 - II

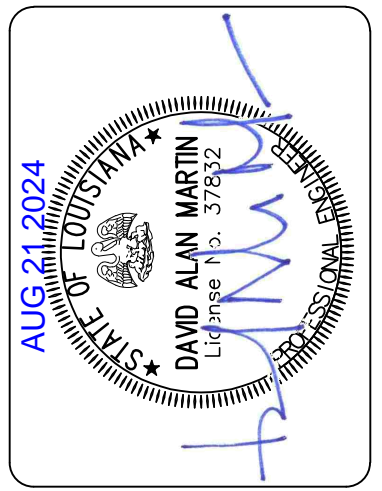
SHEET NO.
40PP-02



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

DESCRIPTION OF REVISION	DATE:
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DESIGNED BY:	M. LOKER
CHECKED BY:	J. CATLANOTTO
PROJECT NO.:	DU 168,170
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED



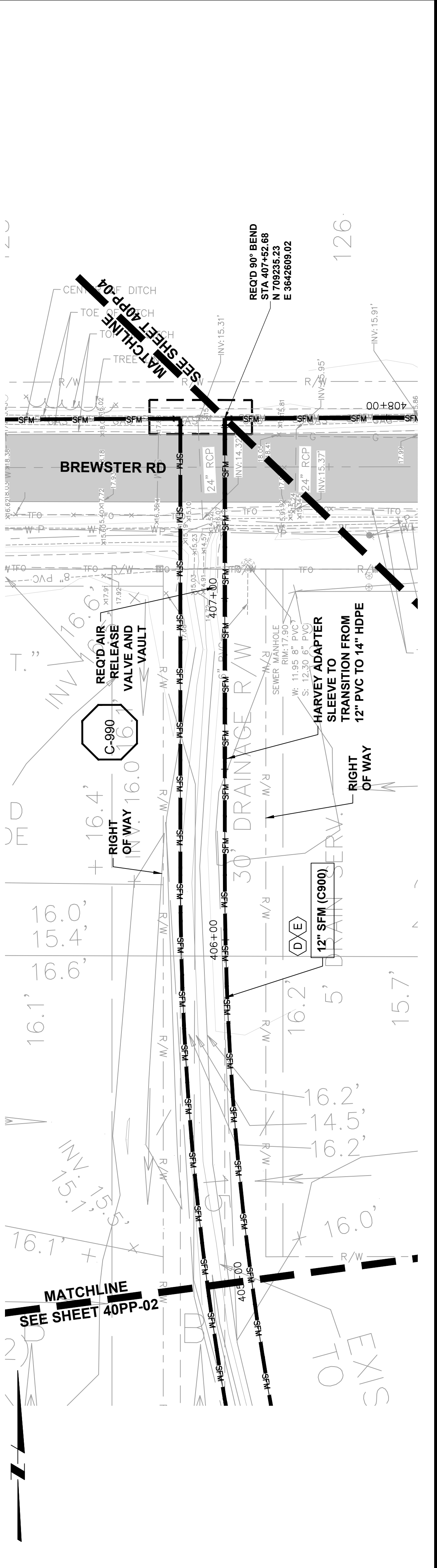
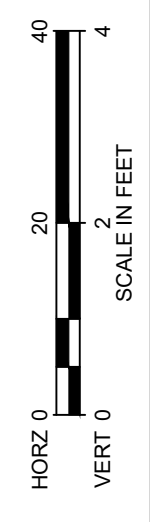
BREWSTER ROAD SEWER
CONSOLIDATION

FORCE MAIN PLAN & PROFILES - BASELINE 400 - III

SHEET NO.
40PP-03

- PLAN AND PROFILE GENERAL NOTES**
- PLAN AND PROFILE DRAWING BASED UPON SURVEY TITLED "ST. TAMMANY SEWER CONSOLIDATION SURVEY - FAIRFIELD OAKS, THREE RIVERS, AND TCHEFUNCTE PARK" PREPARED BY ALL - SOUTH CONSULTING ENGINEERS, DATED JULY 2023 AND AS-BUILT DRAINAGE PLAN FOR ARUNDEL SUBDIVISION.
 - AT EACH LOCATION WHERE THE REQUIRED SEWER FORCE MAIN CROSSES AN EXISTING UTILITY, OR TIES INTO AN EXISTING UTILITY, CONDUCT EXPLORATORY EXCAVATIONS AS NECESSARY TO POSITIVELY DETERMINE LOCATION, ELEVATION, AND SIZE OF UTILITY CONDUCT SUCH EXPLORATORY EXCAVATIONS AND REPORT FINDINGS TO ENGINEER PRIOR TO ANY HORIZONTAL DIRECTIONAL DRILLING OPERATIONS. COORDINATE WITH THE ENGINEER IN ADJUSTING THE ALIGNMENT OF THE REQUIRED PIPELINE TO MAINTAIN REQUIRED CLEARANCES. THE CONTRACTOR WILL NOT BE ENTITLED TO ANY ADJUSTMENT IN PAY FOR SUCH ADJUSTMENTS EXCEPT FOR ADDITIONAL QUANTITIES.
 - PROVIDE TEMPORARY TRAFFIC CONTROL PER THE ACCEPTED TEMPORARY TRAFFIC CONTROL PLAN. SEE SPECIFICATIONS AND MINIMUM STANDARDS FOR ADDITIONAL REQUIREMENTS.
 - PIPE SIZES NOTED ON PLANS REFERENCE NOMINAL PIPE DIAMETER.
 - REFER TO PIPE SCHEDULE FOR ADDITIONAL REQUIREMENTS.
 - CONTRACTOR TO MAINTAIN A MINIMUM 6' HORIZONTAL AND 18" VERTICAL SEPARATION BETWEEN SEWER FORCE MAIN AND WATER MAIN.
 - NOT ALL NOTES BY SYMBOL USED ON THIS SHEET.

- PLAN AND PROFILE NOTES BY SYMBOLS**
- REQ'D 12" BREWSTER RD. SFM TO DISCHARGE INTO TCHEFUNCTE PARC SPS
 - REQ'D 4" FAIRFIELD OAKS SEWER FORCE MAIN TO DISCHARGE INTO BREWSTER RD. SFM
 - REQ'D 4" THREE RIVERS SFM TO DISCHARGE INTO BREWSTER RD. SFM.
 - REQ'D 12" TCHEFUNCTE PARC SFM TO DISCHARGE TO FAUBOURG NO 2 SPS.
 - PIPE TO BE INSTALLED BY HORIZONTALLY DIRECTIONALLY DRILLING
 - PIPE TO BE INSTALLED BY OPEN CUT
 - HORIZONTAL DISTANCE FROM EDGE OF ROADWAY
 - REQ'D LAUNCHING AND RECEIVING PIT FOR HORIZONTAL DIRECTIONAL DRILLING
 - REQ'D FULLY RESTRAINED GATE VALVE WITH STEM EXTENSION PER DETAIL
 - REQ'D AIR RELEASE VALVE AND VAULT PER DETAIL
 - REQ'D VERTICAL CURVE. SEE CURVE TABLE ON SHEET G-102 FOR ADDITIONAL REQUIREMENTS AND INFORMATION.
 - REQUIRED 3" ARUNDEL SEWER FORCE MAIN (BY OTHERS) TO DISCHARGE IN BREWSTER FORCE MAIN INTO FAUBORG NO. 2 LIFT STATION



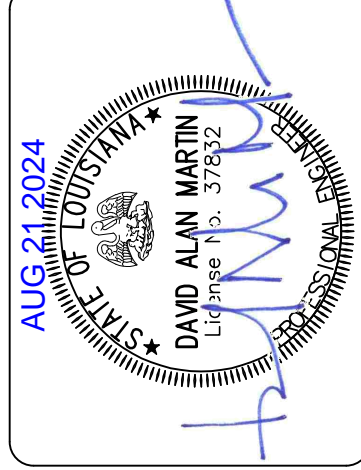
STATION	EXIST GND EL	VERTICAL PIPE GEOMETRY	PIPE ELEV DATA (COVER INV)
4.98(C)	16.03	288' @ -0.0%	9.88(I)
5.28(C)	16.33	80.52'	9.88(I)
8.52(C)	17.56	80.27'	7.87(I)
10.52(C)	17.96	80.27'	6.27(I)
13.83(C)	17.66	1273' @ -0.0%	2.67(I)
12.00(C)	15.81		2.65(I)



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

NO.	DATE	DESCRIPTION OF REVISION
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DESIGNED BY:	M. LOKER
DRAWN BY:	J. HITT
CHECKED BY:	J. CATLANOTTO
PROJECT NO.:	FAIRWAY CE 175, 177, DU 168, 170.
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED



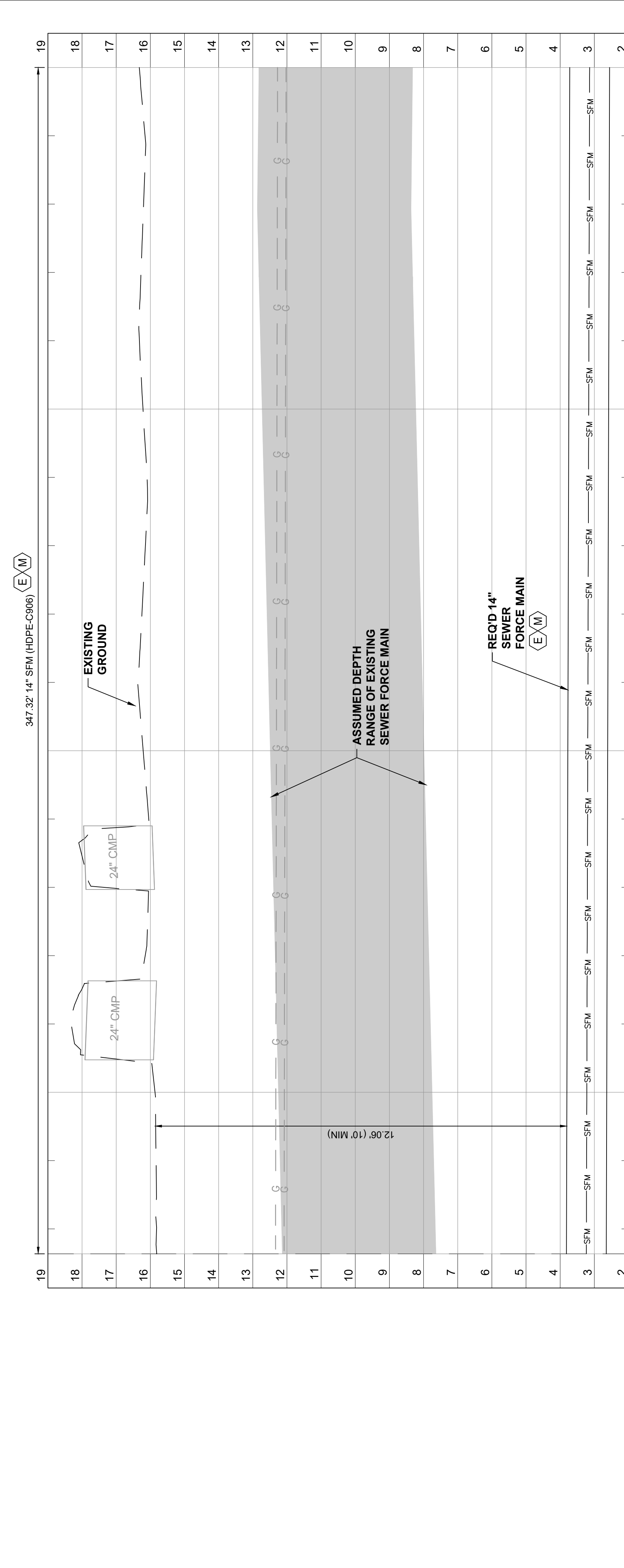
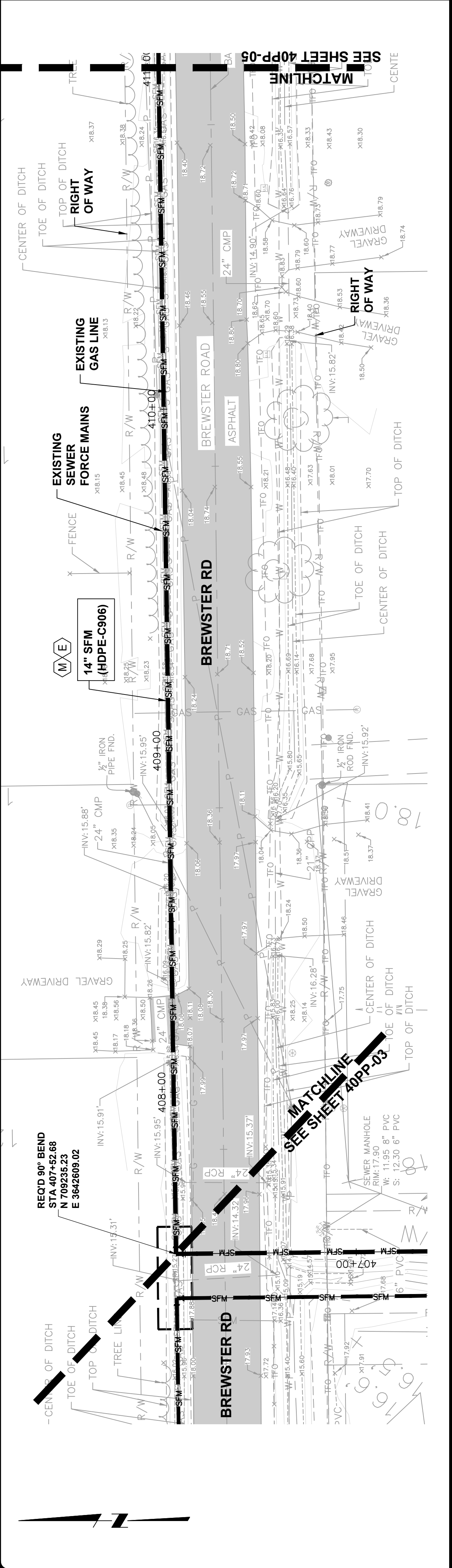
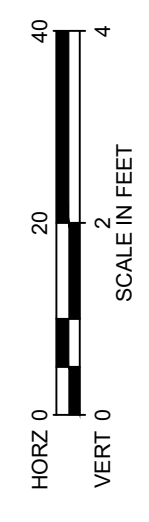
BREWSTER ROAD SEWER
CONSOLIDATION
FORCE MAIN PLAN & PROFILES - BASELINE 400 - IV

SHEET NO.
40PP-04

- ### PLAN AND PROFILE GENERAL NOTES
- PLAN AND PROFILE DRAWING DRAWINGS BASED UPON SURVEY TITLED "ST. TAMMANY SEWER CONSOLIDATION SURVEY - FAIRFIELD OAKS, THREE RIVERS, AND TCHEFUNCTE PARK" PREPARED BY ALL - SOUTH CONSULTING ENGINEERS, DATED JULY 2023 AND AS-BUILT DRAINAGE PLAN FOR ARUNDEL SUBDIVISION
 - AT EACH LOCATION WHERE THE REQUIRED SEWER FORCE MAIN CROSSES AN EXISTING UTILITY, OR TIES INTO AN EXISTING UTILITY, CONDUCT EXPLORATORY EXCAVATIONS AS NECESSARY TO POSITIVELY DETERMINE LOCATION, ELEVATION, AND SIZE OF UTILITY CONDUIT SUCH AS EXPLORATORY EXCAVATIONS AND REPORT FINDINGS TO ENGINEER PRIOR TO ANY HORIZONTAL DIRECTIONAL DRILLING OPERATIONS. COORDINATE WITH THE ENGINEER IN ADJUSTING THE ALIGNMENT OF THE REQUIRED PIPELINE TO MAINTAIN REQUIRED CLEARANCES. THE CONTRACTOR WILL NOT BE ENTITLED TO ANY ADJUSTMENT IN PAY FOR SUCH ADJUSTMENTS EXCEPT FOR ADDITIONAL QUANTITIES.
 - PROVIDE TEMPORARY TRAFFIC CONTROLS PER THE ACCEPTED TEMPORARY TRAFFIC CONTROL PLAN. SEE SPECIFICATIONS AND MINIMUM STANDARDS FOR ADDITIONAL REQUIREMENTS.
 - PIPE SIZES NOTED ON PLANS REFERENCE NOMINAL PIPE DIAMETER.
 - REFER TO PIPE SCHEDULE FOR ADDITIONAL REQUIREMENTS.
 - CONTRACTOR TO MAINTAIN A MINIMUM 6' HORIZONTAL AND 18" VERTICAL SEPARATION BETWEEN SEWER FORCE MAIN AND WATER MAIN.
 - NOT ALL NOTES BY SYMBOL USED ON THIS SHEET.

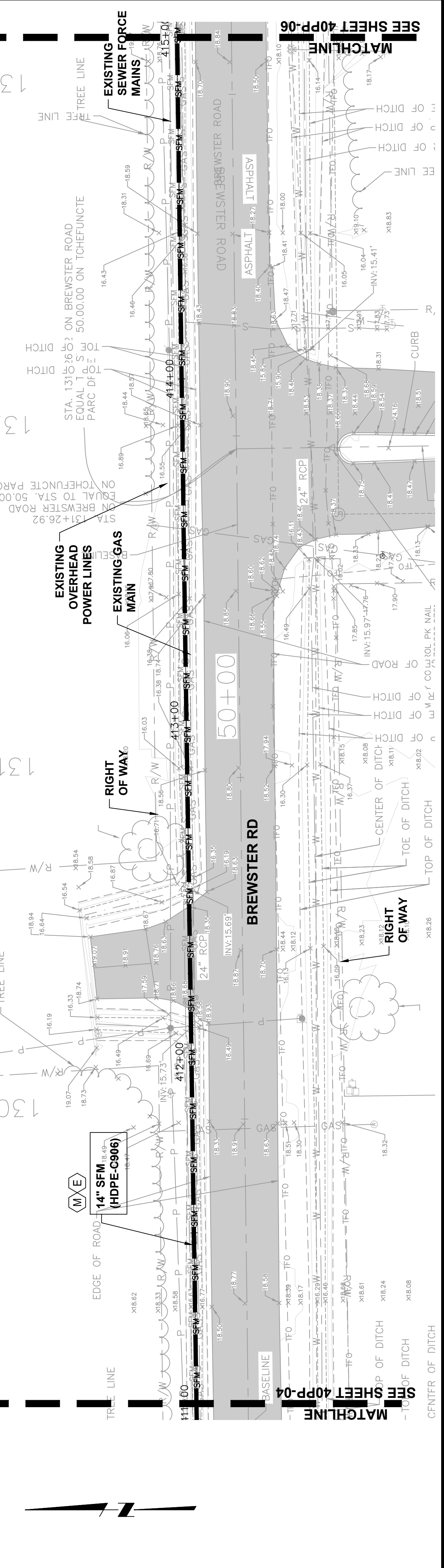
PLAN AND PROFILE NOTES BY SYMBOLS

- REQ'D 12" BREWSTER RD. SFM TO DISCHARGE INTO TCHEFUNCTE PARC SPS
- REQ'D 4" FAIRFIELD OAKS SEWER FORCE MAIN TO DISCHARGE INTO BREWSTER RD. SFM
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- REQ'D FULLY RESTRAINED GATE VALVE WITH STEM EXTENSION PER DETAIL
- REQ'D AIR RELEASE VALVE AND VAULT PER DETAIL
- REQ'D VERTICAL CURVE. SEE CURVE TABLE ON SHEET G-102 FOR ADDITIONAL REQUIREMENTS AND INFORMATION.
- REQUIRED 3" ARUNDEL SEWER FORCE MAIN (BY OTHERS) TO DISCHARGE IN BREWSTER FORCE MAIN
- REQ'D 14" TCHEFUNCTE PARC SFM TO DISCHARGE INTO FAUBORG NO. 2 LIFT STATION



STATION	EXIST GND EL	VERTICAL PIPE GEOMETRY	PIPE ELEV DATA (COVER INV)
407+53	15.81		12.00(C) 407+52.68
408+00	15.86		2.64(I) 12.06(C)
409+00	16.21		2.61(I) 12.43(C)
410+00	16.22		2.58(I) 12.47(C)
411+00	16.32		2.55(I) 12.60(C)

1273 @ -0.0%



STATION	EXIST GND EL	VERTICAL PIPE GEOMETRY	PIPE ELEV DATA (COVER INV)
411+00	16.32		12.60(C) 411+00.00
412+00	16.42	REQD 14" SEWER FORCE MAIN (E)(M)	12.73(C) 412+00.00
413+00	16.26		12.60(C) 413+00.00
414+00			12.60(C) 414+00.00
415+00	16.49		12.88(C) 415+00.00

STATION	VERTICAL PIPE GEOMETRY	PIPE ELEV DATA (COVER INV)
411+00		12.60(C) 411+00.00
412+00	1273' @ -0.0%	12.73(C) 412+00.00
413+00		12.60(C) 413+00.00
414+00		12.60(C) 414+00.00
415+00		12.88(C) 415+00.00

- PLAN AND PROFILE GENERAL NOTES**
- PLAN AND PROFILE DRAWING BASED UPON SURVEY TITLED "ST. TAMMANY SEWER CONSOLIDATION SURVEY - FAIRFIELD OAKS, THREE RIVERS, AND TCHEFUNCTE PARK" PREPARED BY ALL - SOUTH CONSULTING ENGINEERS, DATED JULY 2023 AND AS-BUILT DRAINAGE PLAN FOR ARUNDEL SUBDIVISION
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 - PIPE SIZES NOTED ON PLANS REFERENCE NOMINAL PIPE DIAMETER.
 - REFER TO PIPE SCHEDULE FOR ADDITIONAL REQUIREMENTS.
 - CONTRACTOR TO MAINTAIN A MINIMUM 6" HORIZONTAL AND 18" VERTICAL SEPARATION BETWEEN SEWER FORCE MAIN AND WATER MAIN.
 - NOT ALL NOTES BY SYMBOL USED ON THIS SHEET.

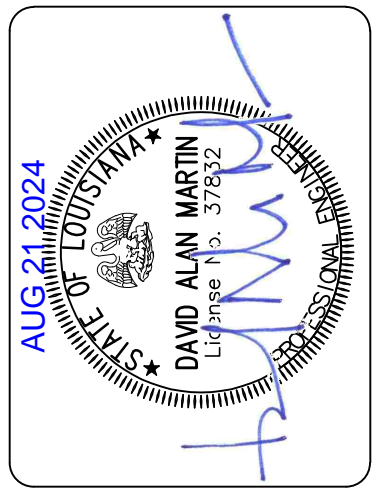
- PLAN AND PROFILE NOTES BY SYMBOLS**
- REQD 12" BREWSTER RD. SFM TO DISCHARGE INTO TCHEFUNCTE PARC SPS
 - REQD 4" FAIRFIELD OAKS SEWER FORCE MAIN TO DISCHARGE INTO BREWSTER RD. SFM
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 - PIPE TO BE INSTALLED BY HORIZONTALLY DIRECTIONALLY DRILLING
 - PIPE TO BE INSTALLED BY OPEN CUT
 - HORIZONTAL DISTANCE FROM EDGE OF ROADWAY
 - REQD LAUNCHING AND RECEIVING PIT FOR HORIZONTAL DIRECTIONAL DRILLING
 - REQD FULLY RESTRAINED GATE VALVE WITH STEM EXTENSION PER DETAIL
 - REQD AIR RELEASE VALVE AND VAULT PER DETAIL
 - REQD VERTICAL CURVE. SEE CURVE TABLE ON SHEET G-102 FOR ADDITIONAL REQUIREMENTS AND INFORMATION.
 - REQUIRED 3" ARUNDEL SEWER FORCE MAIN (BY OTHERS) TO DISCHARGE IN BREWSTER FORCE MAIN
 - REQD 14" TCHEFUNCTE PARC SFM TO DISCHARGE INTO FAUBORG NO. 2 LIFT STATION



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

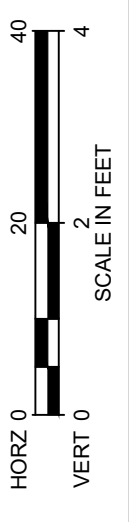
DESCRIPTION OF REVISION	DATE

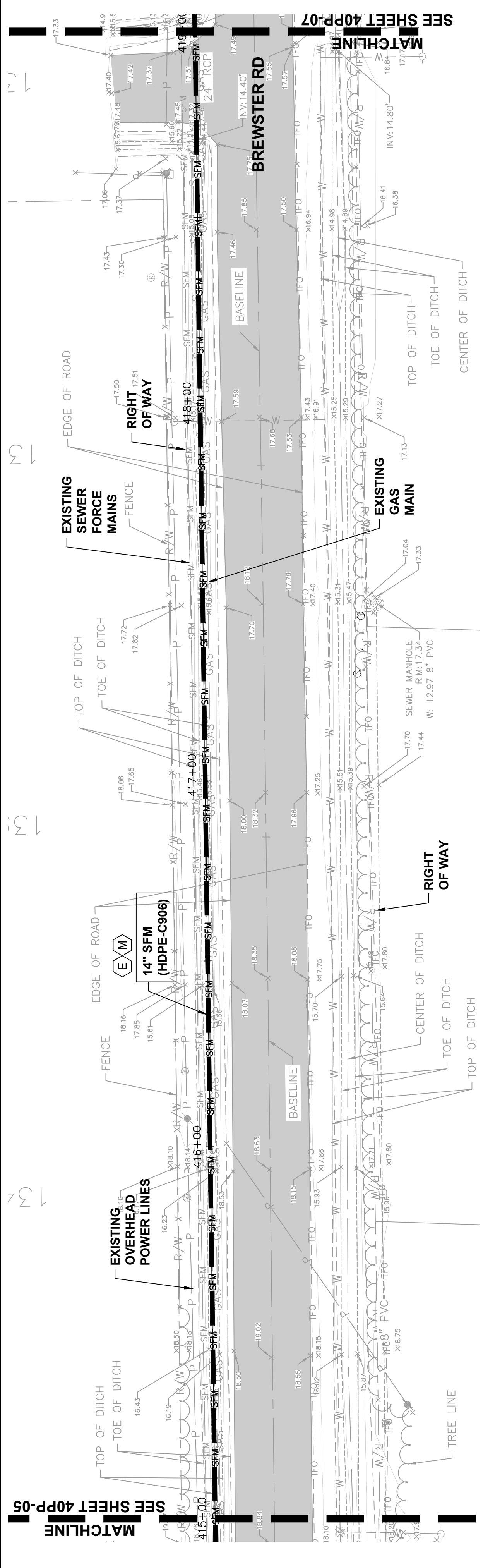
DESIGNED BY: M. LOKER	CHECKED BY: J. CATLANOTTO	PROJECT No.: DU 168,170.	ISSUE DATE: 08/20/2024	APPROVED BY: D. MARTIN	SHEET SIZE: ANSI D 34x22	SCALE: AS NOTED
DRAWN BY: J. HITT	SUBMITTED BY: FARWAY CE	PROJECT No.: 175, 177	ISSUE DATE: 08/20/2024	APPROVED BY: D. MARTIN	SHEET SIZE: ANSI D 34x22	SCALE: AS NOTED



BREWSTER ROAD SEWER
CONSOLIDATION
FORCE MAIN PLAN & PROFILES - BASELINE 400 - V

SHEET NO.
40PP-05



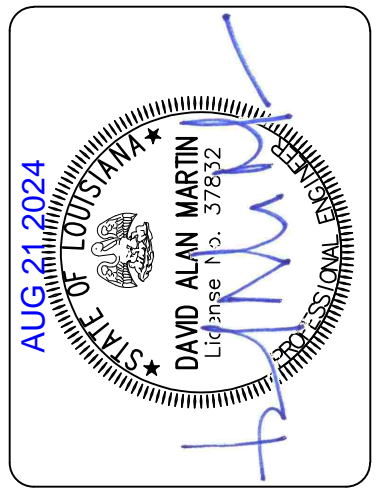


- PLAN AND PROFILE GENERAL NOTES**
- PLAN AND PROFILE DRAWING BASED UPON SURVEY TITLED "ST. TAMMANY SEWER CONSOLIDATION SURVEY - FAIRFIELD OAKS, THREE RIVERS, AND TCHEFUNCTE PARK" PREPARED BY ALL - SOUTH CONSULTING ENGINEERS, DATED JULY 2023 AND AS-BUILT DRAINAGE PLAN FOR ARUNDEL SUBDIVISION
 - AT EACH LOCATION WHERE THE REQUIRED SEWER FORCE MAIN CROSSES AN EXISTING UTILITY, OR TIES INTO AN EXISTING UTILITY CONDUIT EXPLORATORY EXCAVATIONS AS NECESSARY TO POSITIVELY DETERMINE LOCATION, ELEVATION, AND SIZE OF UTILITY CONDUIT SUCH AS EXPLORATORY EXCAVATIONS AND REPORT FINDINGS TO ENGINEER PRIOR TO ANY HORIZONTAL DIRECTIONAL DRILLING OPERATIONS. COORDINATE WITH THE ENGINEER IN ADJUSTING THE ALIGNMENT OF THE REQUIRED PIPELINE TO MAINTAIN REQUIRED CLEARANCES. THE CONTRACTOR WILL NOT BE ENTITLED TO ANY ADJUSTMENT IN PAY FOR SUCH ADJUSTMENTS EXCEPT FOR ADDITIONAL QUANTITIES.
 - PROVIDE TEMPORARY TRAFFIC CONTROL THE ACCEPTED TEMPORARY TRAFFIC CONTROL PLAN. SEE SPECIFICATIONS AND MINIMUM STANDARDS FOR ADDITIONAL REQUIREMENTS.
 - PIPE SIZES NOTED ON PLANS REFERENCE NOMINAL PIPE DIAMETER.
 - REFER TO PIPE SCHEDULE FOR ADDITIONAL REQUIREMENTS.
 - CONTRACTOR TO MAINTAIN A MINIMUM 6' HORIZONTAL AND 18" VERTICAL SEPARATION BETWEEN SEWER FORCE MAIN AND WATER MAIN.
 - NOT ALL NOTES BY SYMBOL USED ON THIS SHEET.



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DESIGNED BY: M. LOKER	DRAWN BY: J. HITT	CHECKED BY: J. CATLANOTTO	PROJECT No.: DU 168,170.	ISSUE DATE: 08/20/2024	APPROVED BY: D. MARTIN	SHEET SIZE: ANSI D 34x22	SCALE: AS NOTED
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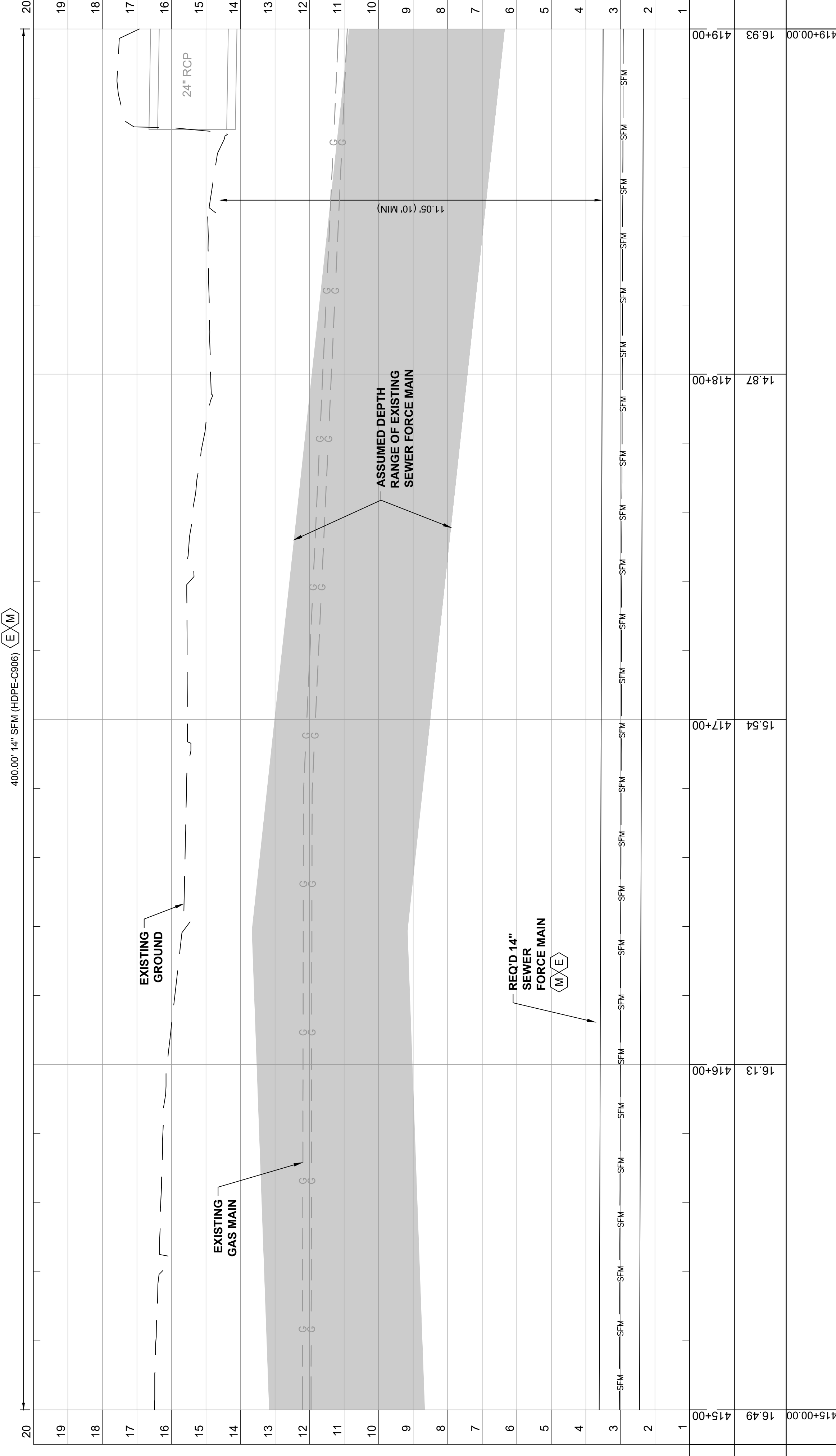


BREWSTER ROAD SEWER CONSOLIDATION
FORCE MAIN PLAN & PROFILES - BASELINE - VI

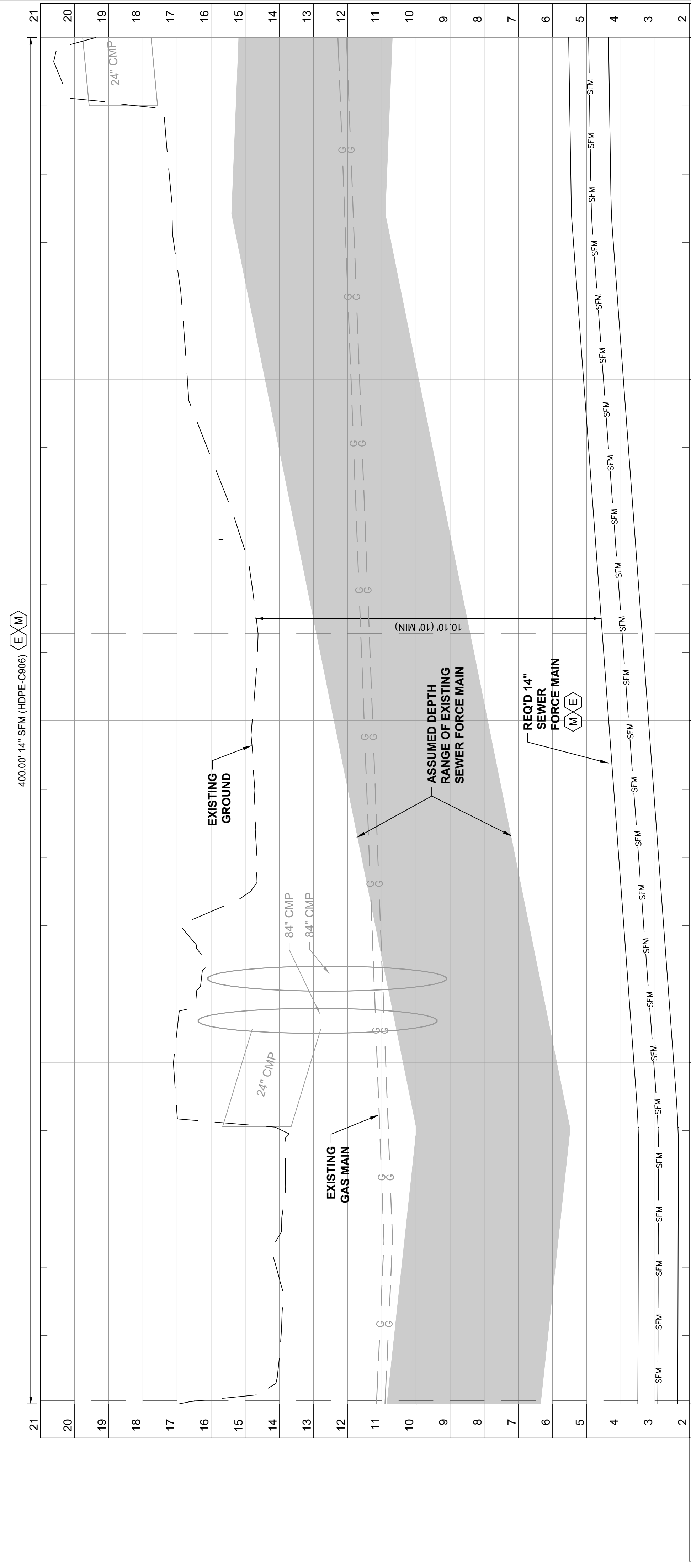
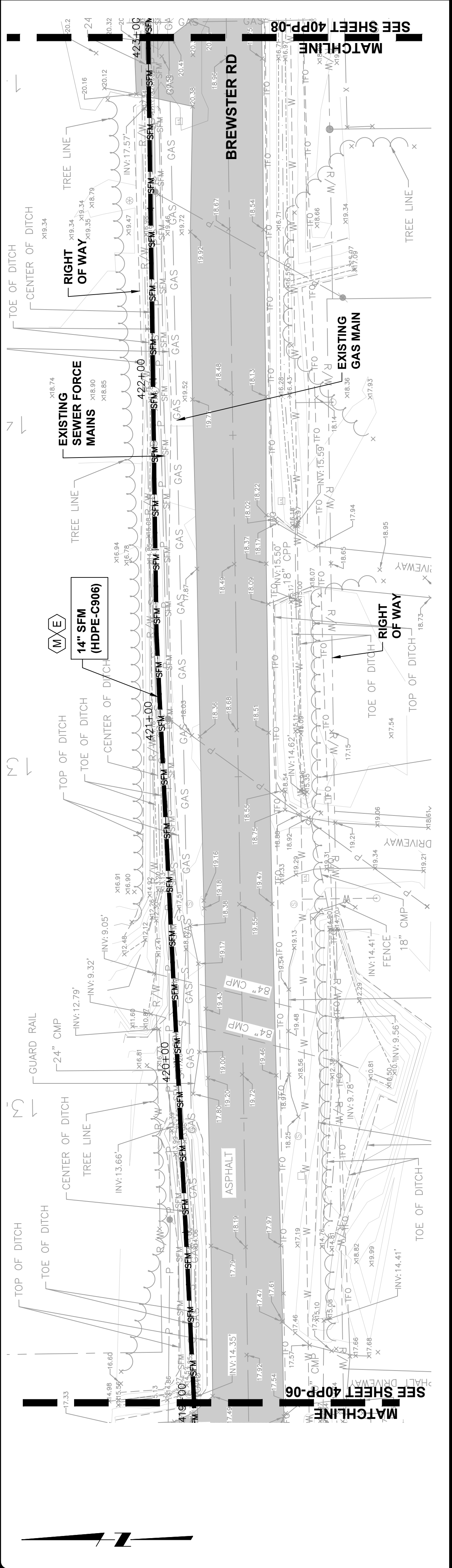
SHEET NO.
40PP-06



- PLAN AND PROFILE NOTES BY SYMBOLS**
- REQD 12" BREWSTER RD. SFM TO DISCHARGE INTO TCHEFUNCTE PARC SPS
 - REQD 4" FAIRFIELD OAKS SEWER FORCE MAIN TO DISCHARGE INTO BREWSTER RD. SFM
 - REQD 4" THREE RIVERS SFM TO DISCHARGE INTO BREWSTER RD. SFM.
 - REQD 12" TCHEFUNCTE PARC SFM TO DISCHARGE TO FAUBORG NO 2 SPS.
 - PIPE TO BE INSTALLED BY HORIZONTALLY DIRECTIONALLY DRILLING
 - PIPE TO BE INSTALLED BY OPEN CUT
 - HORIZONTAL DISTANCE FROM EDGE OF ROADWAY
 - REQD LAUNCHING AND RECEIVING PIT FOR HORIZONTAL DIRECTIONAL DRILLING
 - REQD FULLY RESTRAINED GATE VALVE WITH STEM EXTENSION PER DETAIL
 - REQD AIR RELEASE VALVE AND VAULT PER DETAIL
 - REQD VERTICAL CURVE. SEE CURVE TABLE ON SHEET G-102 FOR ADDITIONAL REQUIREMENTS AND INFORMATION.
 - REQUIRED 3" ARUNDEL SEWER FORCE MAIN (BY OTHERS) TO DISCHARGE IN BREWSTER FORCE MAIN
 - REQD 14" TCHEFUNCTE PARC SFM TO DISCHARGE INTO FAUBORG NO. 2 LIFT STATION



STATION	EXIST GND EL	VERTICAL PIPE GEOMETRY	PIPE ELEV DATA (COVER INV)
415+00	16.49		2.44(I) 12.88(C)
416+00	16.13		2.42(I) 12.54(C)
417+00	15.54		2.39(I) 11.98(C)
418+00	14.87		2.36(I) 11.34(C)
419+00	16.93		2.33(C) 13.43(C)



STATION	EXIST GND EL	VERTICAL PIPE GEOMETRY	PIPE ELEV DATA (COVER / INV)
419+00	16.93	1273' @ -0.0%	2.33(C) / 419+00.00
419+25	17.03	15.30'	2.37(I) / 419+88.59
420+00	17.10	260' @ 0.7%	2.45(I) / 420+00.00
421+00	14.80	10.44(C)	3.19(I) / 421+00.00
422+00	16.69	11.60(C)	3.93(I) / 422+00.00
422+48.17	17.14	11.69(C)	4.22+48.17
423+00	19.38	1559' @ 0.2%	4.36(I) / 423+00.00

- PLAN AND PROFILE GENERAL NOTES**
- PLAN AND PROFILE DRAWING DRAWINGS BASED UPON SURVEY TITLED "ST. TAMMANY SEWER CONSOLIDATION SURVEY - FAIRFIELD OAKS, THREE RIVERS, AND TCHEFUNCTE PARK" PREPARED BY ALL - SOUTH CONSULTING ENGINEERS, DATED JULY 2023 AND AS-BUILT DRAINAGE PLAN FOR ARUNDEL SUBDIVISION
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 - PIPE SIZES NOTED ON PLANS REFERENCE NOMINAL PIPE DIAMETER.
 - REFER TO PIPE SCHEDULE FOR ADDITIONAL REQUIREMENTS.
 - CONTRACTOR TO MAINTAIN A MINIMUM 6' HORIZONTAL AND 18" VERTICAL SEPARATION BETWEEN SEWER FORCE MAIN AND WATER MAIN.
 - NOT ALL NOTES BY SYMBOL USED ON THIS SHEET.

- PLAN AND PROFILE NOTES BY SYMBOLS**
- REQD 12" BREWSTER RD. SFM TO DISCHARGE INTO TCHEFUNCTE PARC SPS
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 - REQD 12" TCHEFUNCTE PARC SFM TO DISCHARGE TO FAUBOURG NO 2 SPS.
 - PIPE TO BE INSTALLED BY HORIZONTALLY DIRECTIONALLY DRILLING
 - PIPE TO BE INSTALLED BY OPEN CUT
 - HORIZONTAL DISTANCE FROM EDGE OF ROADWAY
 - REQD LAUNCHING AND RECEIVING PIT FOR HORIZONTAL DIRECTIONAL DRILLING
 - REQD FULLY RESTRAINED GATE VALVE WITH STEM EXTENSION PER DETAIL
 - REQD AIR RELEASE VALVE AND VAULT PER DETAIL
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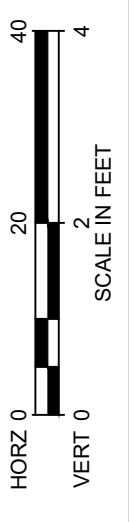
DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

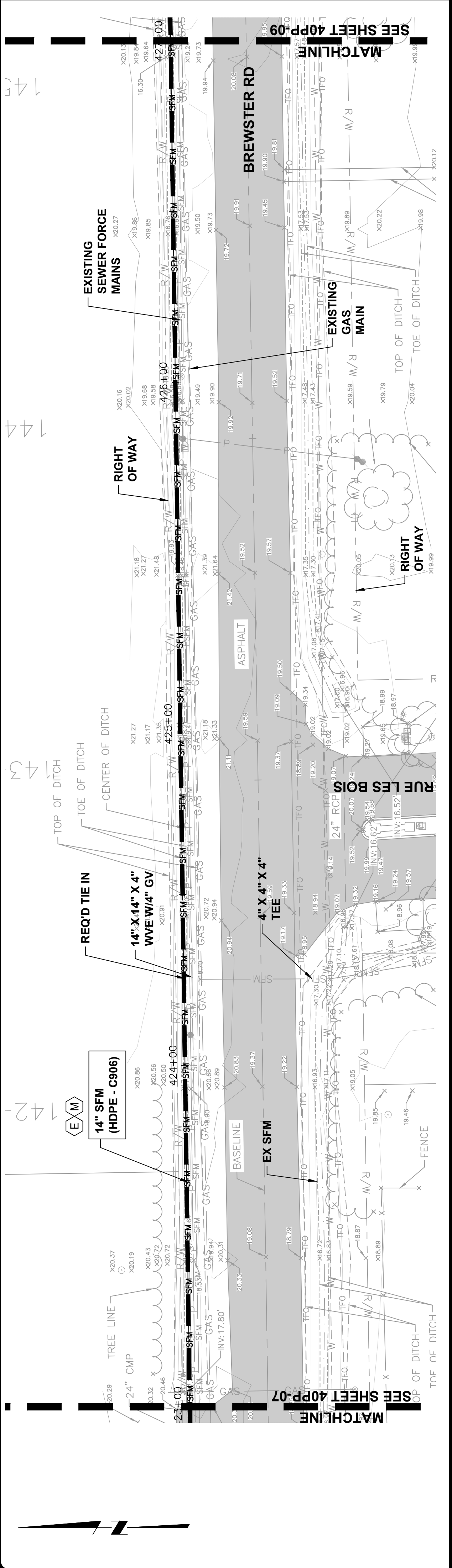
DESCRIPTION OF REVISION	DATE

DESIGNED BY: M. LOKER
DRAWN BY: J. HITT
CHECKED BY: J. CATLANOTTO
SUBMITTED BY: FAIRWAY CE
PROJECT No.: DU 168,170.
ISSUE DATE: 08/20/2024
APPROVED BY: D. MARTIN
SHEET SIZE: ANSI D 34x22
SCALE: AS NOTED

BREWSTER ROAD SEWER
CONSOLIDATION
VII
SEWER FORCE MAIN PLAN & PROFILES - BASELINE -

SHEET NO.
40PP-07





- PLAN AND PROFILE GENERAL NOTES**
- PLAN AND PROFILE DRAWING DRAWINGS BASED UPON SURVEY TITLED "ST. TAMMANY SEWER CONSOLIDATION SURVEY - FAIRFIELD OAKS, THREE RIVERS, AND TCHEFUNCTE PARK" PREPARED BY ALL - SOUTH CONSULTING ENGINEERS, DATED JULY 2023 AND AS-BUILT DRAINAGE PLAN FOR ARUNDEL SUBDIVISION
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 - REFER TO PIPE SCHEDULE FOR ADDITIONAL REQUIREMENTS.
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 - NOT ALL NOTES BY SYMBOL USED ON THIS SHEET.



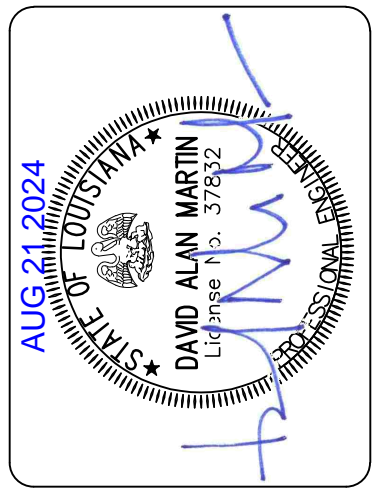
DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

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PLAN AND PROFILE NOTES BY SYMBOLS

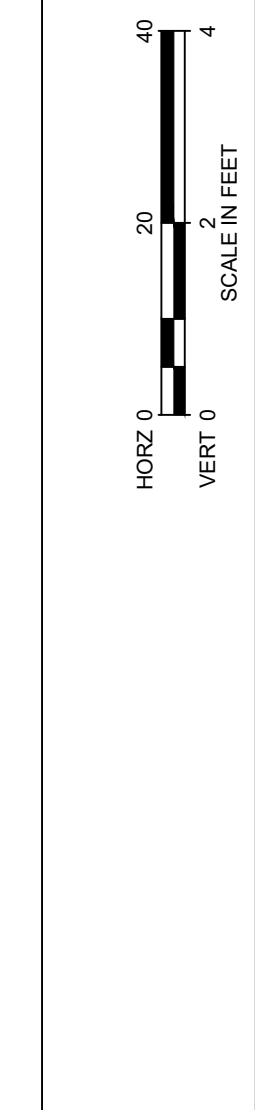
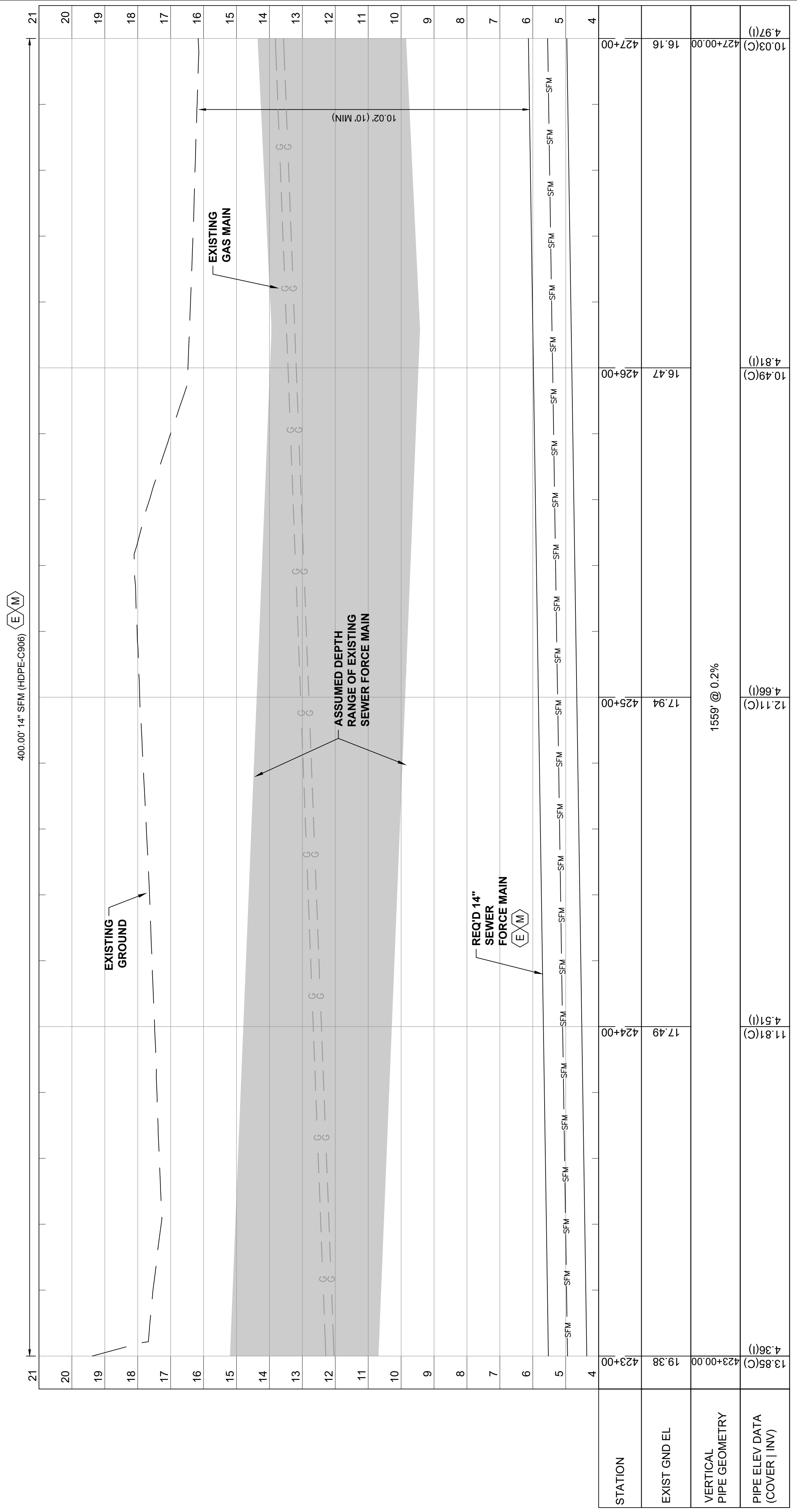
- REQD 12" BREWSTER RD. SFM TO DISCHARGE INTO TCHEFUNCTE PARC SPS
- REQD 4" FAIRFIELD OAKS SEWER FORCE MAIN TO DISCHARGE INTO BREWSTER RD. SFM
- REQD 4" THREE RIVERS SFM TO DISCHARGE INTO BREWSTER RD. SFM
- REQD 12" TCHEFUNCTE PARC SFM TO DISCHARGE TO FAUBOURG NO 2 SPS.
- PIPE TO BE INSTALLED BY HORIZONTALLY DIRECTIONALLY DRILLING
- PIPE TO BE INSTALLED BY OPEN CUT
- HORIZONTAL DISTANCE FROM EDGE OF ROADWAY
- REQD LAUNCHING AND RECEIVING PIT FOR HORIZONTAL DIRECTIONAL DRILLING
- REQD FULLY RESTRAINED GATE VALVE WITH STEM EXTENSION PER DETAIL
- REQD AIR RELEASE VALVE AND VAULT PER DETAIL
- REQD VERTICAL CURVE. SEE CURVE TABLE ON SHEET G-102 FOR ADDITIONAL REQUIREMENTS AND INFORMATION.
- REQUIRED 3" ARUNDEL SEWER FORCE MAIN (BY OTHERS) TO DISCHARGE IN BREWSTER FORCE MAIN
- REQD 14" TCHEFUNCTE PARC SFM TO DISCHARGE INTO FAUBORG NO. 2 LIFT STATION

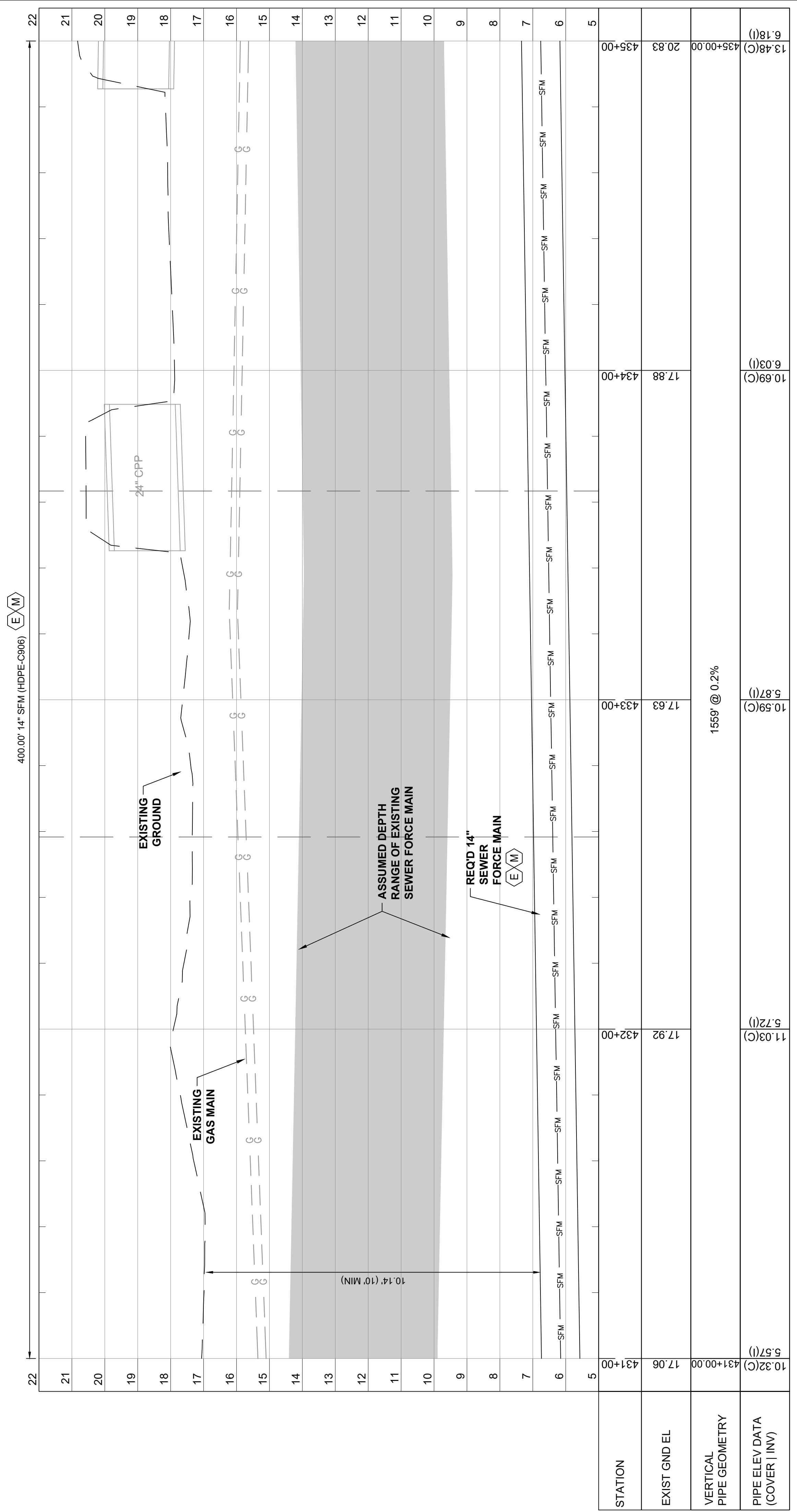
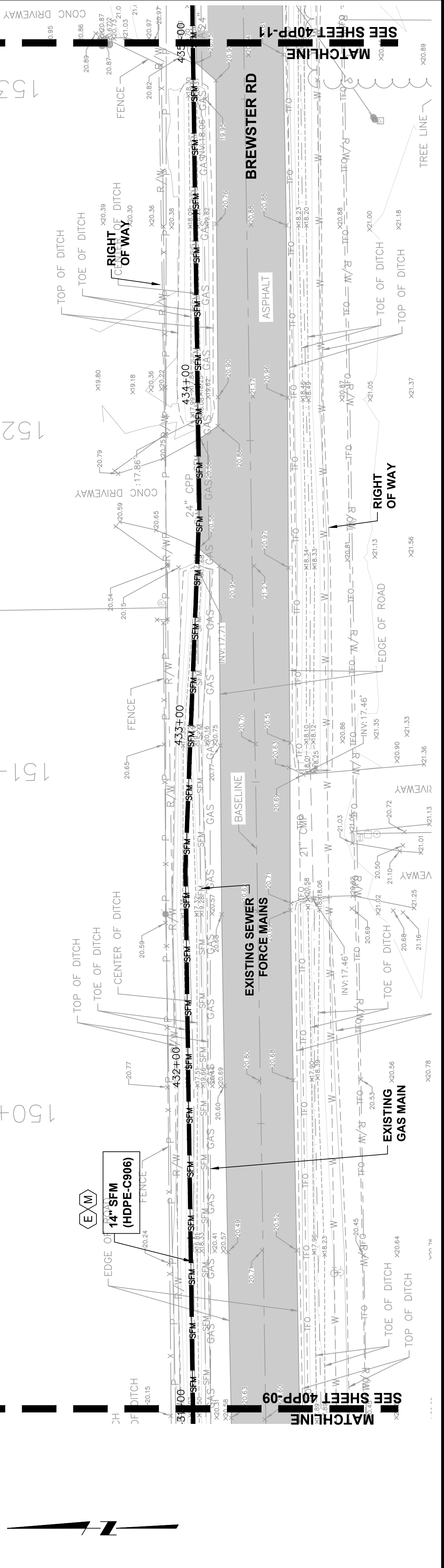
DESIGNED BY:	M. LOKER
CHECKED BY:	J. CATLANOTTO
SUBMITTED BY:	FAIRWAY CE
PROJECT No.:	DU 168,170.
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED



BREWSTER ROAD SEWER
CONSOLIDATION
400 - VIII
SEWER FORCE MAIN PLAN & PROFILES - BASELINE

SHEET NO.
40PP-08

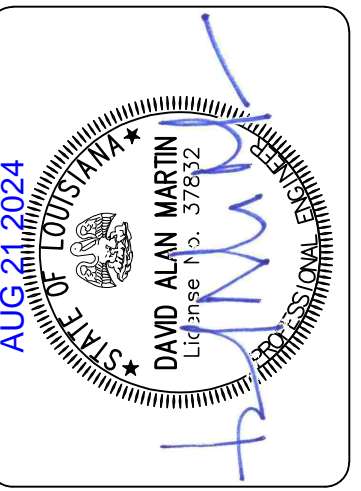




DEPT. OF UTILITIES
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GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

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DESIGNED BY:	M. LOKER
CHECKED BY:	J. HITT
SUBMITTED BY:	J. CATLANOTTO
PROJECT No.:	DU 168,170.
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED

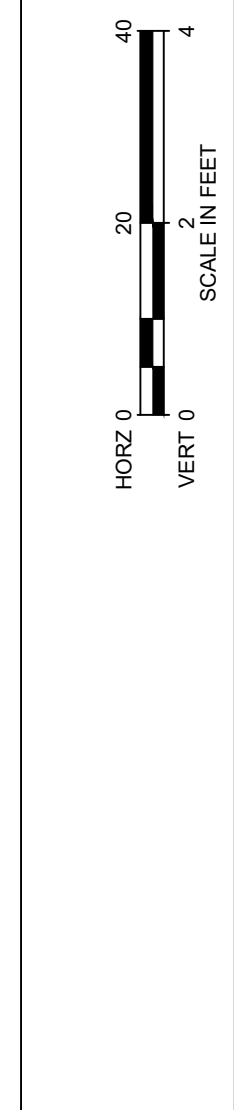


BREWSTER ROAD SEWER
CONSOLIDATION
400 - X
SEWER FORCE MAIN PLAN & PROFILES - BASELINE

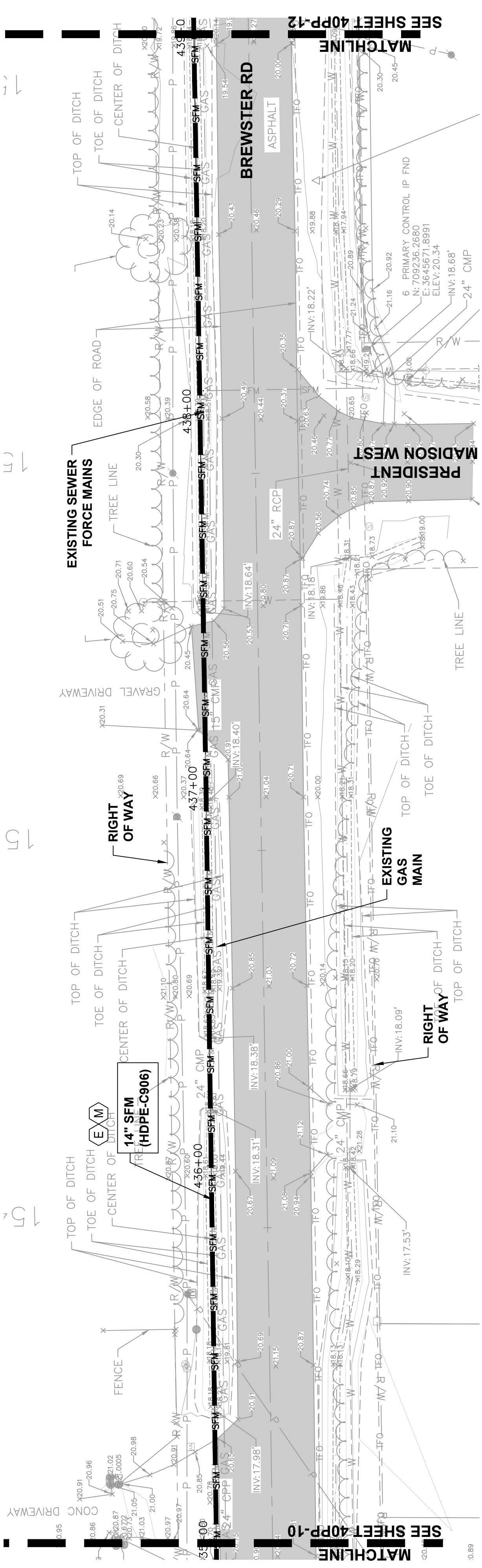
SHEET NO.
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- PLAN AND PROFILE GENERAL NOTES**
- PLAN AND PROFILE DRAWING DRAWINGS BASED UPON SURVEY TITLED "ST. TAMMANY SEWER CONSOLIDATION SURVEY - FAIRFIELD OAKS, THREE RIVERS, AND TCHEFUNCTE PARK" PREPARED BY ALL - SOUTH CONSULTING ENGINEERS, DATED JULY 2023 AND AS-BUILT DRAINAGE PLAN FOR ARUNDEL SUBDIVISION
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 - CONTRACTOR TO MAINTAIN A MINIMUM 6' HORIZONTAL AND 18" VERTICAL SEPARATION BETWEEN SEWER FORCE MAIN AND WATER MAIN.
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- REQD 12" BREWSTER RD. SFM TO DISCHARGE INTO TCHEFUNCTE PARC SPS
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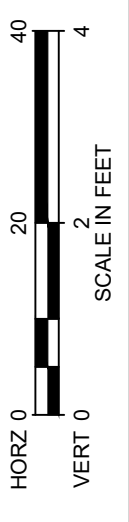
STATION	EXIST GND EL	VERTICAL PIPE GEOMETRY	PIPE ELEV DATA (COVER INV)
431+00	17.06		5.57(I) 10.32(C)
432+00	17.92		5.72(I) 11.03(C)
433+00	17.63	1559' @ 0.2%	5.87(I) 10.59(C)
434+00	17.88		6.03(I) 10.69(C)
435+00	20.83		6.18(I) 13.48(C)



STATION	EXIST GND EL	VERTICAL PIPE GEOMETRY	PIPE ELEV DATA (COVER INV)
435+00	6.18(1)		13.48(C)
20.83	18.10		6.33(1)
436+00	18.10		10.61(C)
437+00	20.21	1559' @ 0.2%	12.56(C)
438+00	18.15		6.63(C)
438+07.02	18.11		6.64(1)
438+70.21	17.97		7.84(C)
65.04'			8.96(1)
439+00.00	18.10		6.33(C)
10.61(1)			10.61(1)

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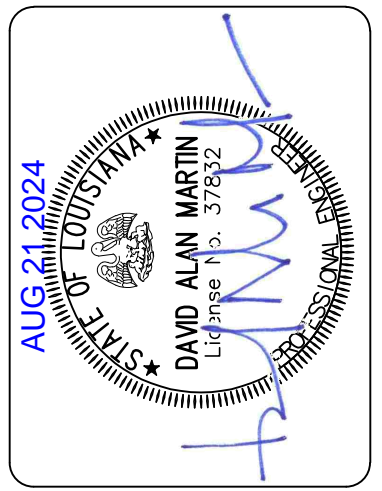
- PLAN AND PROFILE NOTES BY SYMBOLS**
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DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

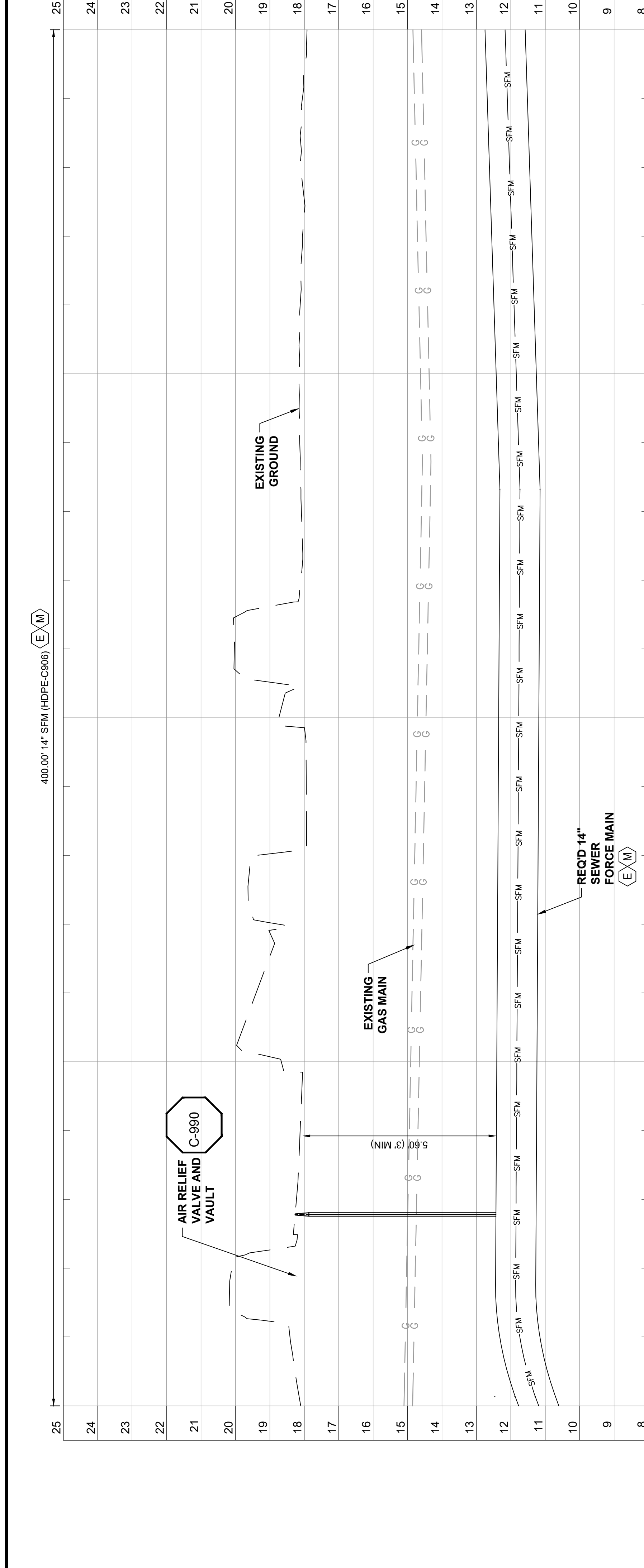
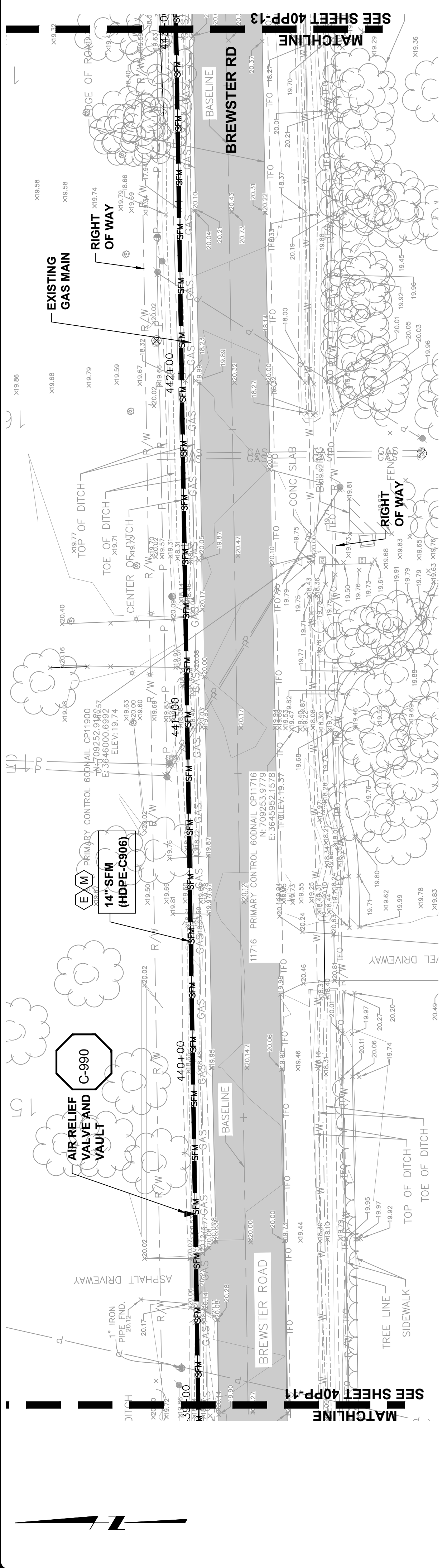
NO.	DATE	DESCRIPTION OF REVISION
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DESIGNED BY:	M. LOKER
CHECKED BY:	J. CATLANOTTO
SUBMITTED BY:	FAIRWAY CE
PROJECT No.:	DU 168,170.
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED



BREWSTER ROAD SEWER
CONSOLIDATION
SEWER FORCE MAIN PLAN & PROFILES - BASELINE
400 - XI

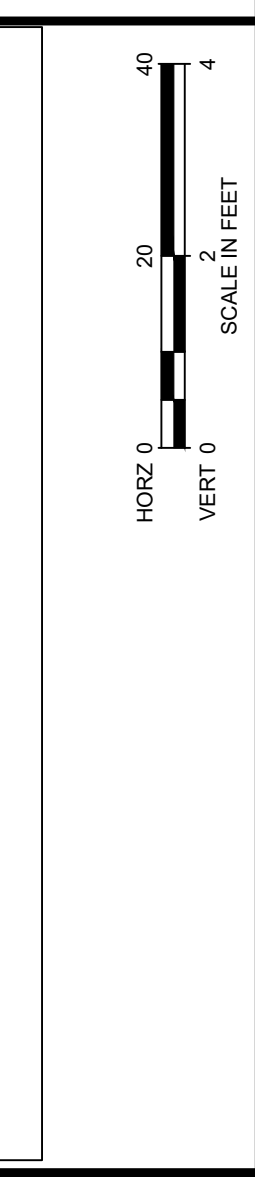
SHEET NO.
40PP-11



STATION	EXIST GND EL	VERTICAL PIPE GEOMETRY	PIPE ELEV DATA (COVER INV)
439+00	18.10	65.04'	6.33(C) 4.99+34.78
440+00	18.66		6.26(C) 11.28(I)
441+00	18.74	231' @ -0.1%	6.39(C) 11.19(I)
442+00	18.15	542' @ 0.3%	5.73(C) 11.15(I)
443+00	17.92		5.17(C) 11.58(I)

- PLAN AND PROFILE GENERAL NOTES**
- PLAN AND PROFILE DRAWING DRAWINGS BASED UPON SURVEY TITLED "ST. TAMMANY SEWER CONSOLIDATION SURVEY - FAIRFIELD OAKS, THREE RIVERS, AND TCHEFUNCTE PARK" PREPARED BY ALL - SOUTH CONSULTING ENGINEERS, DATED JULY 2023 AND AS-BUILT DRAINAGE PLAN FOR ARUNDEL SUBDIVISION.
 - AT EACH LOCATION WHERE THE REQUIRED SEWER FORCE MAIN CROSSES AN EXISTING UTILITY, OR TIES INTO AN EXISTING UTILITY, CONDUCT EXPLORATORY EXCAVATIONS AS NECESSARY TO POSITIVELY DETERMINE LOCATION, ELEVATION, AND SIZE OF UTILITY, CONDUIT SUCH AS EXPLORATORY EXCAVATIONS AND REPORT FINDINGS TO ENGINEER PRIOR TO ANY HORIZONTAL DIRECTIONAL DRILLING OPERATIONS. COORDINATE WITH THE ENGINEER IN ADJUSTING MAINTAIN REQUIRED CLEARANCES. THE CONTRACTOR WILL NOT BE ENTITLED TO ANY ADJUSTMENT IN PAY FOR SUCH ADJUSTMENTS EXCEPT FOR ADDITIONAL QUANTITIES.
 - PROVIDE TEMPORARY TRAFFIC CONTROLS PER THE ACCEPTED TEMPORARY TRAFFIC CONTROL PLAN. SEE SPECIFICATIONS AND MINIMUM STANDARDS FOR ADDITIONAL REQUIREMENTS.
 - PIPE SIZES NOTED ON PLANS REFERENCE NOMINAL PIPE DIAMETER.
 - REFER TO PIPE SCHEDULE FOR ADDITIONAL REQUIREMENTS.
 - CONTRACTOR TO MAINTAIN A MINIMUM 6' HORIZONTAL AND 18" VERTICAL SEPARATION BETWEEN SEWER FORCE MAIN AND WATER MAIN.
 - NOT ALL NOTES BY SYMBOL USED ON THIS SHEET.

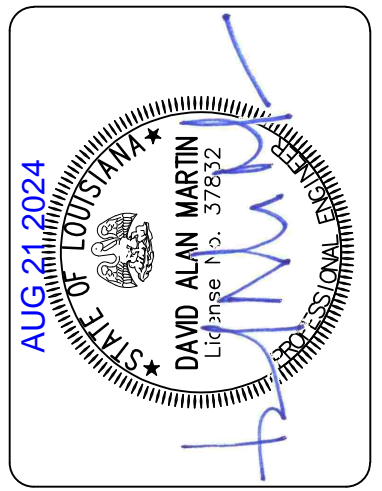
- PLAN AND PROFILE NOTES BY SYMBOLS**
- REQ'D 12" BREWSTER RD. SFM TO DISCHARGE INTO TCHEFUNCTE PARC SPS
 - REQ'D 4" FAIRFIELD OAKS SEWER FORCE MAIN TO DISCHARGE INTO BREWSTER RD. SFM
 - REQ'D 4" THREE RIVERS SFM TO DISCHARGE INTO BREWSTER RD. SFM.
 - REQ'D 12" TCHEFUNCTE PARC SFM TO DISCHARGE TO FAUBOURG NO 2 SPS.
 - PIPE TO BE INSTALLED BY HORIZONTALLY DIRECTIONALLY DRILLING
 - PIPE TO BE INSTALLED BY OPEN CUT
 - HORIZONTAL DISTANCE FROM EDGE OF ROADWAY
 - REQ'D LAUNCHING AND RECEIVING PIT FOR HORIZONTAL DIRECTIONAL DRILLING
 - REQ'D FULLY RESTRAINED GATE VALVE WITH STEM EXTENSION PER DETAIL
 - REQ'D AIR RELEASE VALVE AND VAULT PER DETAIL
 - REQ'D VERTICAL CURVE. SEE CURVE TABLE ON SHEET G-102 FOR ADDITIONAL REQUIREMENTS AND INFORMATION.
 - REQUIRED 3" ARUNDEL SEWER FORCE MAIN (BY OTHERS) TO DISCHARGE IN BREWSTER FORCE MAIN INTO FAUBORG NO. 2 LIFT STATION



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

NO.	DESCRIPTION OF REVISION	DATE
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

DESIGNED BY: M. LOKER	DRAWN BY: J. HITT	CHECKED BY: J. CATLANOTTO	SUBMITTED BY: FAIRWAY CE	PROJECT NO.: DU 168,170, 175, 177	ISSUE DATE: 08/20/2024	APPROVED BY: D. MARTIN	SHEET SIZE: ANSI D 34x22	SCALE: AS NOTED
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BREWSTER ROAD SEWER CONSOLIDATION
SEWER FORCE MAIN PLAN & PROFILES - BASELINE
400 - XII

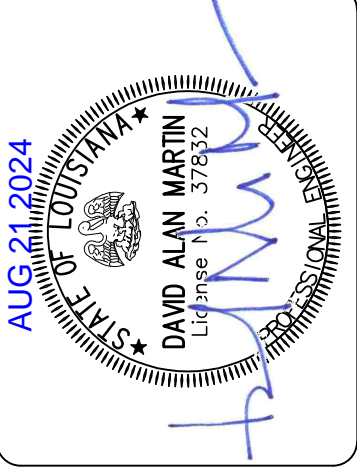
SHEET NO.
40PP-12



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

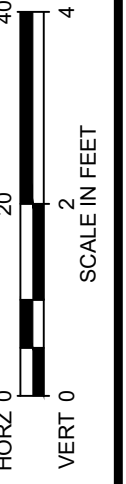
NO.	DATE	DESCRIPTION OF REVISION
1		
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4		
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6		
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8		

DESIGNED BY:	M. LOKER
CHECKED BY:	J. CATLANOTTO
SUBMITTED BY:	FAIRWAY CE
PROJECT No.:	DU 168,170.
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED



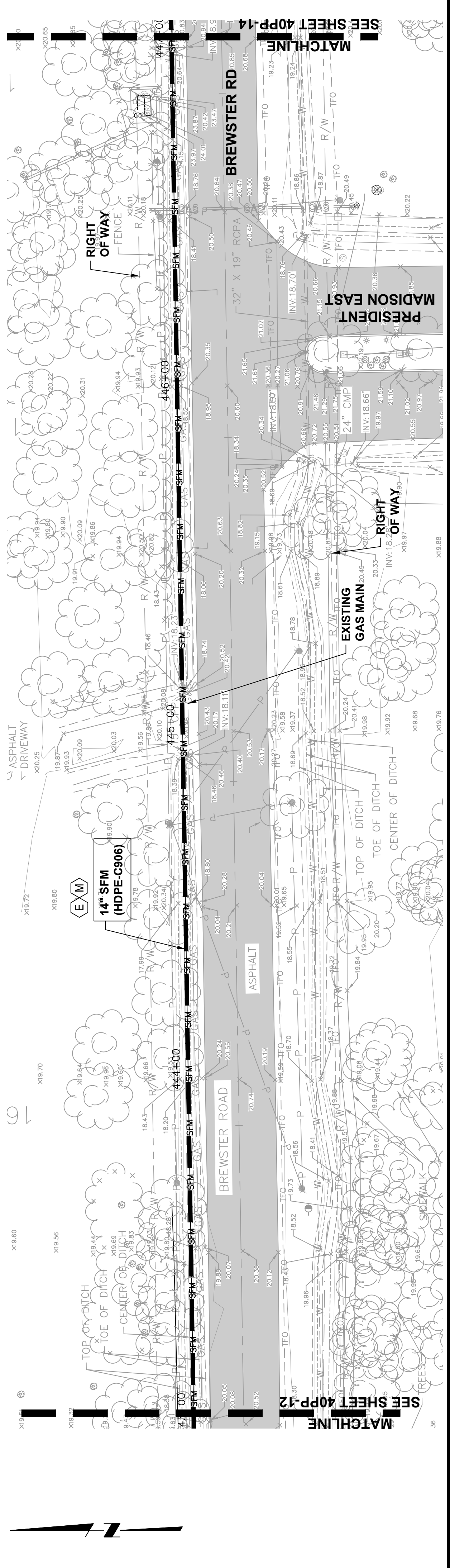
BREWSTER ROAD SEWER
CONSOLIDATION
SEWER FORCE MAIN PLAN & PROFILES - BASELINE
400 - XIII

SHEET NO.
40PP-13

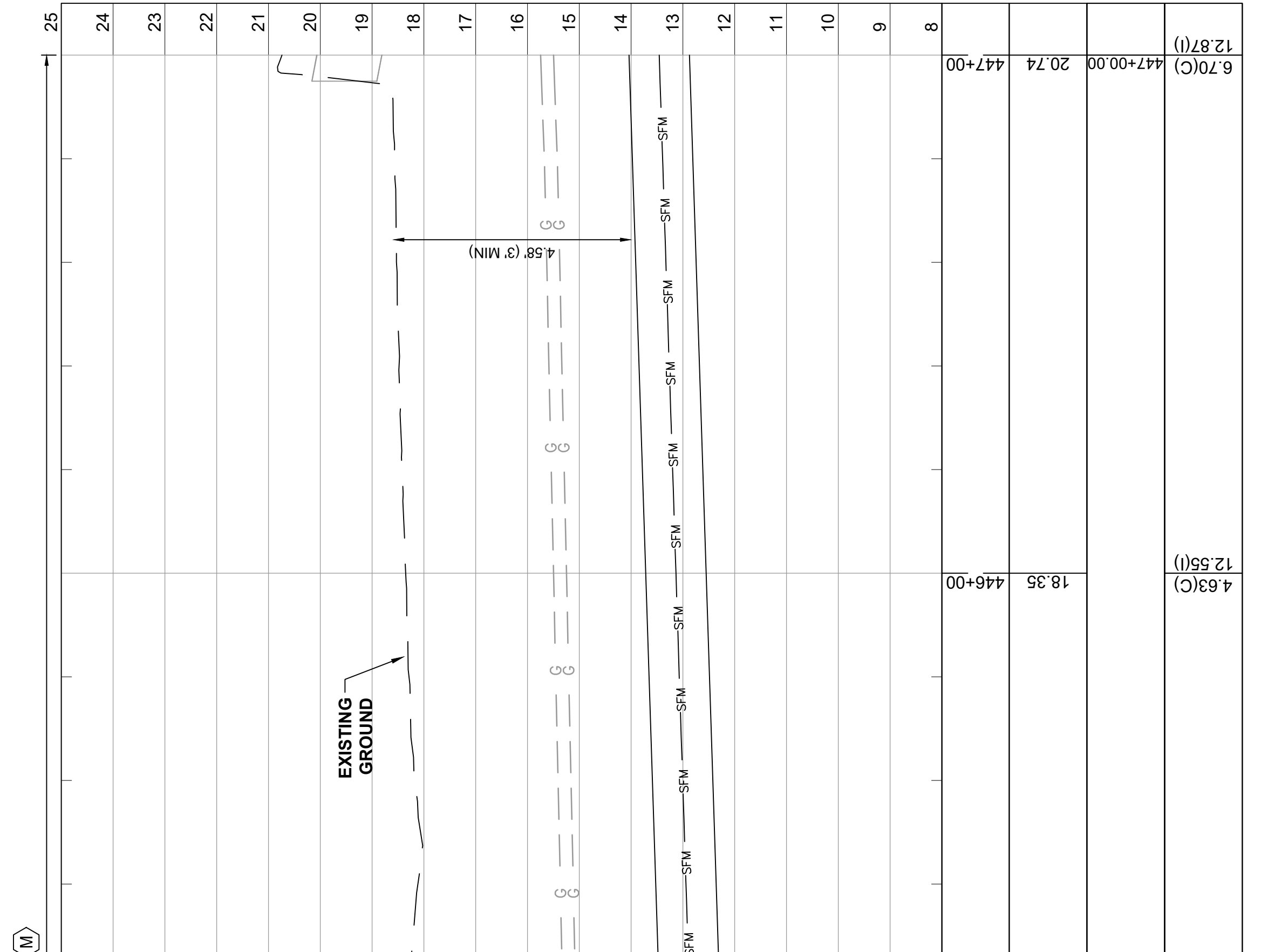


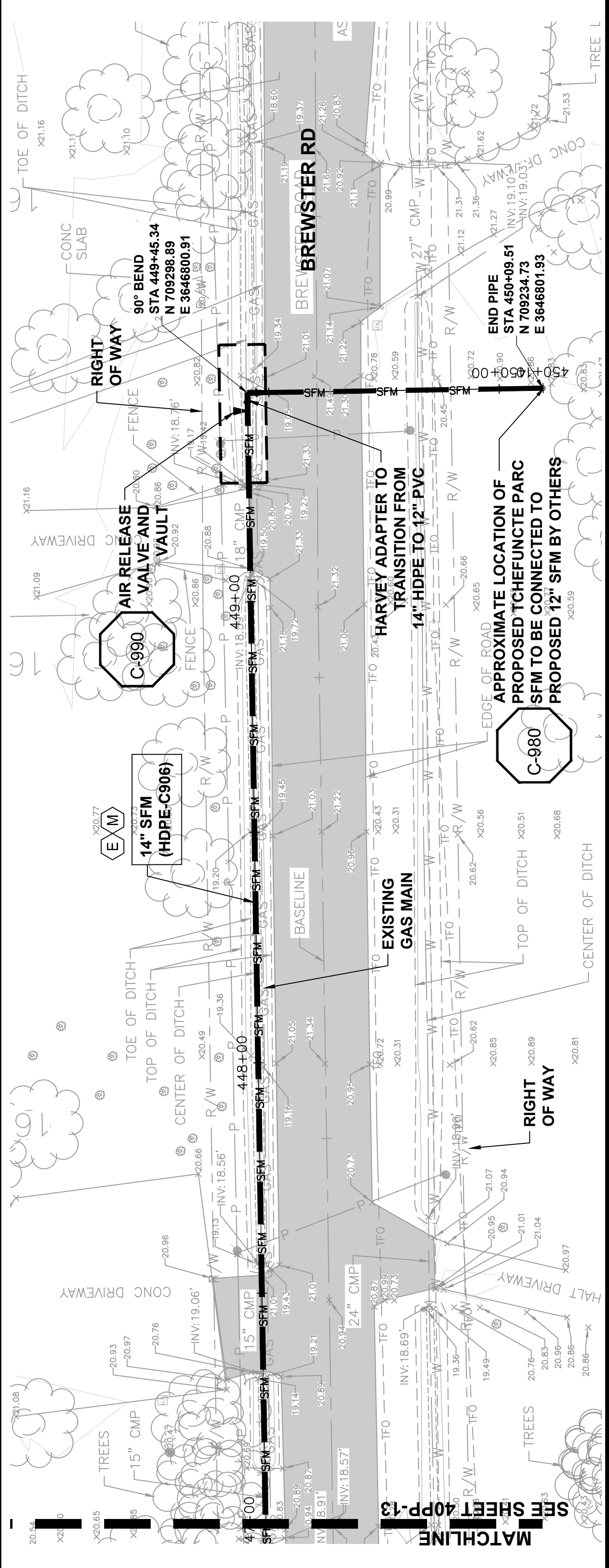
- PLAN AND PROFILE GENERAL NOTES**
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 - REQ'D 14" TCHEFUNCTE PARC SFM TO DISCHARGE INTO FAUBORG NO. 2 LIFT STATION



STATION	EXIST GND EL	VERTICAL PIPE GEOMETRY	PIPE ELEV DATA (COVER INV)
443+00	17.92		5.17(C) 11.58(I)
444+00	17.97		4.90(C) 11.90(I)
445+00	20.40	542' @ 0.3%	7.00(C) 12.23(I)
446+00	18.35		4.63(C) 12.55(I)
447+00			6.70(C) 12.87(I)





PLAN AND PROFILE GENERAL NOTES

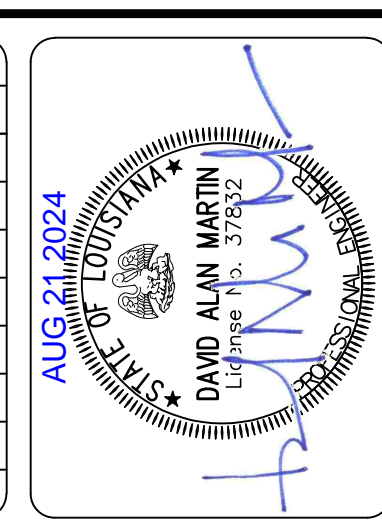
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DESCRIPTION OF REVISION	DATE

DESIGNED BY: M. LOKER
CHECKED BY: J. CATLANOTTO
SUBMITTED BY: FAIRWAY CE
PROJECT No.: DU 168,170, 175, 177
ISSUE DATE: 08/20/2024
APPROVED BY: D. MARTIN
SHEET SIZE: ANSI D 34x22
SCALE: AS NOTED



BREWSTER ROAD SEWER
CONSOLIDATION
SEWER FORCE MAIN PLAN & PROFILES - BASELINE
400 - XIV

SHEET NO.
40PP-14



STATION	EXIST GND EL	VERTICAL PIPE GEOMETRY	PIPE ELEV DATA (COVER INV)
447+00	18.99	301' @ 0.1%	6.70(C) 12.87(I) 6.39(C) 12.90(I) 447+08.17
448+00	18.99		4.83(C)
449+00	19.55		5.31(C)
450+00	20.83		6.50(C) 13.17(I) 6.47(C) 13.18(I) 450+09.51
450+20			(I) (C)

- PLAN AND PROFILE NOTES BY SYMBOLS**
- REQD 12" BREWSTER RD. SFM TO DISCHARGE INTO TCHEFUNCTE PARC SPS
 - REQD 4" FAIRFIELD OAKS SEWER FORCE MAIN TO DISCHARGE INTO BREWSTER RD. SFM
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 - REQD 14" TCHEFUNCTE PARC SFM TO DISCHARGE INTO FAUBORG NO. 2 LIFT STATION

GENERAL NOTES

GENERAL

THESE NOTES ARE GENERAL AND APPLY TO THE ENTIRE PROJECT EXCEPT WHERE SPECIFICALLY INDICATED OTHERWISE.

STRUCTURAL DIMENSIONS CONTROLLED BY OR RELATED TO MECHANICAL OR ELECTRICAL EQUIPMENT SHALL BE COORDINATED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. BOLT SIZES, TYPES, AND PATTERNS SHALL BE VERIFIED WITH THE MANUFACTURER. ALL BOLT PATTERNS SHALL BE TEMPLATED TO INSURE ACCURACY OF PLACEMENT.

MECHANICAL AND ELECTRICAL EQUIPMENT SUPPORTS, ANCHORAGES, OPENINGS, RECESSES AND REVEALS NOT SHOWN ON THE STRUCTURAL DRAWINGS BUT REQUIRED BY OTHER CONTRACT DRAWINGS, SHALL BE PROVIDED PRIOR TO PLACING CONCRETE.

STRUCTURAL DRAWINGS SHALL BE USED IN COORDINATION WITH MECHANICAL, ELECTRICAL, ARCHITECTURAL, CIVIL DRAWINGS AND SHOP DRAWINGS PROVIDED BY MANUFACTURERS OR EQUIPMENT.

STRUCTURES HAVE BEEN DESIGNED FOR OPERATIONAL, HYDROSTATIC, AND BACKFILL LOADS ON THE COMPLETED STRUCTURES. THE STRUCTURES HAVE NOT BEEN DESIGNED TO RESIST THESE LOADS WHILE ONLY PARTIALLY CONSTRUCTED. DURING CONSTRUCTION, THE STRUCTURES SHALL BE NOTICED FROM ALL CONSTRUCTION LOADS. BACKFILL SHALL BE PLACED IN ACCORDANCE WITH THE SPECIFIED PLACEMENT AND ALL CONCRETE HAS REACHED THE SPECIFIED 28 DAY COMPRESSIVE STRENGTH. OVERLOADING OF ANY STRUCTURAL ELEMENT IS PROHIBITED.

UNLESS OTHERWISE SHOWN, ON ALL STRUCTURAL DRAWINGS THE FINISHED GRADE/GROUND STRUCTURES IS SHOWN THIS INCLUDES FINISH GRADE, FINISH FLOORING, FINISH CONCRETE SLAB OR AC PAVEMENT. FOR DETAILS OF FINISH SURFACES SEE CIVIL AND ARCHITECTURAL DRAWINGS.

STRUCTURAL STEEL

STEEL CONSTRUCTION SHALL CONFORM TO THE SPECIFICATIONS AND CONSTRUCTION MANUAL.

STRUCTURAL WIDE FLANGE SHAPES SHALL BE STEEL MEETING ASTM A-992 SPECIFICATIONS.

OTHER SHAPES, BARS, PLATES AND SHEETS SHALL BE OF STEEL MEETING ASTM A-36 SPECIFICATIONS.

PIPE, PIPE COLUMNS, AND BOLLARDS SHALL BE OF STEEL MEETING ASTM A-53, TYPE E OR S, GRADE B STANDARD WEIGHT, UNO

HSS SHALL BE OF STEEL MEETING ASTM A-500 GRADE B.

STEEL JOISTS, BEAMS, AND GIRDERS SHALL NOT BE RELOCATED WITHOUT APPROVAL BY THE ENGINEER.

ALL WELDING SHALL BE BY THE SHIELDED ARC METHOD AND SHALL CONFORM TO AWS CODE FOR ARC AND GAS WELDING IN BUILDING CONSTRUCTION. QUALIFICATIONS OF WELDERS SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS FOR STANDARD QUALIFICATION PROCEDURE OF THE AWS.

CONCRETE (EXCEPT PRECAST CONCRETE)

UNLESS OTHERWISE NOTED OR SPECIFIED, ALL STRUCTURAL CONCRETE SHALL DEVELOP A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF:

STRUCTURAL CONCRETE AT WATER CONTAINING STRUCTURES: 5000 PSI, 4500 PSI

OTHER STRUCTURAL CONCRETE: 5000 PSI, 4500 PSI

SITEWORK CONCRETE: 3000 PSI, 3000 PSI

UNREINFORCED CONCRETE FILL: 2000 PSI, 2000 PSI

REINFORCEMENT STEEL SHALL BE DEFORMED BARS CONFORMING IN QUALITY TO THE REQUIREMENTS OF ASTM A-615. SPECIFICATIONS FOR DEFORMED CARBON-STEEL BARS FOR CONCRETE REINFORCEMENT, GRADE 60

COLUMN SPIRALS SHALL CONFORM TO ASTM A-615, "DEFORMED AND PLAIN CARBON-STEEL BARS FOR CONCRETE REINFORCEMENT, GRADE 60 OR ASTM A-82 "STEEL WIRE, PLAIN, FOR CONCRETE REINFORCEMENT".

ALL DETAILING, FABRICATION AND PLACING OF REINFORCING BARS, UNLESS OTHERWISE INDICATED, SHALL BE IN ACCORDANCE WITH CONCRETE STRUCTURES, LATEST EDITION.

TOLERANCES IN PLACING REINFORCEMENT SHALL BE:

3/8 INCH FOR MEMBERS WITH D <= 8 INCHES

1/2 INCH FOR MEMBERS WITH D > 8 INCHES

UNLESS CONSTRUCTION JOINTS, SHALL BE ROUGH AND THOROUGHLY CLEANED FOR BOND.

LOCATION OF ALL CONSTRUCTION JOINTS SHALL BE AS SHOWN ON THE DRAWINGS OR APPROVED BY THE ENGINEER. ALL CONSTRUCTION JOINTS LOCATED ON THE DRAWINGS OR REQUIRED FOR CONSTRUCTION, BUT NOT SHOWN ON THE DRAWINGS, SHALL HAVE A 6" FLAT STRIP WATERS TOP. IF WITH WATER, SHALL HAVE AN ADDITIONAL JOINT WITH ALL SLABS COVERED WITH WATER. SHALL HAVE BOTH A 6" FLAT STRIP WATERS TOP AND A SEALANT GROOVE.

DOWELS, PIPE, WATERSTOPS AND OTHER INSTALLED MATERIALS AND ACCESSORIES SHALL BE HELD SECURELY IN POSITION WHILE CONCRETE IS BEING PLACED.

UNLESS OTHERWISE INDICATED, ASIDE FROM NORMAL ACCESSORIES USED TO HOLD REINFORCING BARS FIRMLY IN POSITION, THE FOLLOWING SHALL BE ADDED:

- A) IN SLABS #5 RISER BARS AT 36 INCHES OC MAXIMUM TO SUPPORT TOP REINFORCING BARS.
- B) IN WALLS WITH 2 CURTAINS #3 U OR Z SHAPE SPACERS AT 6 FEET OC EACH WAY.

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 UNLESS INDICATED OTHERWISE.

SEALANT SHALL BE PLACED AT THE TOP OF ALL JOINTS RECEIVING EXPANSION JOINT FILLER. SEALANT DEPTH SHALL BE THE JOINT FILL THICKNESS OR 1/2", WHICHEVER IS LESS.

ALL GROUT SHALL BE NON-SHRINK GROUT, UNLESS INDICATED OTHERWISE.

UNLESS OTHERWISE SHOWN CONCRETE WALLS AND SLABS SHALL BE REINFORCED AS FOLLOWS: #4@12" EW, CENTER OF 6" SECTIONS; #5@12" EW, CENTER OF 8" SECTIONS; #4 @ 12" EW EF OF 10" SECTIONS; #6@12" EW EF OF 12" AND THICKER SECTIONS.

METAL CLIPS OR SUPPORTS SHALL NOT BE PLACED IN CONTACT WITH REINFORCING BARS. SUBGRADING SHALL BE IN SUFFICIENT DOUBLES TO SUPPORT THE BARS WITHOUT SETTLEMENT, BUT IN NO CASE SHALL SUCH SUPPORT BE CONTINUOUS.

DOWELS SHALL BE WIRE OR OTHERWISE HELD IN POSITION. THEY SHALL NOT BE SHOVED INTO FRESHLY PLACED CONCRETE.

UNLESS OTHERWISE INDICATED ON THE DRAWINGS, LAPS OF REINFORCEMENT SHALL BE AS SHOWN ON DETAIL S-143.

LOCATE TWO 3/4 INCH GALVANIZED RICHMOND ROCKET INSERTS, HOHMANN & BARNARD OR EQUAL, STRADDLING CENTERLINE OF EQUIPMENT OVER ALL PUMPS, METERS OR OTHER MECHANICAL UNITS OF MORE THAN 100 LBS. FOR INSERTING LIFTING EYES IF NOT OTHERWISE INDICATED.

REINFORCING BARS AND ACCESSORIES SHALL NOT BE IN CONTACT WITH ANY PIPE, PIPE FLANGE OR METAL PARTS EMBEDDED IN CONCRETE. A MINIMUM OF 2 INCHES CLEARANCE SHALL BE PROVIDED AT ALL TIMES.

ALL ITEMS EMBEDDED IN CONCRETE SHALL BE SPACED ON CENTER AT LEAST 4 TIMES THEIR OUTSIDE DIMENSION. THE OUTSIDE DIMENSION SHALL NOT EXCEED ONE THIRD OF THE MEMBER THICKNESS

ELECTRICAL CONDUIT EMBEDDED IN CONCRETE SHALL NOT BE SPACED CLOSER THAN 3 OUTSIDE DIAMETERS ON CENTER.

UNLESS OTHERWISE SHOWN ON THE DRAWINGS, CONCRETE COVER FOR REINFORCING BARS SHALL BE AS FOLLOWS:

- FOR CONCRETE PLACED AGAINST EARTH SEE CONSTRUCTION JOINT DETAILS FOR THIN SLABS-ON-GRADE. BOTTOM COVER MAY BE LESS THAN 3" IF SO INDICATED
- FOR SURFACES IN CONTACT WITH WATER OR WEATHER AND FORMED SURFACES IN CONTACT WITH EARTH
- FOR CONCRETE NOT EXPOSED TO WEATHER, OR IN CONTACT WITH WATER OR EARTH

UNLESS OTHERWISE NOTED, WALLS AND SLABS SHOWN WITH A SINGLE LAYER OF REINFORCEMENT SHALL HAVE THAT REINFORCEMENT CENTERED

SLABS WITH SLOPING SURFACES SHALL HAVE THE INDICATED SLAB THICKNESS MAINTAINED AS THE MINIMUM. SLAB BOTTOMS MAY EITHER SLOPE WITH THE TOP SURFACE OR BE LEVEL. REINFORCING BARS SHALL BE PLACED AT THE REQUIRED CLEARANCE FROM THE SLAB SURFACES.

METAL DECK, AND ROOFS

THE CONTRACTOR SHALL COORDINATE THE LOCATION AND SIZES OF ROOF OPENINGS WITH THE MECHANICAL, HVAC AND ARCHITECTURAL DRAWINGS. STANDARD DETAIL S-551 SHALL BE USED AT ALL OPENINGS.

WELDING REQUIREMENTS FOR METAL DECKING.

UNLESS INDICATED OTHERWISE, SEE THE SPECIFICATIONS FOR THE WELDING REQUIREMENTS FOR METAL DECKING.

UNLESS INDICATED OTHERWISE, 1.5" METAL DECK SHALL BE 18 GA WITH 3'-0" COVERAGE, 2" CONCRETE TOPPING FOR A TOTAL THICKNESS OF 3.5" AND SHALL HAVE THE FOLLOWING MINIMUM PROPERTIES:

- Fy = 33 ksi
 - Em = 29,000 ksi
 - Sx = 1.14 IN³ (MIN)
 - Sy = 18.5 IN³ (MIN)
 - THICKNESS PRIOR TO GALVANIZING = 0.0295 IN (MIN)
- DECKING SHALL BE SCREW WITH 387 PATTERN SUPPORT FASTENERS #12 TEK SCREWS WITH 1/2" WASHERS AND NUTS NUMBER OF SIDE LAP FASTENERS = 8 SHEAR = 627 PLF
- METAL DECK TO BE CONTINUOUS OVER 3 SPANS MINIMUM

SPECIAL INSPECTIONS

SPECIAL INSPECTION SHALL BE PERFORMED PER SPECIFICATION SECTION 014160 - SPECIAL INSPECTION.

DEFERRED SUBMITTALS

STRUCTURAL STEEL CONNECTION DESIGN

METAL DECK SHEAR CAPACITY

PIPE AND CONDUIT SUPPORTS

DESIGN CRITERIA

DESIGN IN ACCORDANCE WITH THE 2021 EDITION OF THE INTERNATIONAL BUILDING CODE EXCEPT WHERE OTHER APPLICABLE CODES OR THE FOLLOWING NOTES ARE MORE RESTRICTIVE.

SOIL DESIGN PARAMETERS:

ALLOWABLE BEARING PRESSURE: -----

DEAD PLUS LIVE (PSF): ----- 2000

DESIGN GROUNDWATER ELEV.: -----

LATERAL SOIL LOAD - EQUIV FLUID PRESSURE (POF) : ----- 100

STABILITY FACTORS OF SAFETY: -----

SLIDING-SEISMIC: ----- 1.1

OVERTURNING: ----- 1.5

OVERTURNING-SEISMIC: ----- 1.25

UPLIFT (DL ONLY): ----- 1.2

UPLIFT: ----- 1.25

FLOOR LIVE LOADS:

WALKWAYS, PLATFORMS, STAIR FRAMING (PSF): ----- 150

GRATING, COVERPLATES, HATCH COVERS (PSF): ----- 250

FLOOR COLLATERAL LOADS (PSF) -----

ELECTRICAL BUILDING ----- 10

ROOF LIVE LOADS:

ROOF LIVE LOAD (PSF): ----- 20

TANK COVER (PSF): ----- 100

ROOF COLLATERAL LOADS (PSF) -----

PROCESSES, FULLY DEVELOPED CRANES PREVENT ATTACHMENT OF LARGE PIPES) ----- 25

OTHER BUILDINGS ----- 10

WIND LOADS:

BASE WIND SPEED (3 SEC. - MPH): ----- 130

WIND IMPORTANCE FACTOR (iw): ----- 1.15

BUILDING CATEGORY: ----- C

EXPOSURE CATEGORY: ----- 0, 1B

INTERNAL PRESSURE COEFFICIENT: -----

SEISMIC RISK CATEGORY: ----- IV

SPECTRAL RESPONSE ACCELERATION (0.2s) Ss: ----- 0.089g

SPECTRAL RESPONSE ACCELERATION (1s) S1: ----- 0.058g

SPECTRAL RESPONSE ACCELERATION (5s) S5: ----- 0.034g

SPECTRAL RESPONSE COEFFICIENT (Ss1): ----- 0.094

SITE MODIFIED SPECTRAL ACCELERATION (Sms): ----- 0.145

SITE MODIFIED SPECTRAL ACCELERATION (Sm1): ----- 0.141

SITE CLASS (ASSUMED): ----- D

SEISMIC IMPORTANCE FACTOR (Ipe): ----- 1.25

SEISMIC DESIGN CATEGORY: ----- C

SEISMIC RESISTING SYSTEM: ----- VARIES

ANALYSIS PROCEDURE: ----- EQUIV LAT

COEFFICIENT OF RISK, CR1 (1.0s): ----- 0.844

COEFFICIENT OF RISK, CR1 (1.0s): ----- 0.883

RESPONSE MODIFICATION FACTORS R: ----- 2.0

SITE AMPLIFICATION FACTOR AT 0.2s, Fp: ----- 1.6

SITE AMPLIFICATION FACTOR AT 1.0s, Fv: ----- 1.6

COEFFICIENT OF RISK AT 0.2s, CR2: ----- 0.844

COEFFICIENT OF RISK AT 1.0s, CR2: ----- 0.883

PEAK GROUND ACCELERATION, PGA: ----- 0.044

SITE AMPLIFICATION FACTOR AT PGA, Fpga: ----- 1.6

SITE MODIFIED PEAK GROUND ACCELERATION, PGAm: ----- 0.07

LONG PERIOD TRANSITION PERIOD, Tl: ----- 12

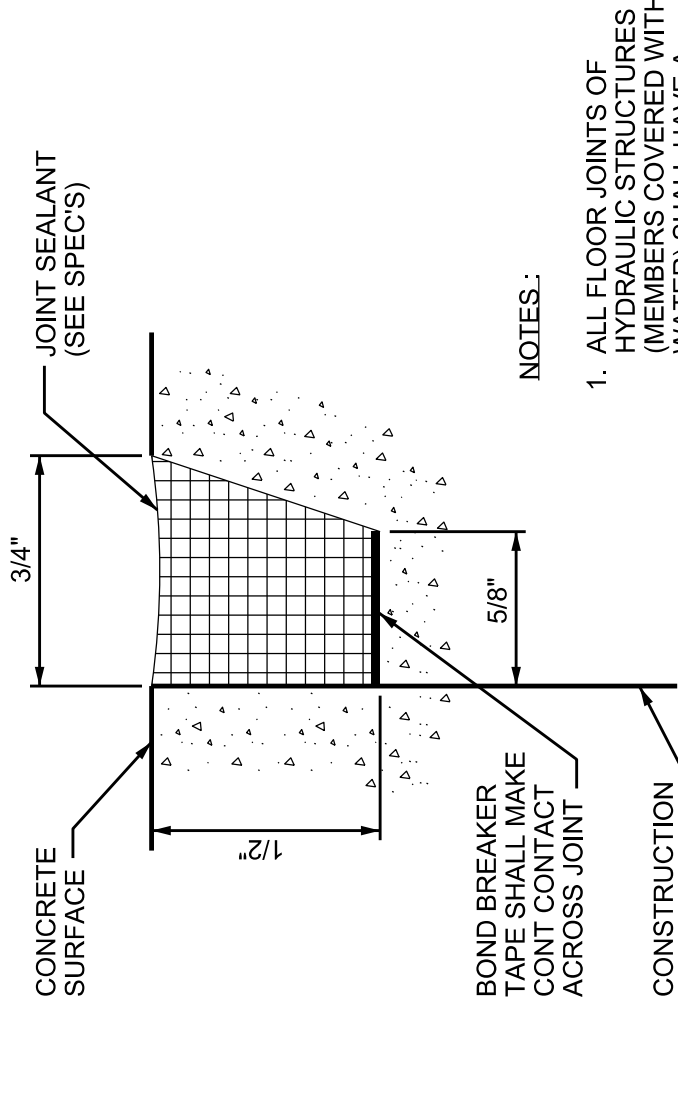
PERIOD OF PREDOMINANT WIND MOTION AT 0.2s, Ss4: ----- 0.086

FACTORED UNIFORM HAZARD SPECTRAL ACCELERATION (2%,50), Ssuh: ----- 0.086

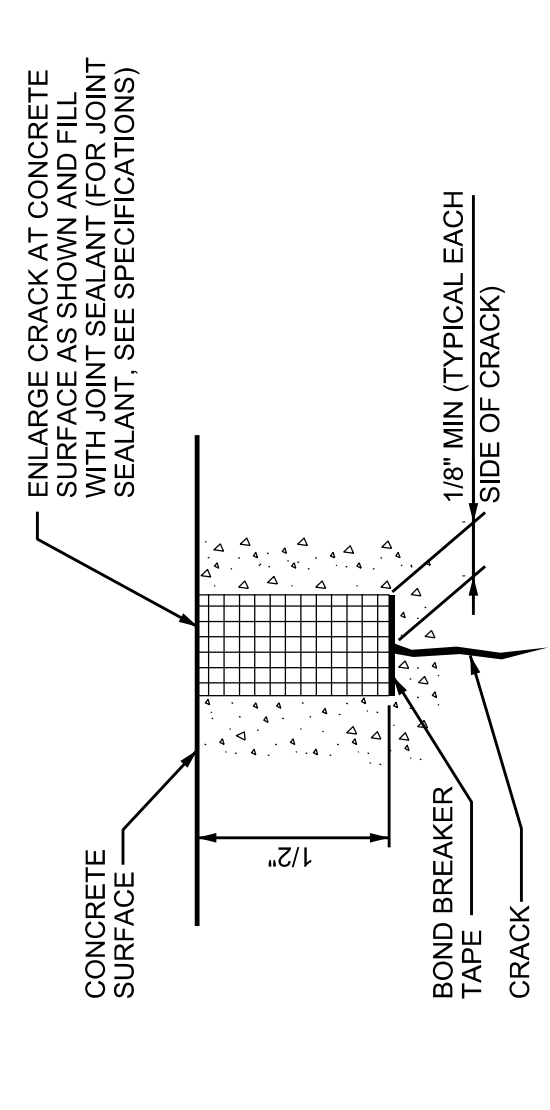
FACTORED DETERMINISTIC ACCELERATION AT 0.2s, Ssd: ----- 1.5

PROBABALISTIC RISK TARGETED GROUND MOTION AT 1.0s, S1t: ----- 0.059

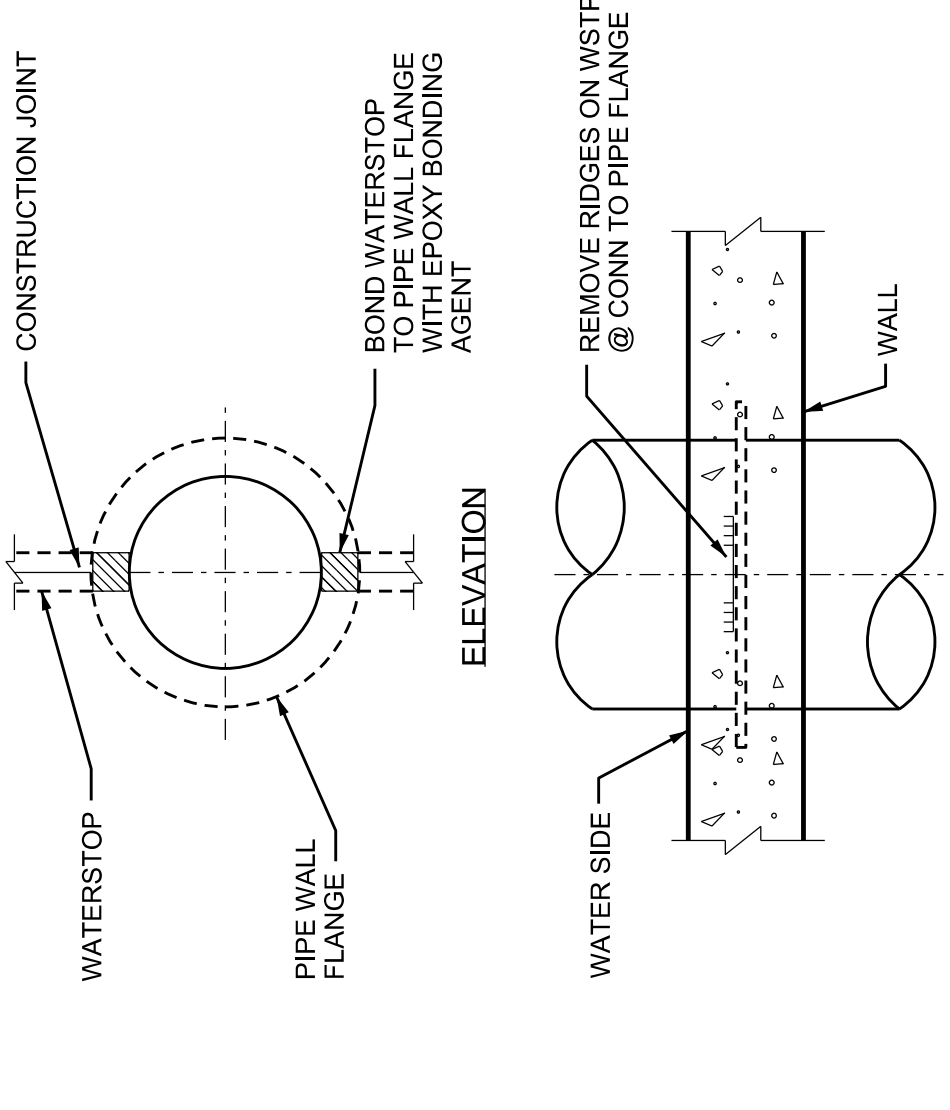
SNOW LOADS: ----- 0



S-131
SEALANT GROOVE



S-132
CONCRETE CRACK REPAIR

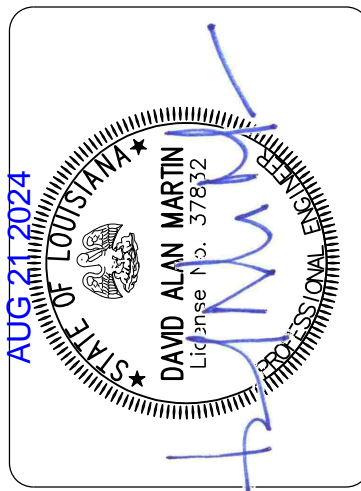


S-133
CONSTRUCTION JOINT AT PIPE OPENINGS

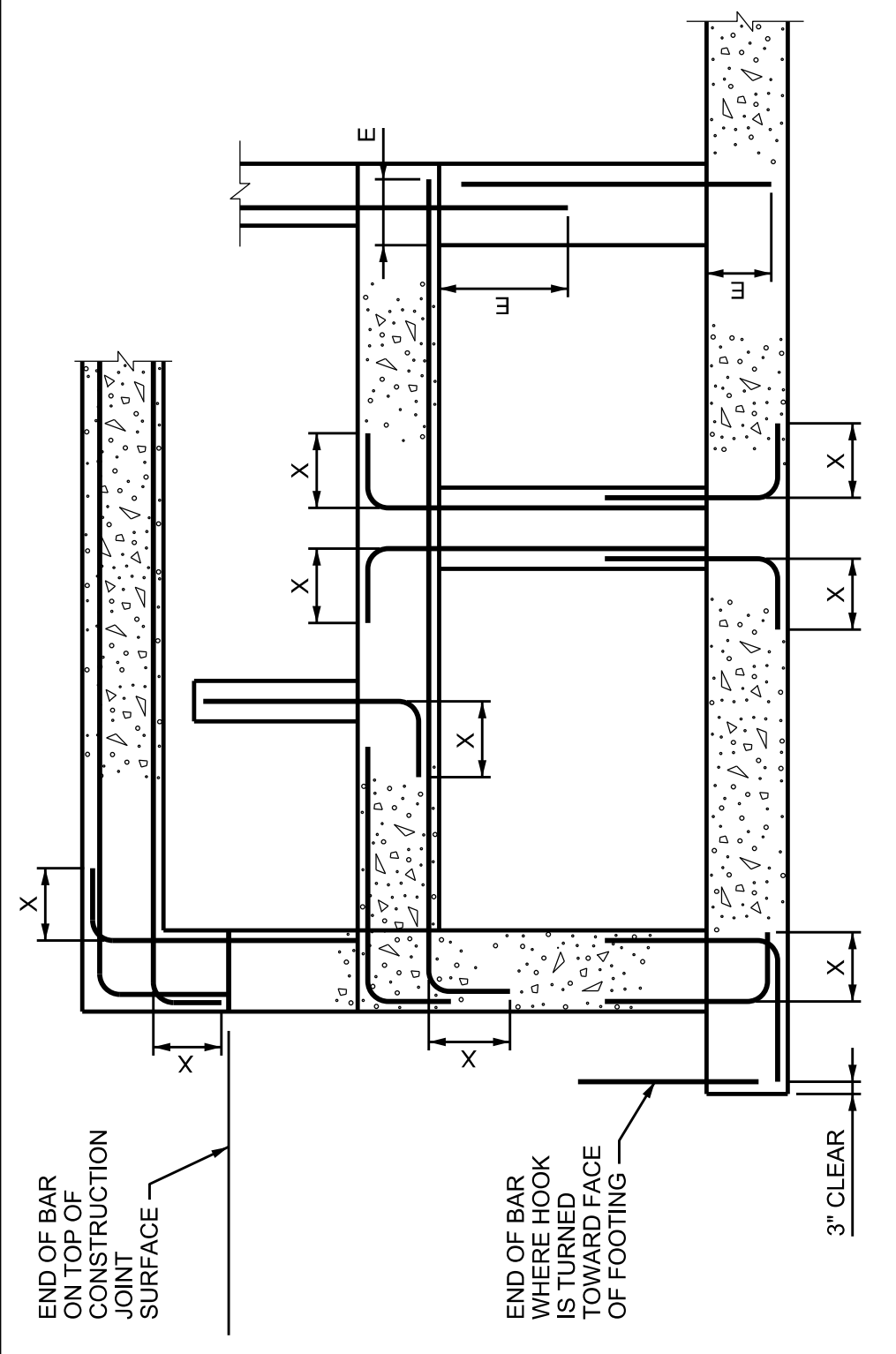
DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

No	DESCRIPTION OF REVISION	DATE:
1	PRELIMINARY DESIGN SUBMITTAL	07/21/23
2		
3		
4		
5		
6		
7		

DESIGNED BY:	BC
CHECKED BY:	M. LOKER
SUBMITTED BY:	FAIRWAY CE
PROJECT No.:	DU*****
ISSUE DATE:	05/24/2023
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED



BREWSTER ROAD SEWER
CONSOLIDATION
STRUCTURAL NOTES
AND DETAILS - 1



SECTION

BAR SIZE	HOOK X	LAP	EMBEDMENT E
#3	6"	16" (21")	12" (16")
#4	8"	16" (21")	12" (16")
#5	10"	20" (26")	15" (20")
#6	12"	28" (37")	22" (28")
#7	14"	48" (62")	37" (48")
#8	16"	62" (81")	48" (62")
#9	19"	79" (102")	61" (79")
#10	22"	100" (130")	77" (100")
#11	24"	123" (160")	95" (123")

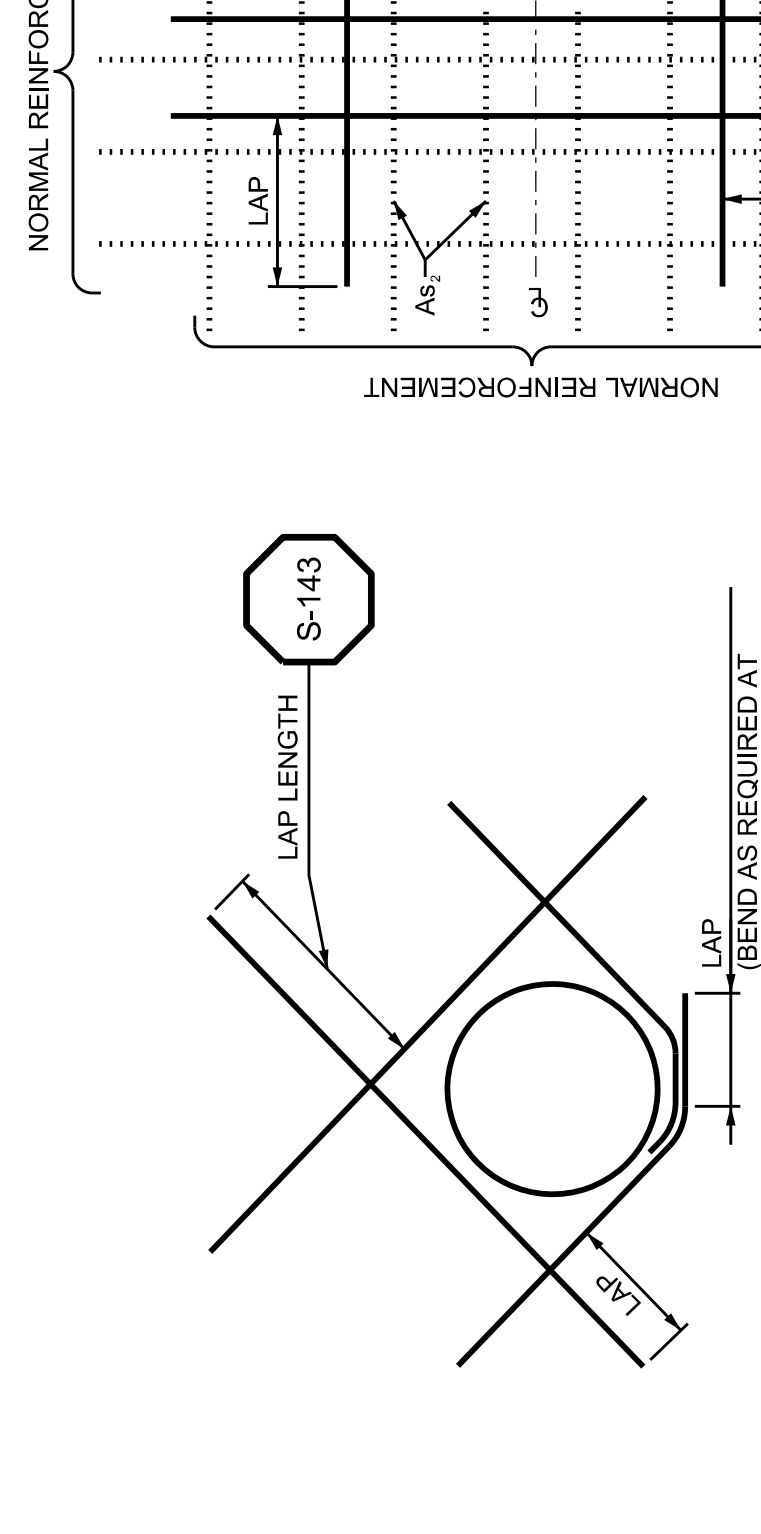
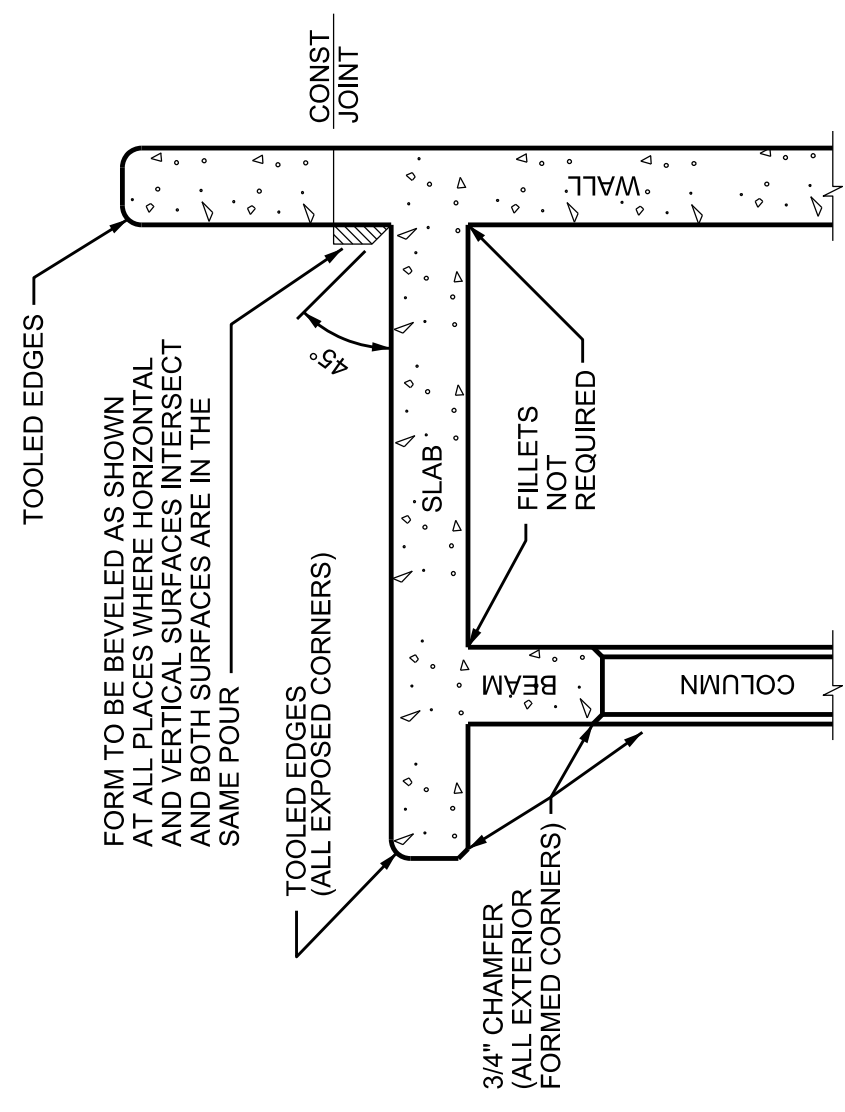
LENGTH (*)

- NOTES:
- USE LAP LENGTHS AS DETERMINED FROM THESE TABLES UNLESS SHOWN OTHERWISE.
 - THE TABLES SHOWN ARE FOR $f_c=4000\text{psi}$, $f_y=60,000\text{psi}$, 1.5" MIN CONCRETE COVER AND 3" MIN BAR SPACING.
 - MULTIPLY THE LAP AND E SHOWN IN THESE TABLES BY 1.5 FOR EPOXY COATED REINFORCING.
 - WHEN BARS OF DIFFERENT SIZES ARE LAP SPliced, LAP LENGTH SHALL BE THE LARGER OF:
 - EMBEDMENT LENGTH OF LARGER BAR
 - LAP LENGTH OF SMALLER BAR
 - UNLESS NOTED OTHERWISE USE REBAR COUPLERS FOR SPLICES OF #11 AND LARGER BARS.
 - ALL DOWEL BARS SHALL EXTEND AN EMBEDMENT LENGTH E INTO ANOTHER MEMBER OR ACROSS A CONSTRUCTION JOINT UNLESS SHOWN TO SPLICE WITH OTHER BARS OR TO EXTEND TO THE FAR FACE OF THE MEMBER AND END WITH A STANDARD HOOK.

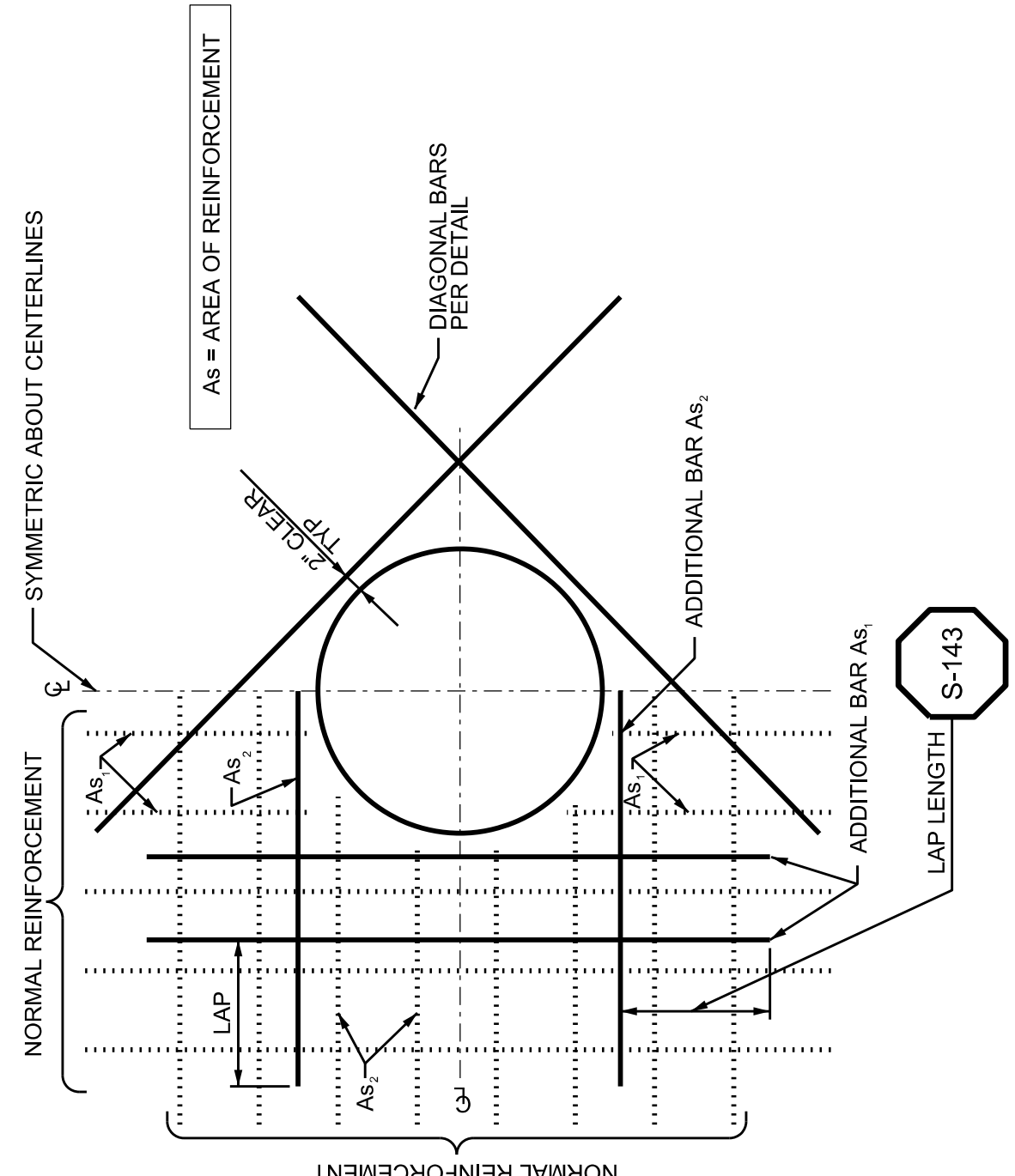
* USE LENGTH IN PARENTHESIS FOR WALL HORIZONTAL REBARS AND SLAB BARS WITH 12" OR MORE OF FRESH CONCRETE UNDERNEATH

STANDARD 90° BAR HOOKS, EMBEDMENT LENGTHS AND LAP LENGTHS

FORMING DETAILS
REV 050808
S-152

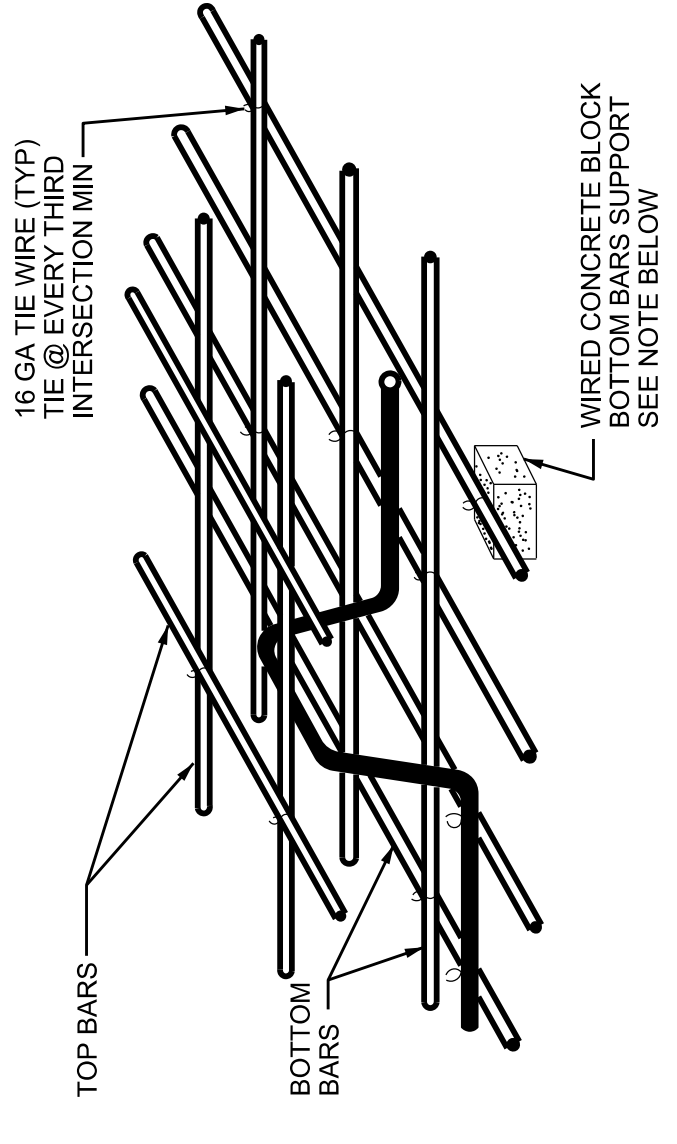


DIAGONAL BAR DETAILING

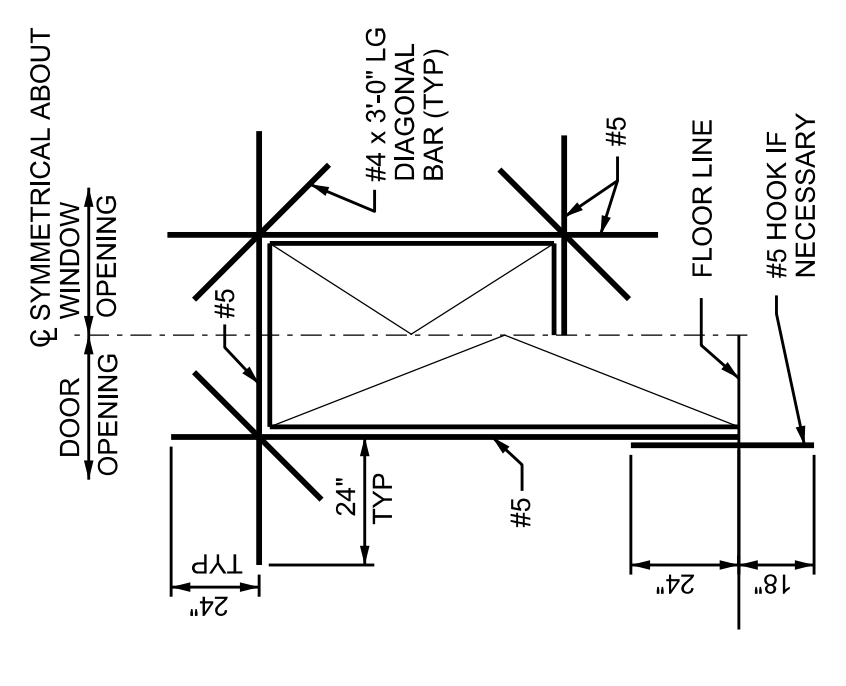


DIAGONAL BAR DETAILING

REINFORCEMENT SUPPORT
S-204



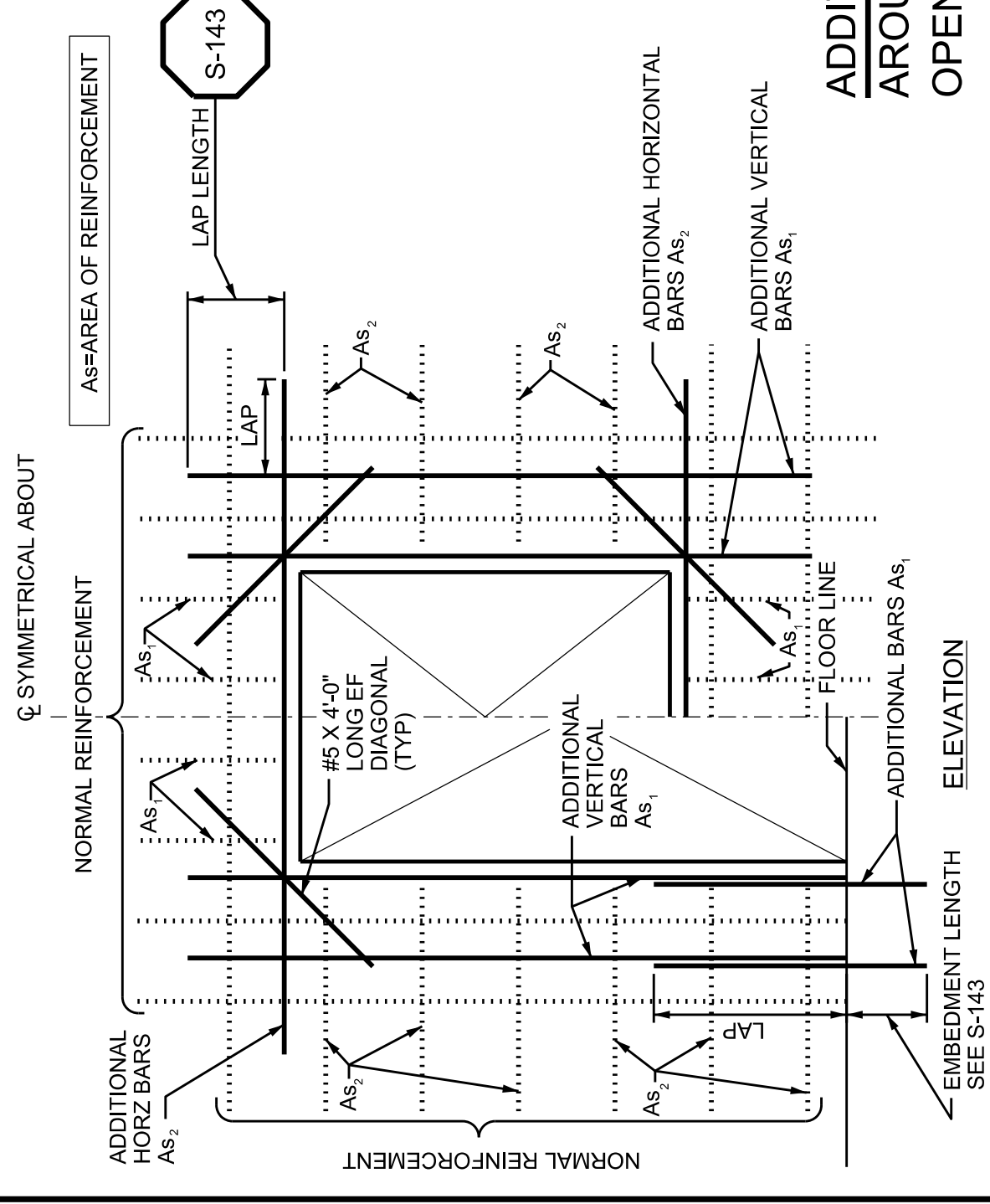
NOTE:
METAL BAR SUPPORTS, IF USED IN SLABS NOT ON GROUND, SHALL NOT MAKE CONTACT WITH FORMS



REINFORCEMENT AROUND RECTANGULAR WALL OPENING

S-147

- NOTES:
- CUT NORMAL REINFORCING AT OPENING.
 - FOR WALLS WITH TWO LAYERS OF REINFORCING PROVIDE 1 BAR EACH FACE.
 - FOR WALLS WITH ONE LAYER OF REINFORCING PROVIDE 1 BAR ON WALL CENTERLINE.
 - BAR LENGTHS FOR GRADE 60.
 - THIS DETAIL APPLIES TO ABOVE GRADE OPENING AND WHEN SPECIFICALLY REFERENCED REFER TO BELOW GRADE OPENING.



ADDITIONAL REINFORCEMENT AROUND RECTANGULAR OPENING

S-148

- NOTES:
- CUT NORMAL REINFORCEMENT AT OPENING. A_s AND A_s2 = 1/2 AREA OF CUT BARS TO BE ADDED ON EACH SIDE OF OPENING.
 - ADDITIONAL BARS A_s AND A_s2 TO BE PLACED:
 - A) AT CENTERLINE OF WALLS OR SLABS WHERE ONE LAYER OF REINFORCEMENT IS PROVIDED.
 - B) AT EACH FACE OF WALLS OR SLABS WHERE TWO LAYERS OF REINFORCEMENT ARE PROVIDED.
 - INCREASE SIZE OF ADDITIONAL BARS AS NEEDED TO FIT WITHIN A DISTANCE OF 2 X WALL / SLAB THICKNESS FROM OPENING. PROVIDE 2" MIN CLEAR BETWEEN BARS.
 - THIS DETAIL TO BE USED ONLY WHEN NO OTHER DETAIL IS INDICATED ON THE DRAWINGS.
 - WHERE A SLAB OR INTERSECTING WALL CONNECTS WITHIN ONE WALL THICKNESS OF THE OPENING, ADDITIONAL BARS ON THAT SIDE MAY BE OMITTED.
 - THIS DETAIL APPLIES TO BELOW GRADE OPENINGS AND WHEN SPECIFICALLY REFERENCED, REFER TO DETAIL S-147 FOR ABOVE GRADE OPENINGS.

NOTES:

- CUT NORMAL REINFORCEMENT AT OPENINGS. A_s AND A_s2 = 1/2 AREA OF CUT BARS TO BE ADDED ON EACH SIDE OF OPENING.
- ADDITIONAL BARS A_s AND A_s2 TO BE PLACED:
 - A) AT CENTERLINE OF WALLS OR SLABS WHERE ONE LAYER OF REINFORCEMENT IS PROVIDED.
 - B) AT EACH FACE OF WALLS OR SLABS WHERE TWO LAYERS OF REINFORCEMENT ARE PROVIDED.
- INCREASE SIZE OF ADDITIONAL BARS AS NEEDED TO FIT WITHIN A DISTANCE OF 2 X WALL / SLAB THICKNESS FROM OPENING. PROVIDE 2" MIN CLEAR BETWEEN BARS.
- DIAGONAL BARS TO BE PLACED:
 - A) AT CENTERLINE OF WALL OR SLAB WHERE ONE LAYER OF REINFORCEMENT IS PROVIDED.
 - B) AT EACH FACE OF WALL OR SLAB WHERE TWO LAYERS OF REINFORCEMENT ARE PROVIDED. (LOCATE ON INSIDE FACE OF TYPICAL REINFORCEMENT.)
- UNLESS OTHERWISE NOTED, SIZE OF DIAGONAL BARS SHALL BE THE SIZE OF THE LARGEST NORMAL REINFORCING BAR CUT.
- THIS DETAIL TO BE USED ONLY WHEN NO OTHER DETAIL IS INDICATED ON THE DRAWINGS.
- WHERE A SLAB OR INTERSECTING WALL CONNECTS WITHIN ONE WALL THICKNESS OF THE OPENING, ADDITIONAL BARS ON THAT SIDE MAY BE OMITTED.

DIAGONAL BAR DETAILING

S-144

(12" DIA OR LARGER)

ANCHOR BOLT DIAMETER (Inches)	MINIMUM EMBEDMENT	TOP OF COLUMNS	OTHER APPLICATIONS
1/4	5	5	3
3/8	5	6	3
1/2	6	6	4
5/8	6	7	4.5
3/4	7	8	5
7/8	8	9	6
1	9	10	7
1 1/8	10	11	8
1 1/4	11	12	9

- NOTES:
- USE ONLY HEADED ANCHORS. J-BOLTS ARE NOT ALLOWED.
 - THIS DETAIL APPLIES TO BOTH CONCRETE AND MASONRY.
 - IN MASONRY PROVIDE A 1" ANNUAL SPACE IN BLOCK SHELL AROUND ANCHOR. GROUT TO SURFACE.
 - FOR ADHESIVE ANCHORS USE FOLLOWING GUIDELINES: THE EMBEDMENT LENGTHS CALLS OUT LONGER LENGTHS.

ANCHOR BOLT EMBEDMENT

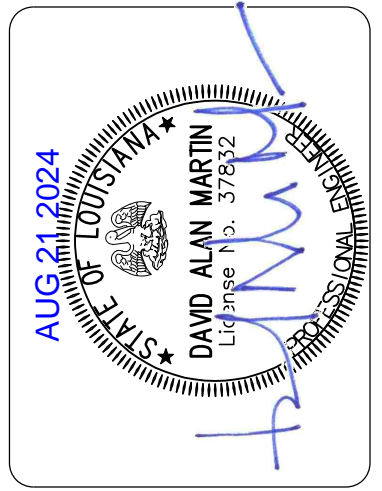
S-175

BREWSTER ROAD SEWER CONSOLIDATION
STRUCTURAL NOTES - II

SHEET NO. GS-02
SHEET of 85

No.	DESCRIPTION OF REVISION	DATE:
1	PRELIMINARY DESIGN SUBMITTAL	07/21/23
2		
3		
4		
5		
6		
7		

DESIGNED BY: BC	DRAWN BY: BC
CHECKED BY: FAIRWAY CE	PROJECT No.: DU*****
ISSUE DATE: 05/24/2023	APPROVED BY: D. MARTIN
SHEET SIZE: ANSI D 34x22	SCALE: AS NOTED

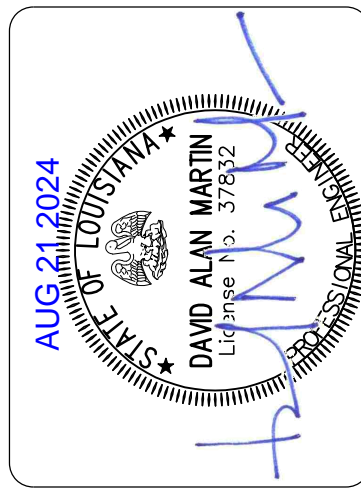


DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

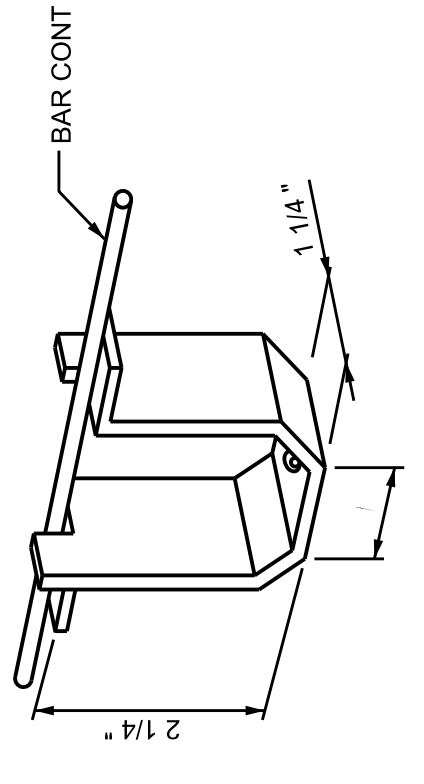
DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

No.	DESCRIPTION OF REVISION	DATE:
1		
2		
3		
4		
5		
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7		

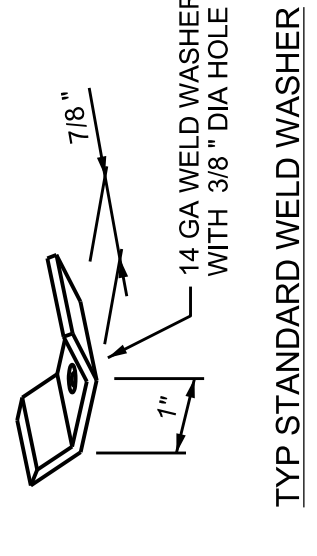
DESIGNED BY: BC	PROJECT No.: DU*****
CHECKED BY: M. LOKER	ISSUE DATE: 05/24/2023
DRAWN BY: BC	APPROVED BY: D. MARTIN
	SHEET SIZE: ANSI D 34x22
	SCALE: AS NOTED



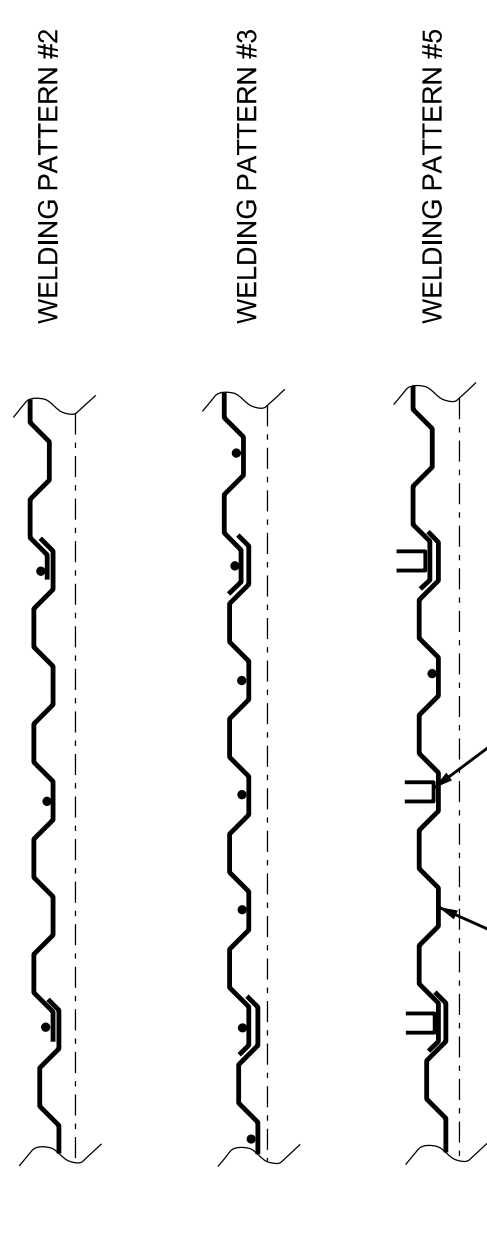
BREWSTER ROAD SEWER
CONSOLIDATION
AND DETAILS - III



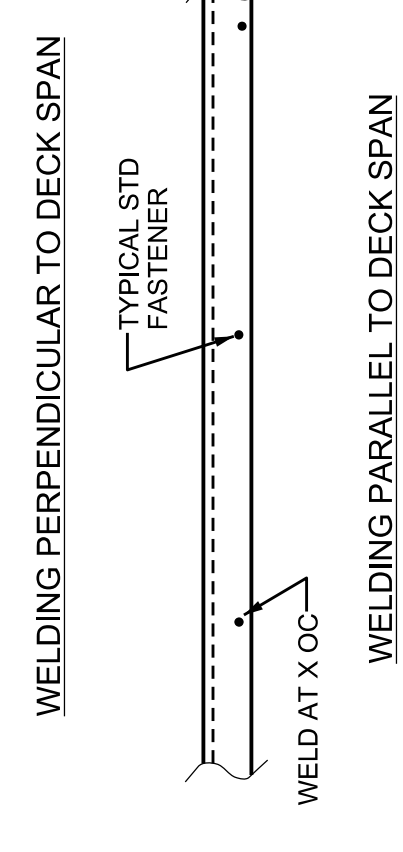
TYPICAL ANCHOR BAR SUPPORT



TYP STANDARD WELD WASHER

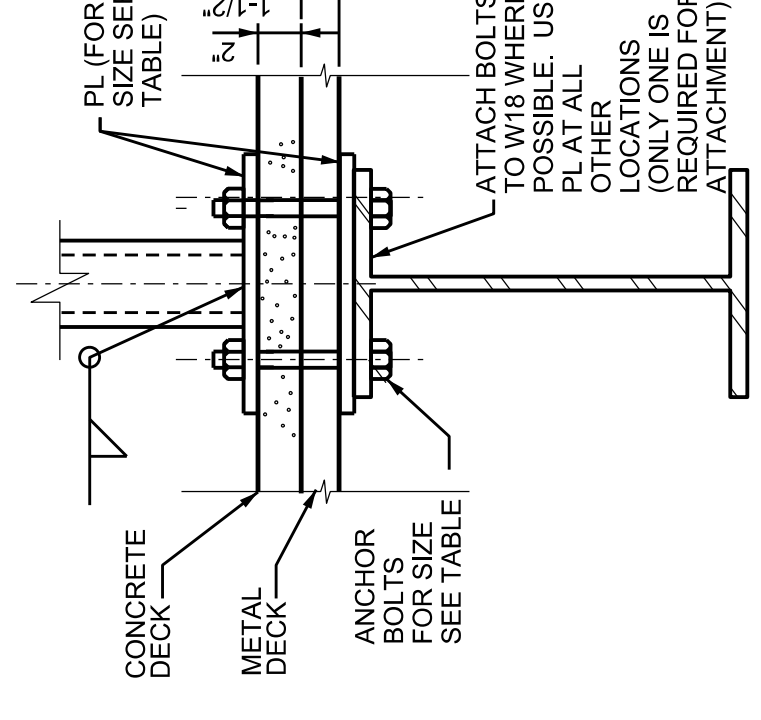


WELDING PATTERN	X
2	24"
3	12"
5	8"



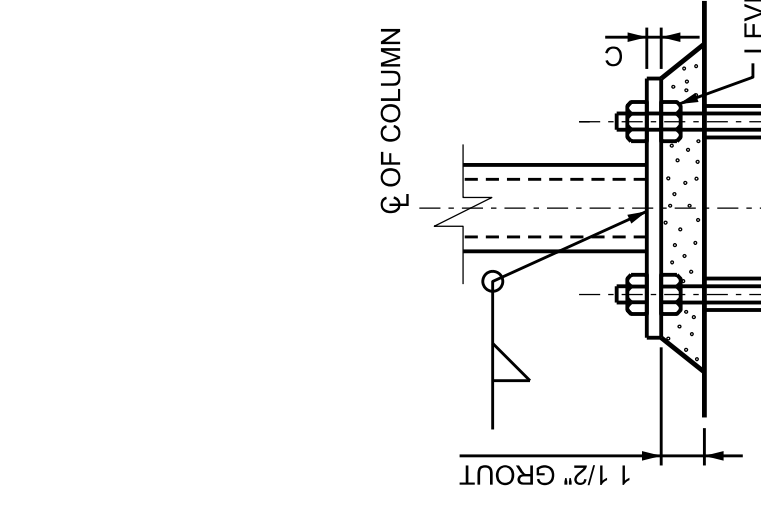
METAL DECK WELDING

S-550



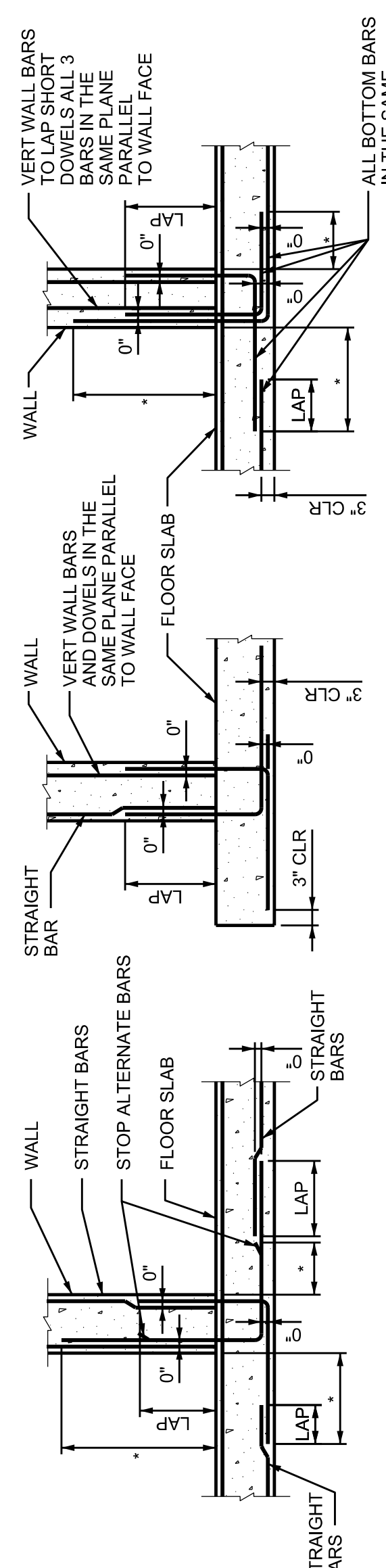
COMPOSITE ROOF DECK CONNECTION

S-567



CONCRETE CONNECTION

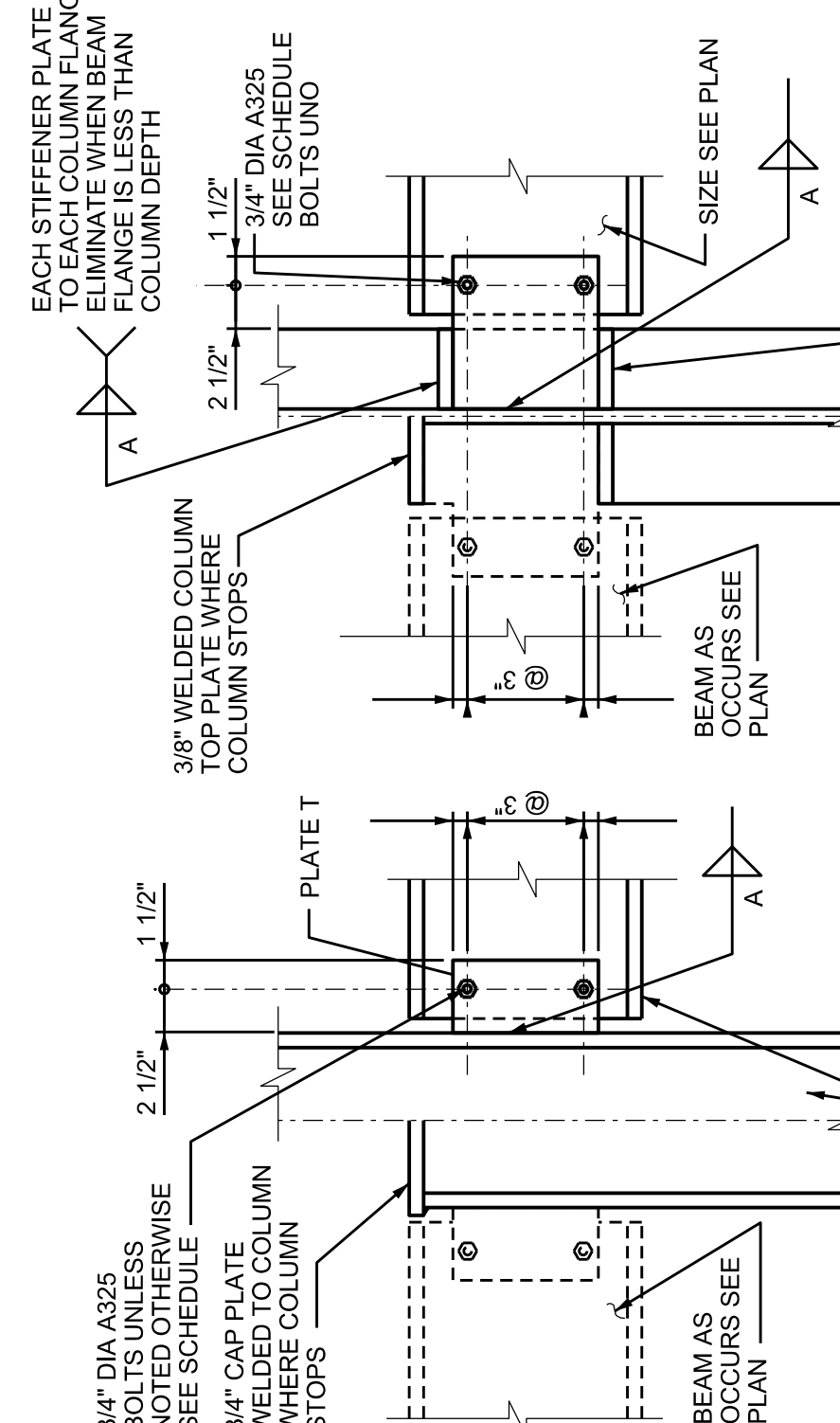
BASE PLATE TYPE	BASE PLATE A X B X C	MAT	BOLTS NUMBER	DIA	EMBED	COMMENTS
I	8x8x5/8	A325	4	5/8	N/A	ANCHOR TO COMPOSITE ROOF DECK
III	8X11X5/8	A325	4	5/8	N/A	



STANDARD FOR REINFORCING BAR DETAILING

S-149

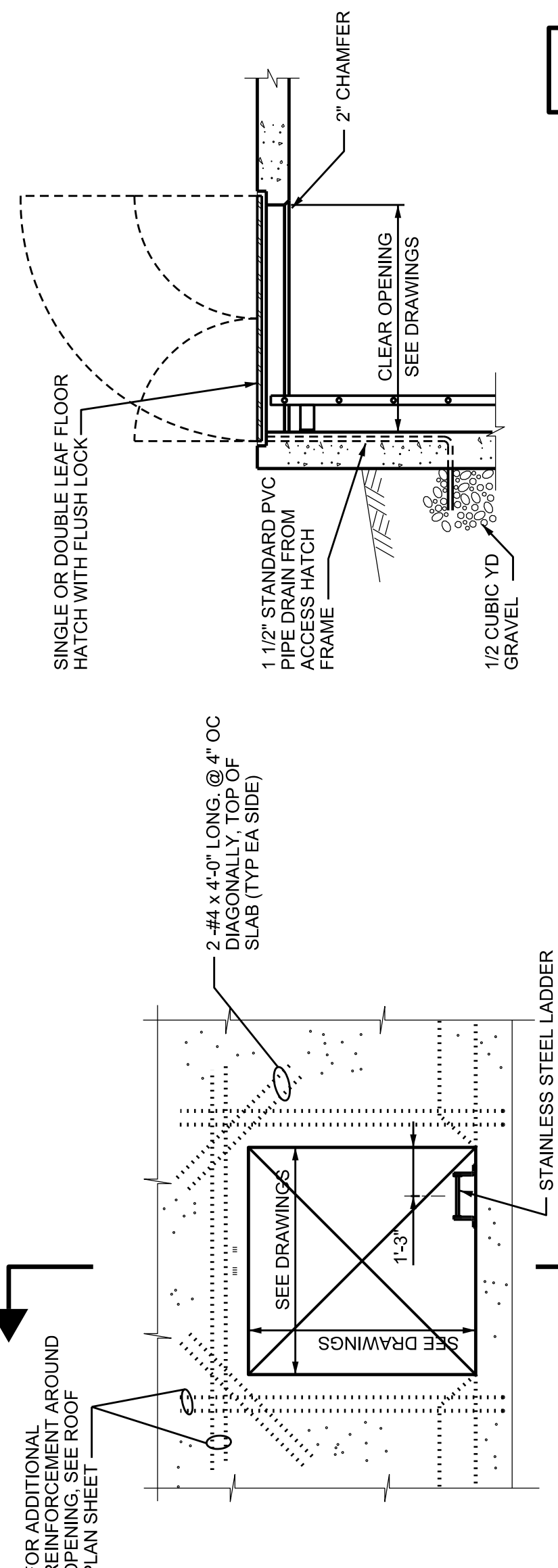
TYPICAL BEAM	NO. OF BOLTS	PLATE THICKNESS	WELD SIZE	COMMENTS
W8	N	T	A	
W10				
W12				
W14				
W16				
W18				
W21				
W24				
W36				



BEAM TO COLUMN CONNECTION

S-561

REV 052808



SECTION

ACCESS HATCH

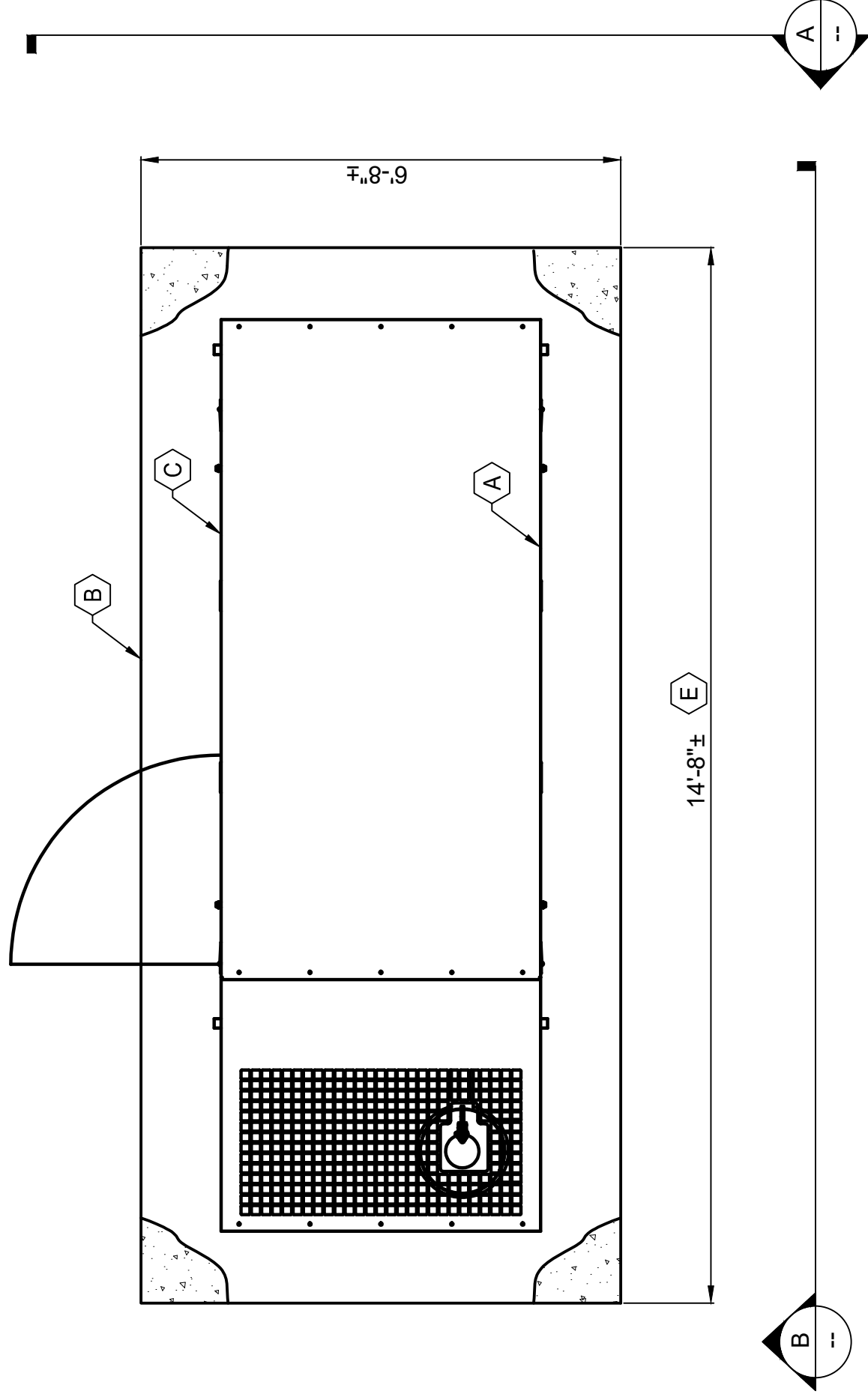
S-594

SHEET GENERAL NOTES

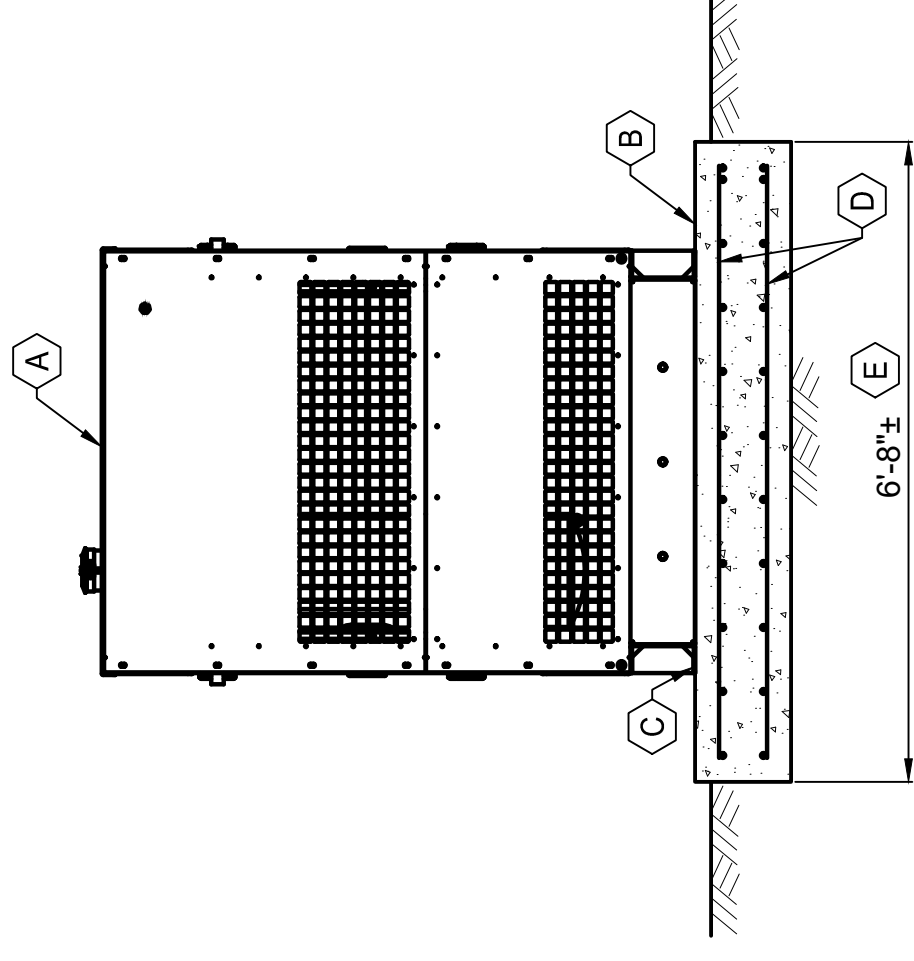
1. PROVIDE HOOKS, LAPS AND EMBEDMENT LENGTHS PER DETAIL S-143.
2. WELDED SPLICES MAY BE ALLOWED IN ACCORDANCE WITH DETAILS S-145 AND S-146. MECHANICAL SPLICES ARE NOT ALLOWED.
3. FORM STRUCTURES IN ACCORDANCE WITH FORMING DETAILS. DETAIL S-152.
4. PROVIDE ADDITIONAL REINFORCING AT CIRCULAR OPENINGS IN ACCORDANCE WITH DETAIL S-144. WHERE OPENINGS ARE CREATED IN SLABS OR WALLS WITH TWO MATS OF REINFORCING, PROVIDE ADDITIONAL REINFORCING IN BOTH MATS.
5. PROVIDE ADDITIONAL REINFORCING AT RECTANGULAR OPENINGS IN ACCORDANCE WITH DETAIL S-148. WHERE OPENINGS ARE CREATED IN SLABS OR WALL WITH TWO MATS OF REINFORCING, PROVIDE ADDITIONAL REINFORCING IN BOTH MATS.
6. SUPPORT ALL REINFORCEMENT PRIOR TO AND DURING CONCRETE PLACEMENT PER DETAIL S-204 AND SPECIFICATIONS.
7. BACKFILL ALL EXCAVATIONS WITH COMPACTED GRANULAR FILL.
8. CONSTRUCTION SHORING IS NOT SHOWN AND IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
9. ADJUST DIMENSIONS OF STRUCTURE TO ACCOMMODATE EQUIPMENT AS REQUIRED AT NO ADDITIONAL COST TO OWNER.
10. UNLESS OTHERWISE NOTED, FURNISH CLASS A1 STRUCTURAL CONCRETE FOR CAST-IN-PLACE CONCRETE.
11. PROVIDE OPENINGS IN SLAB FOR CONDUITS, CABLES AND FUEL LINES AS REQUIRED, THESE ARE NOT SHOWN.

SHEET KEY NOTES

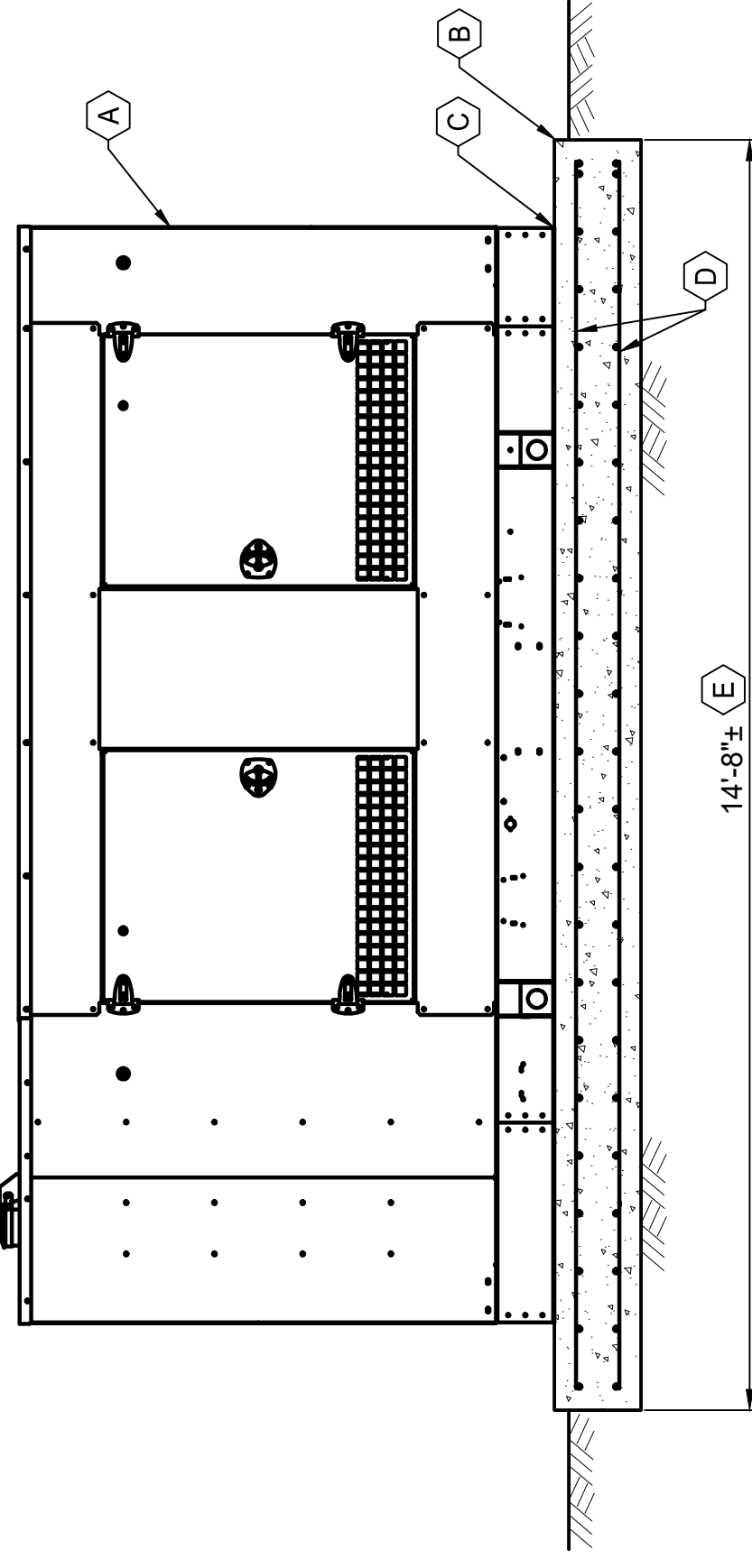
- A. REQ'D GENSET PER ELECTRICAL SPECIFICATIONS
- B. REQ'D CAST-IN-PLACE PORTLAND CEMENT CONCRETE GENERATOR SLAB, 12" THICK
- C. ANCHOR GENSET TO SLAB PER MANUFACTURERS WRITTEN RECOMMENDATIONS.
- D. REQ'D REINFORCING DUAL MAT, NO. 6 BARS 8" O.C. E.W., TOP AND BOTTOM
- E. ADJUST DIMENSION TO FIT EQUIPMENT. (GEN. EQUIPMENT + 2'-0" MIN.)



FOUNDATION PLAN
SCALE: 1/2" = 1' 0"



SECTION VIEW
SCALE: 1/2" = 1' 0"



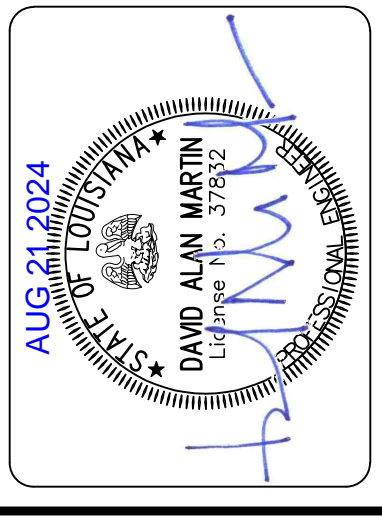
SECTION VIEW
SCALE: 1/2" = 1' 0"



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

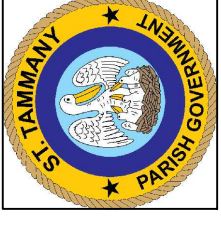
No.	DESCRIPTION OF REVISION	DATE:
0		
1		
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5		
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DESIGNED BY:	M. LOKER
DRAWN BY:	J. HITT
CHECKED BY:	J. CATLANOTTO
PROJECT No.:	175, 177
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED



BREWSTER ROAD SEWER
CONSOLIDATION
GENERATOR STRUCTURAL REQUIREMENTS

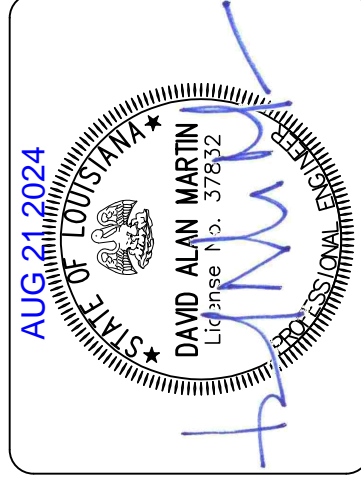
SHEET NO.
GS-04



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

No.	DESCRIPTION OF REVISION	DATE:
0		
1		
2		
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DESIGNED BY:	M. LOKER
DRAWN BY:	J. HITT
CHECKED BY:	J. CATLANOTTO
SUBMITTED BY:	FAIRWAY CE
PROJECT No.:	DU 168,170, 175, 177
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED



**BREWSTER ROAD SEWER
CONSOLIDATION**

CONTROL PANEL AWNING

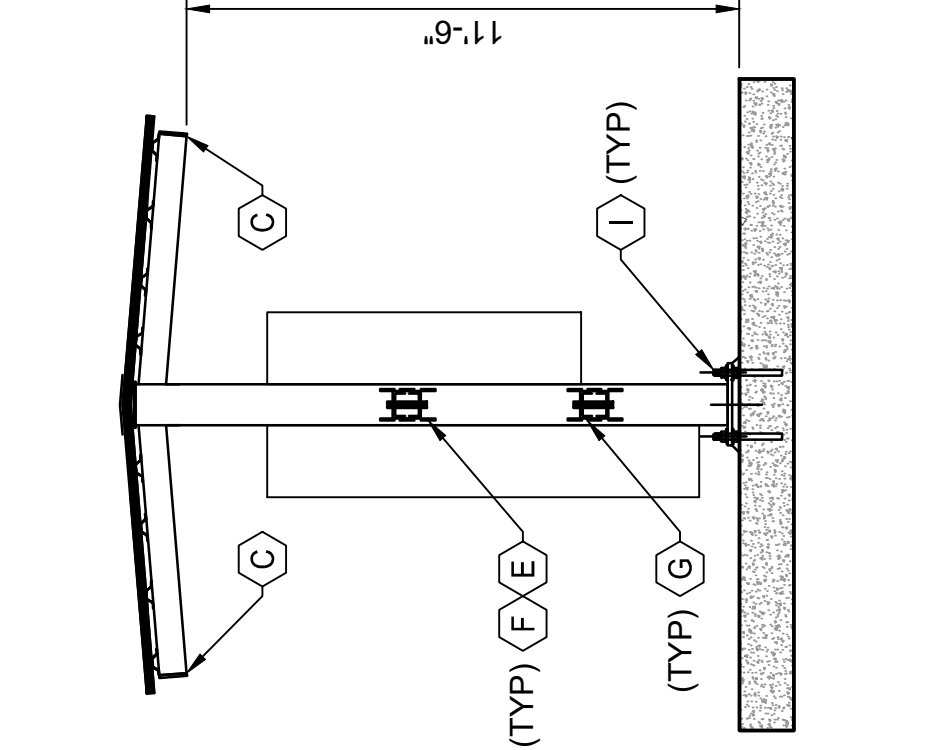
SHEET NO.
GS-05

GENERAL NOTES

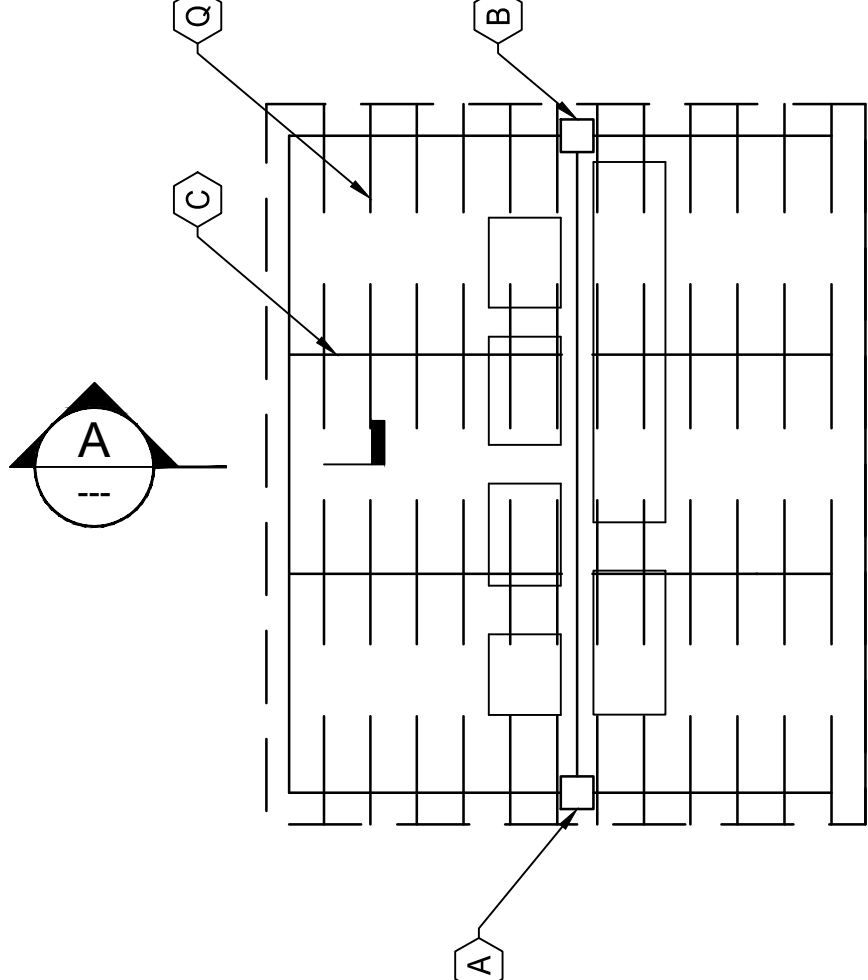
1. PROVIDE HOOKS, LAPS AND EMBEDMENT LENGTHS PER DETAIL S-143.
2. WELDED SPLICES MAY BE ALLOWED IN ACCORDANCE WITH DETAILS S-145 AND S-146. MECHANICAL SPLICES ARE NOT ALLOWED.
3. FORM STRUCTURES IN ACCORDANCE WITH FORMING DETAILS, DETAIL S-152.
4. PROVIDE ADDITIONAL REINFORCING AT CIRCULAR OPENINGS IN ACCORDANCE WITH DETAIL S-144. WHERE OPENINGS ARE CREATED IN SLABS OR WALLS WITH TWO MATS OF REINFORCING, PROVIDE ADDITIONAL REINFORCING IN BOTH MATS.
5. PROVIDE ADDITIONAL REINFORCING AT RECTANGULAR OPENINGS IN ACCORDANCE WITH DETAIL S-146. WHERE OPENINGS ARE CREATED IN SLABS OR WALL WITH TWO MATS OF REINFORCING, PROVIDE ADDITIONAL REINFORCING IN BOTH MATS.
6. SUPPORT ALL REINFORCEMENT PRIOR TO AND DURING CONCRETE PLACEMENT PER DETAIL S-204 AND SPECIFICATIONS.
7. BACKFILL ALL EXCAVATIONS WITH COMPACTED GRANULAR FILL.
8. CONSTRUCTION SHORING IS NOT SHOWN AND IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
9. ADJUST DIMENSIONS OF STRUCTURE TO ACCOMMODATE EQUIPMENT AS REQUIRED AT NO ADDITIONAL COST TO OWNER.
10. UNLESS OTHERWISE NOTED, FURNISH CLASS A1 STRUCTURAL CONCRETE FOR CAST-IN-PLACE CONCRETE.
11. HOT DIP GALVANIZE ALL STEEL MEMBERS AFTER FABRICATION.
12. FURNISH A36 STEEL UNLESS OTHERWISE NOTED.
13. ELECTRICAL GEAR NOT TO SCALE AND MAY VARY.

SHEET KEYNOTES

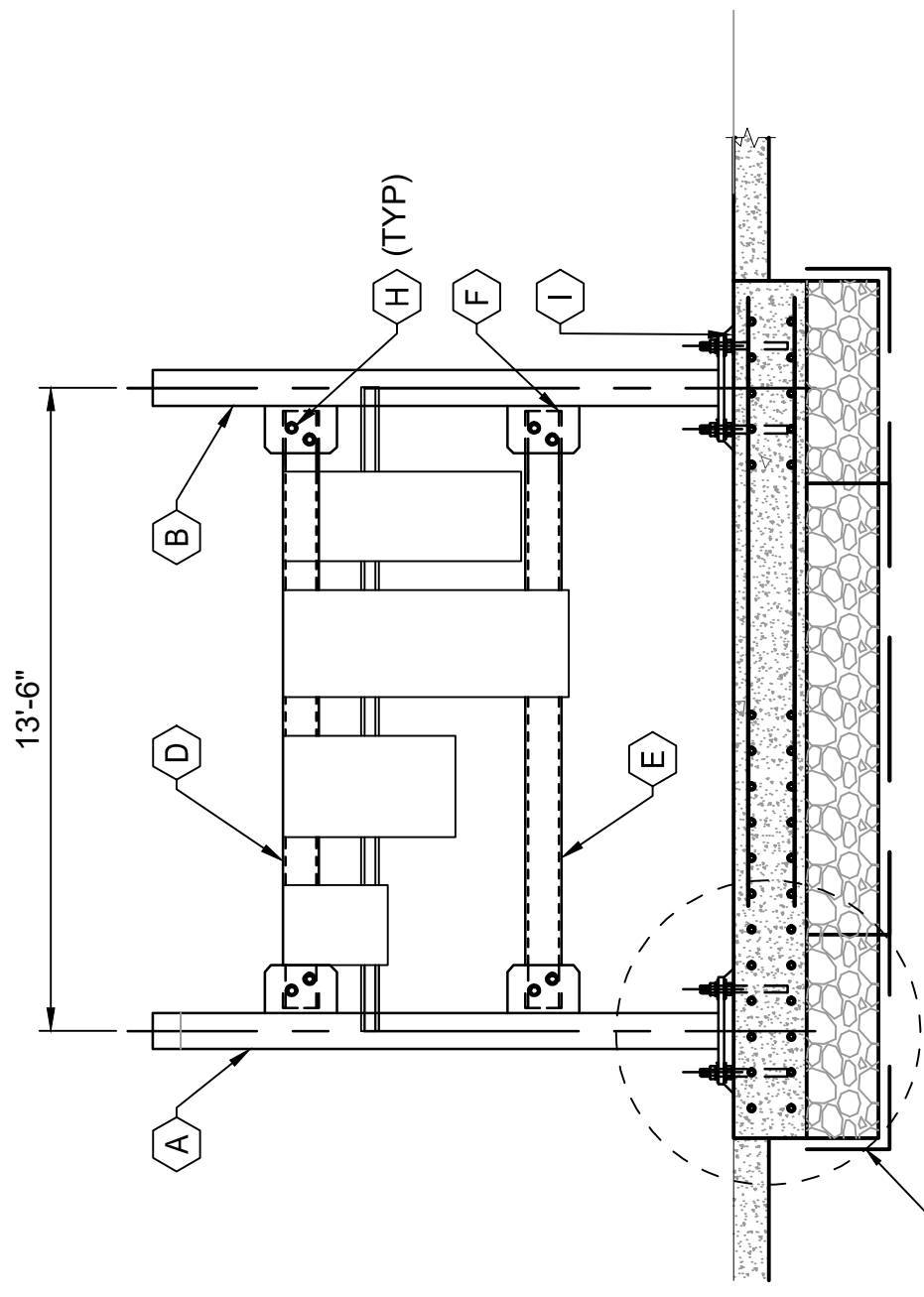
- A. HSS 6" X 6" 1/4" X 7'-11" LEFT COLUMN (ASTM A500 GRADE B), DETAILS AS INDICATED
- B. HSS 6" X 6" 1/4" X 7'-11" RIGHT COLUMN (ASTM A500 GRADE B), DETAILS AS INDICATED
- C. HSS 4" X 4" X 1/4" (ASTM A500 GRADE B), DETAILS AS INDICATED
- D. C6 X 10.5 X 4'-10" BEAM, PUNCH FOUR (4) 13/16" HOLES FOR 3/4" BOLT
- E. BEAM MTG. PLATE, 8" X 12" X 1/2" THK, WELDED TO INSIDE OF COLUMN WEB, PUNCH TWO (2) 13/16" HOLES FOR 3/4" BOLT, FIT/WELD FAR SIDE OF PLATE, 1-1/2" FROM NEAR FACE TO FLANGE.
- F. BEAM MTG. PLATE, 8" X 12" X 1/2" THK, WELDED TO OUTSIDE OF COLUMN WEB, PUNCH TWO (2) 13/16" HOLES FOR 3/4" BOLT, FIT/WELD FAR SIDE OF PLATE 1-1/2" FROM NEAR FACE TO FLANGE.
- G. WELD PLATE, 4" X 8" X 1/4" THK, WELDED TO C6 BEAM FLANGES, FOR BOLTING EQUIPMENT TO BACKSIDE OF BEAMS, PUNCH TWO (2) 9/16" HOLES EACH, PROVIDE FOUR (4) PER BEAM, EVENLY SPACED AT 12" O.C.
- H. 3/4" DIA. X 2-1/2" BOLT, WITH TWO (2) FLATWASHERS, ONE (1) LOCKWASHER, ONE (1) HEAVY NUT, PROVIDE TWO (2) SUCH ASSEMBLIES PER PL01 AND PL02 PLATE, ALL BOLT THREADS SHALL BE SAE/UNC COARSE
- I. REQD NON-SHRINK GROUT
- J. HSS 6" X 6" X 1/4" X 7'-11" HIGH TUBE COLUMN (PLUS 3/4" THK. BASEPLATE)
- K. 1.25" DIA. X 15" ANCHOR
- L. 3/4" HEAVY NUT WITH FLATWASHER AND LOCKWASHER
- M. 18" X 18" X 3/4" THK. BASEPLATE WITH 4-1" DIA. HOLES FOR ANCHOR BOLTS
- N. 1.25" LEVELING HEAVY NUT WITH FLATWASHER
- O. CAST IN PLACE SLAB, 12" THK W/ 2 MATS NO. 6 REBAR, 8" OCEW T&D
- P. REQD HAT CHANNELS



ELEVATION
SCALE: 3/8" = 1' 0"

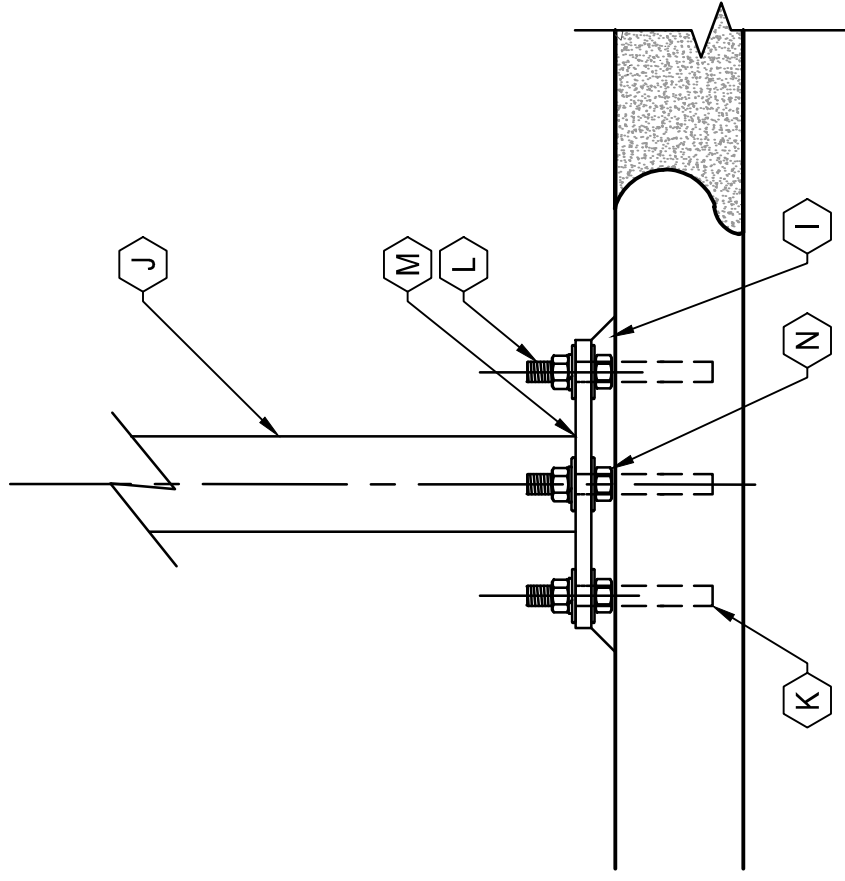


PLAN VIEW
SCALE: 3/8" = 1' 0"

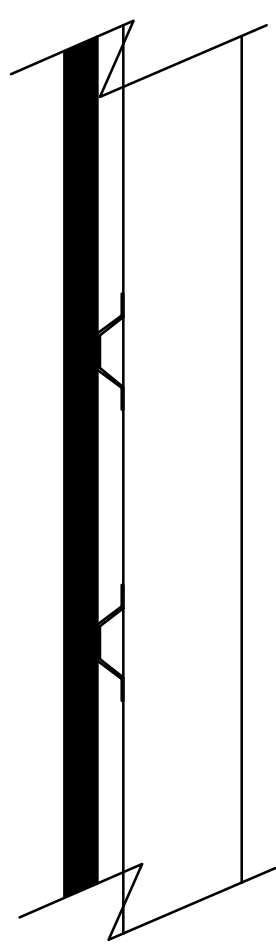


SEE ENLARGEMENT
BELOW

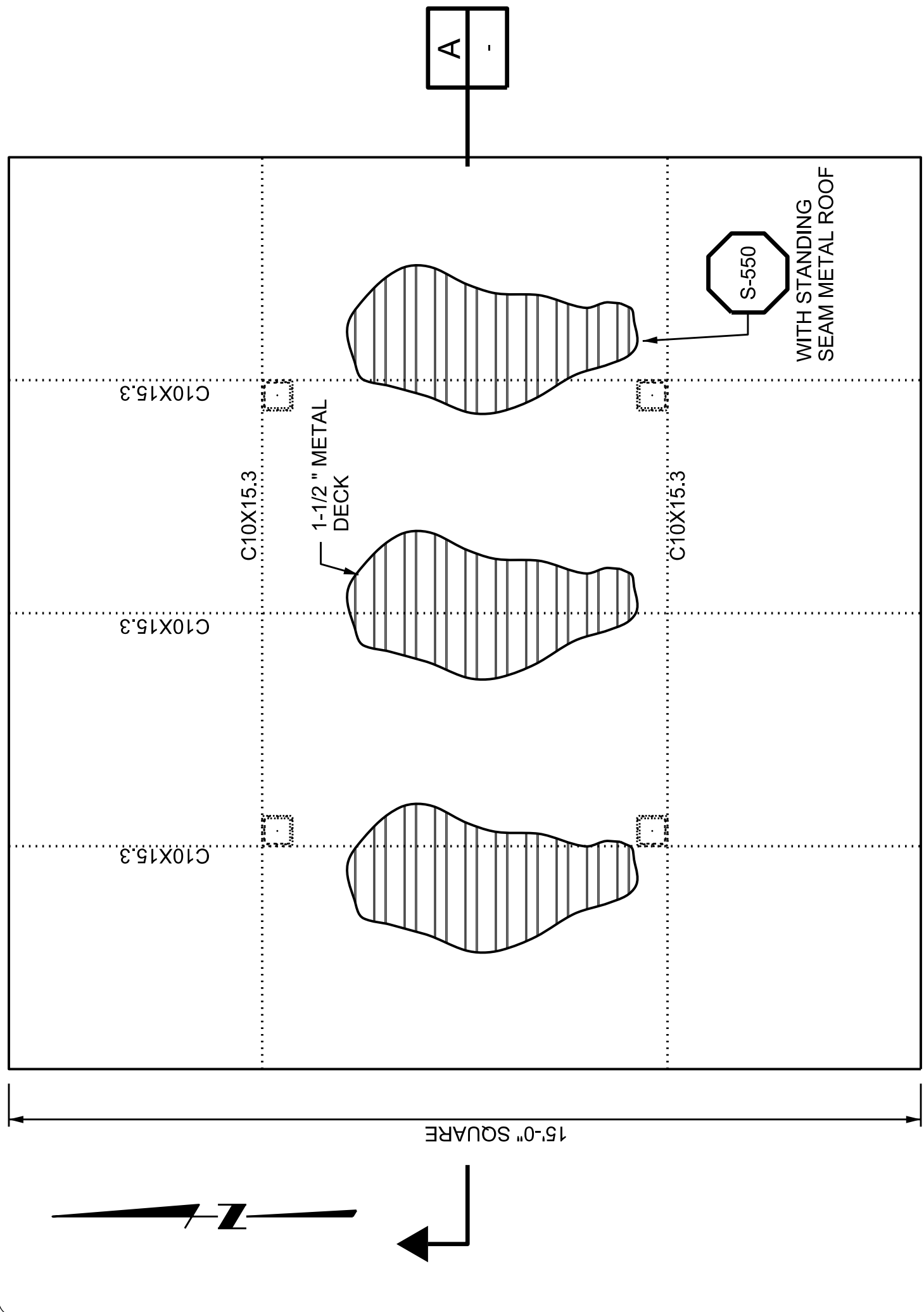
ELEVATION
SCALE: 3/8" = 1' 0"



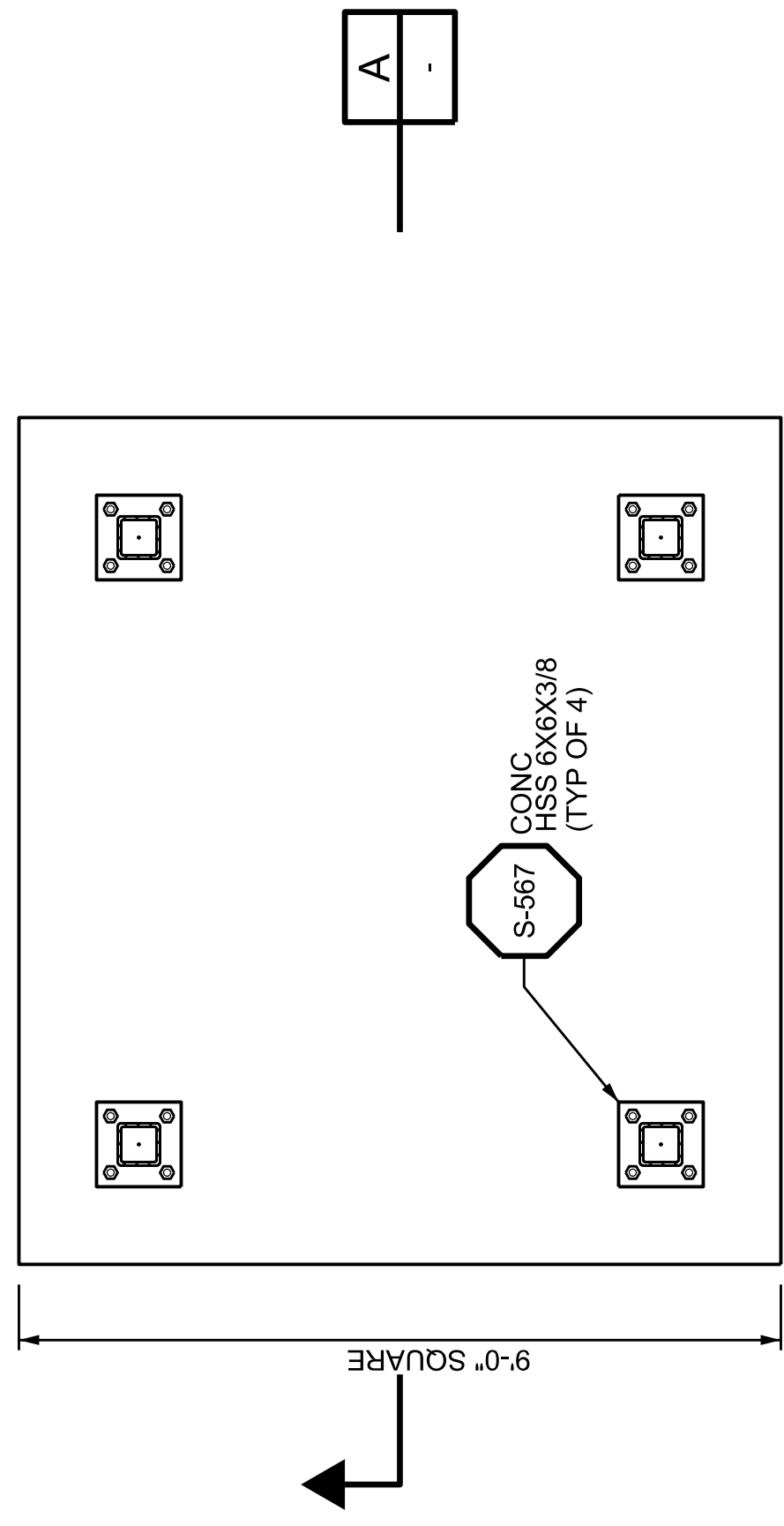
BASEPLATE BOLTING
SCALE: NONE



SECTION
SCALE: NONE

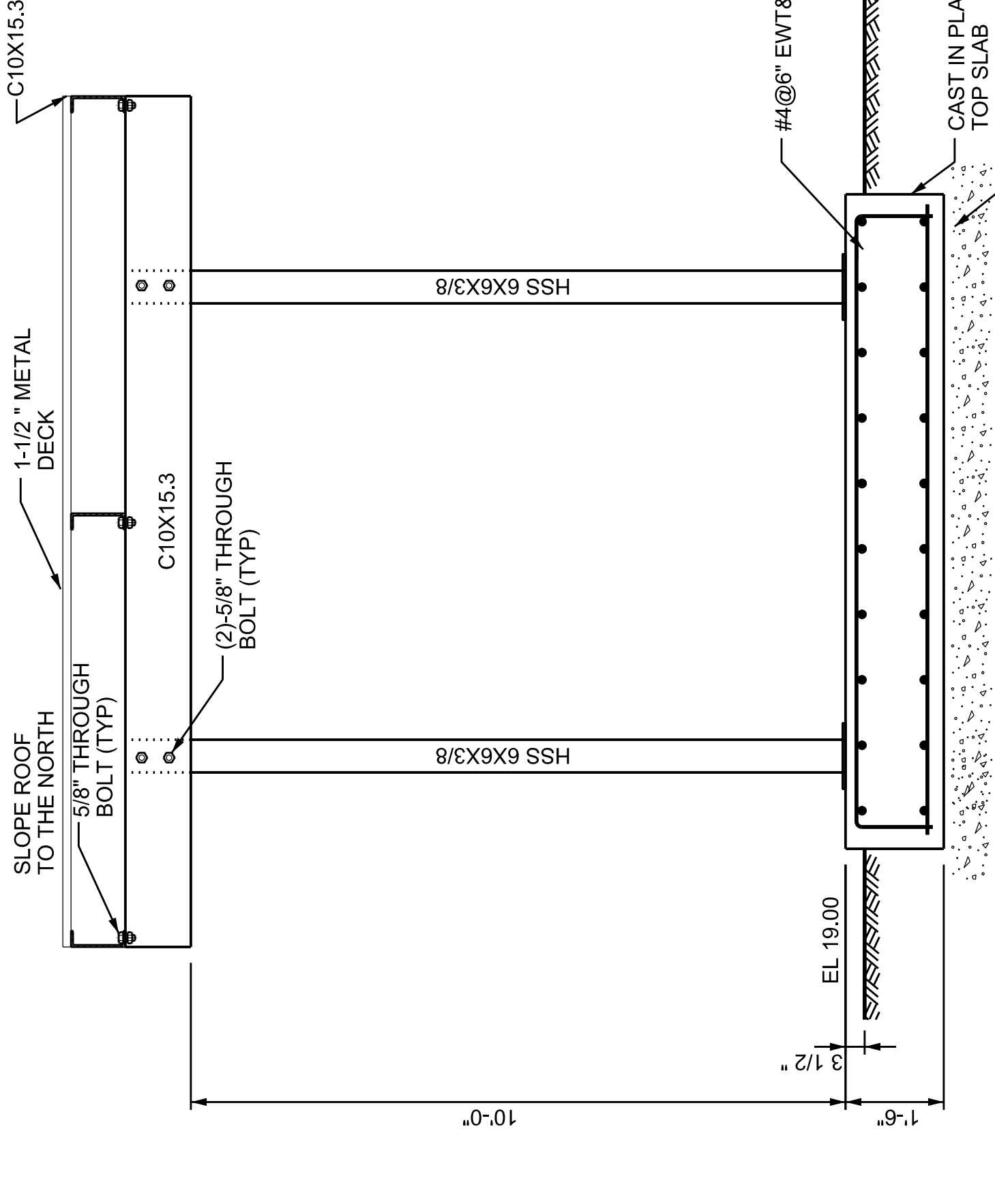


CANOPY PLAN
SCALE: 1/2"=1'-0"

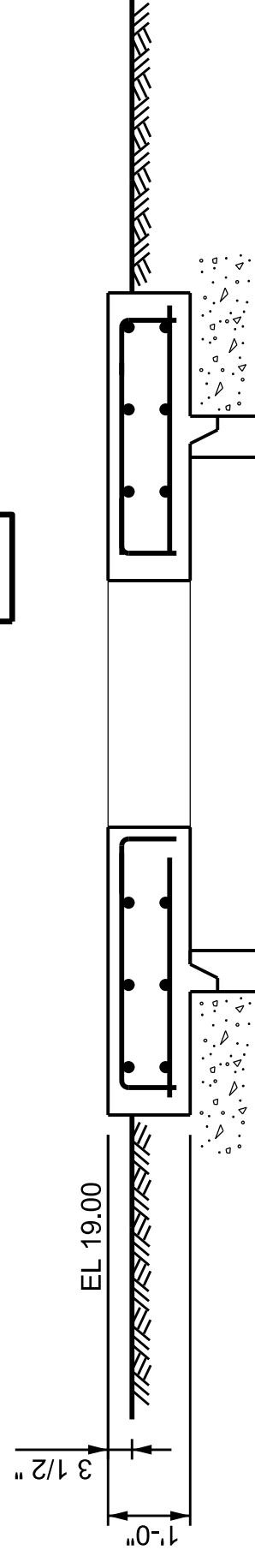


WET WELL AND PUMP SLAB PLAN
SCALE: 1/2"=1'-0"

- GENERAL NOTES**
- SEE MECHANICAL DRAWINGS FOR INFORMATION NOT SHOWN
 - COORDINATE ALL DIMENSIONS WITH MECHANICAL DRAWINGS



SECTION A
SCALE: 1/2"=1'-0"



SECTION B
SCALE: 1/2"=1'-0"

**BREWSTER ROAD SEWER
CONSOLIDATION**

FAIRFIELD OAKS
WET WELL AND CANOPY
PLANS, SECTIONS AND DETAILS

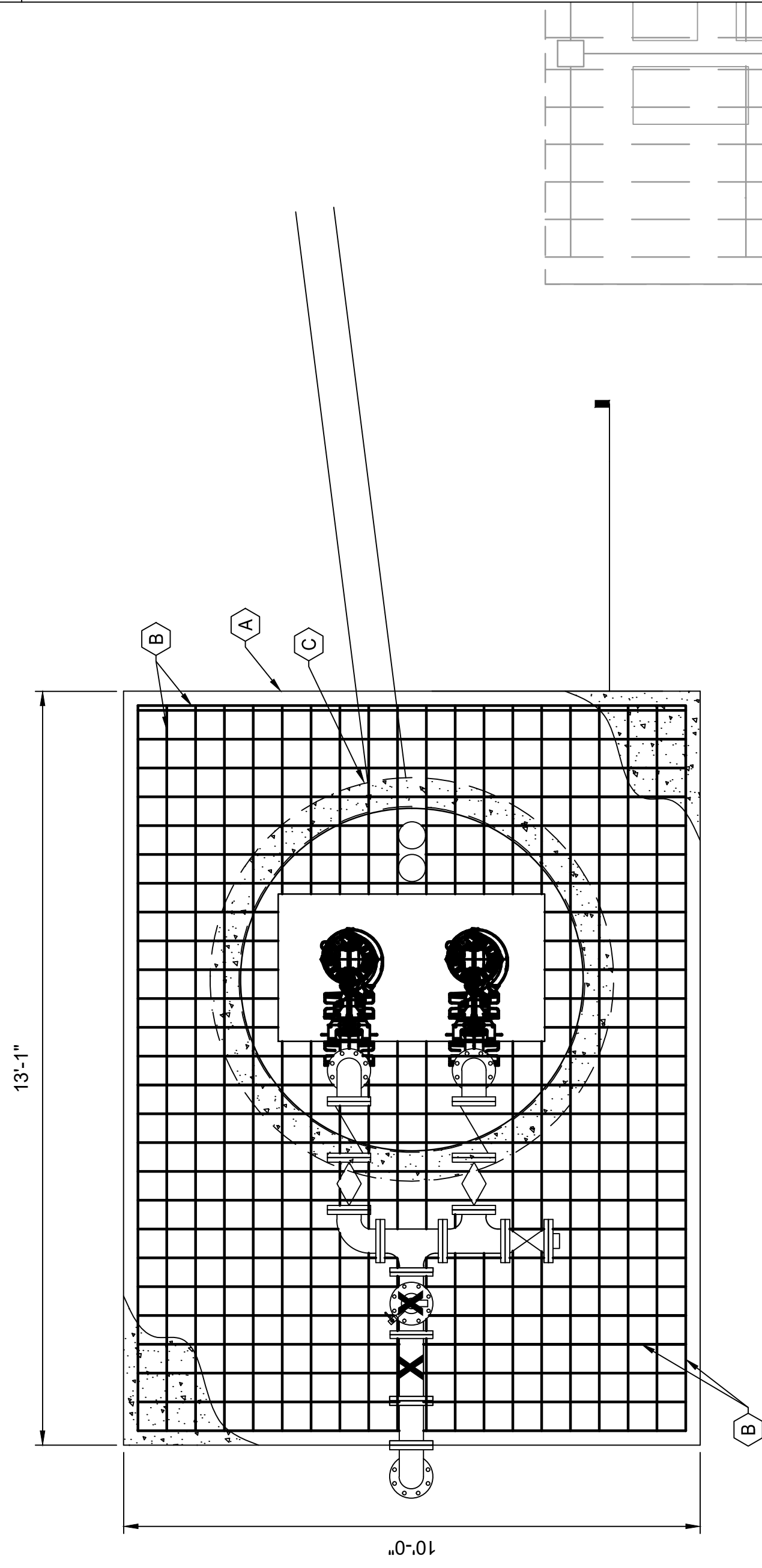
SHEET NO. **20S-01**
SHEET of 85

DESIGNED BY:	BC
DRAWN BY:	BC
CHECKED BY:	M. LOKER
SUBMITTED BY:	FAIRWAY CE
PROJECT No.:	DU*****
ISSUE DATE:	05/24/2023
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED

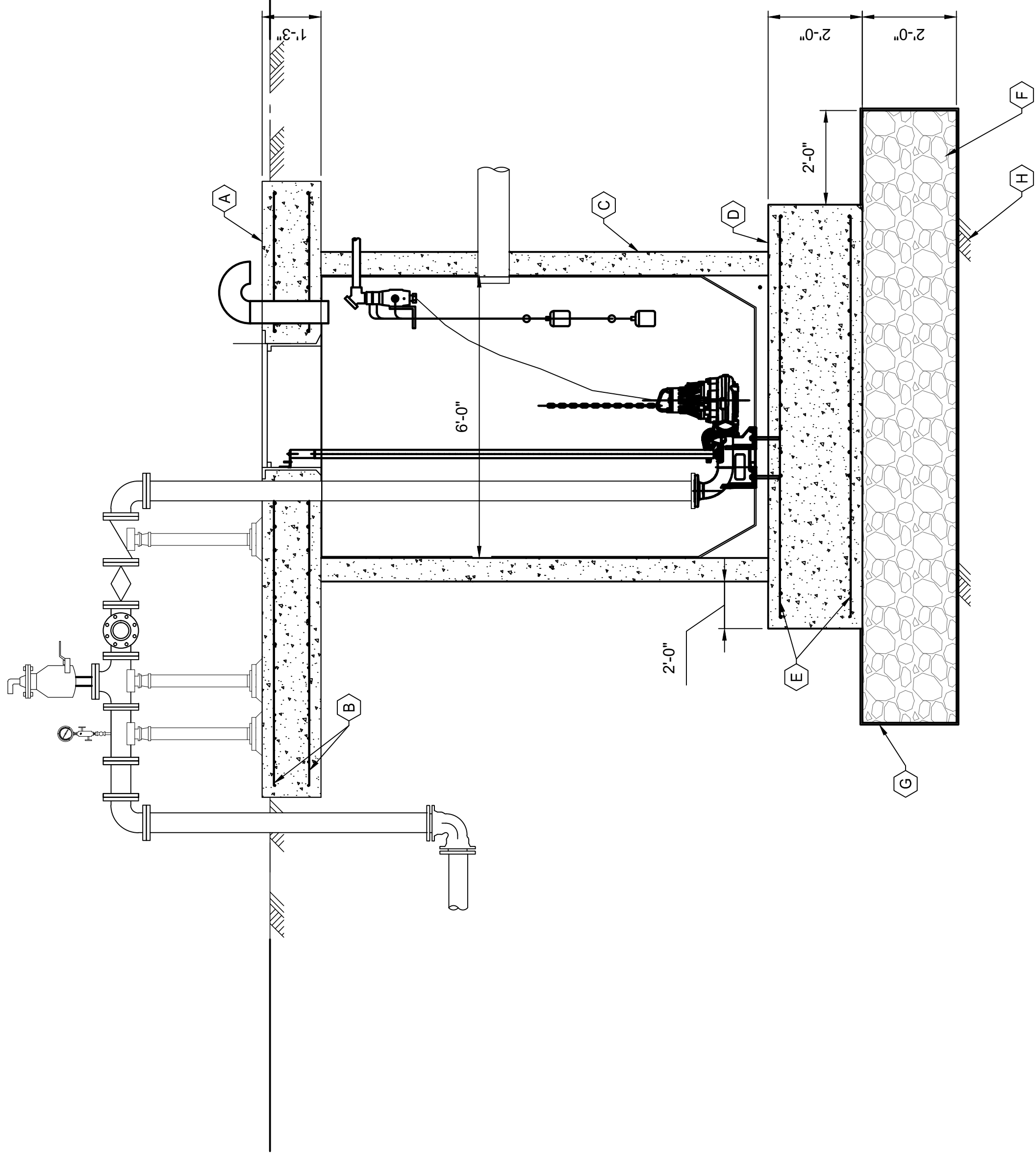
No.	DESCRIPTION OF REVISION	DATE:
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2	90% DESIGN SUBMITTAL	08/18/23
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DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

DATE: _____
DESCRIPTION OF REVISION



THREE RIVERS LIFT STATION - STRUCTURAL PLAN
SCALE: 1/2" = 1' 0"



A SECTION
SCALE: 1/2" = 1' 0"

GENERAL NOTES

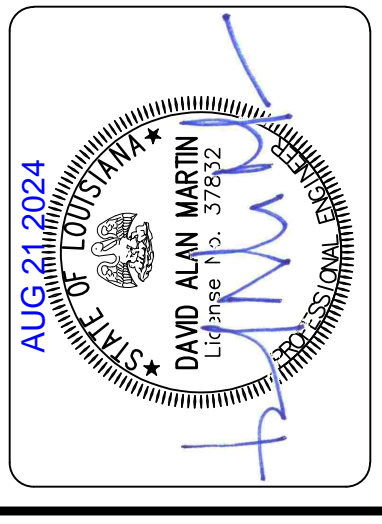
1. PROVIDE HOOKS, LAPS AND EMBEDMENT LENGTHS PER DETAIL S-143.
2. WELDED SPLICES MAY BE ALLOWED IN ACCORDANCE WITH DETAILS S-145 AND S-146. MECHANICAL SPLICES ARE NOT ALLOWED.
3. FORM STRUCTURES IN ACCORDANCE WITH FORMING DETAILS, DETAIL S-152.
4. PROVIDE ADDITIONAL REINFORCING AT CIRCULAR OPENINGS IN ACCORDANCE WITH DETAIL S-144. WHERE OPENINGS ARE CREATED IN SLABS OR WALLS WITH TWO MATS OF REINFORCING, PROVIDE ADDITIONAL REINFORCING IN BOTH MATS.
5. PROVIDE ADDITIONAL REINFORCING AT RECTANGULAR OPENINGS IN ACCORDANCE WITH DETAIL S-148. WHERE OPENINGS ARE CREATED IN SLABS OR WALL WITH TWO MATS OF REINFORCING, PROVIDE ADDITIONAL REINFORCING IN BOTH MATS.
6. SUPPORT ALL REINFORCEMENT PRIOR TO AND DURING CONCRETE PLACEMENT PER DETAIL S-204 AND SPECIFICATIONS.
7. BACKFILL ALL EXCAVATIONS WITH COMPACTED GRANULAR FILL.
8. CONSTRUCTION SHORING IS NOT SHOWN AND IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
9. ADJUST DIMENSIONS OF STRUCTURE TO ACCOMMODATE EQUIPMENT AS REQUIRED AT NO ADDITIONAL COST TO OWNER.
10. UNLESS OTHERWISE NOTED, FURNISH CLASS A1 STRUCTURAL CONCRETE FOR CAST-IN-PLACE CONCRETE.

SHEET KEYNOTES

- A. REQ'D CAST-IN-PLACE PORTLAND CEMENT CONCRETE TOP SLAB, 15" THICK
- B. REQ'D REINFORCING STEEL, NO. 6, O.C.E.W., T & B
- C. REQ'D PRECAST PORTLAND CEMENT CONCRETE WET WELL. PROVIDE 30" WIDE STRIP OF FILTER FABRIC AT EACH JOINT
- D. REQ'D CAST-IN-PLACE PORTLAND CEMENT CONCRETE BOTTOM SLAB, 24" THICK
- E. REQ'D REINFORCING STEEL, NO. 6, O.C.E.W., T. & B.
- F. REQ'D STONE BEDDING, 24" THICK
- G. REQ'D GEOTEXTILE FABRIC
- H. UNDISTURBED EARTH

No.	DESCRIPTION OF REVISION	DATE:
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DESIGNED BY: M. LOKER	DRAWN BY: J. HITT
CHECKED BY: J. CATLANOTTO	PROJECT No.: DU 168,170, 175, 177
ISSUE DATE: 08/20/2024	APPROVED BY: D. MARTIN
SHEET SIZE: ANSI D 34x22	AS NOTED

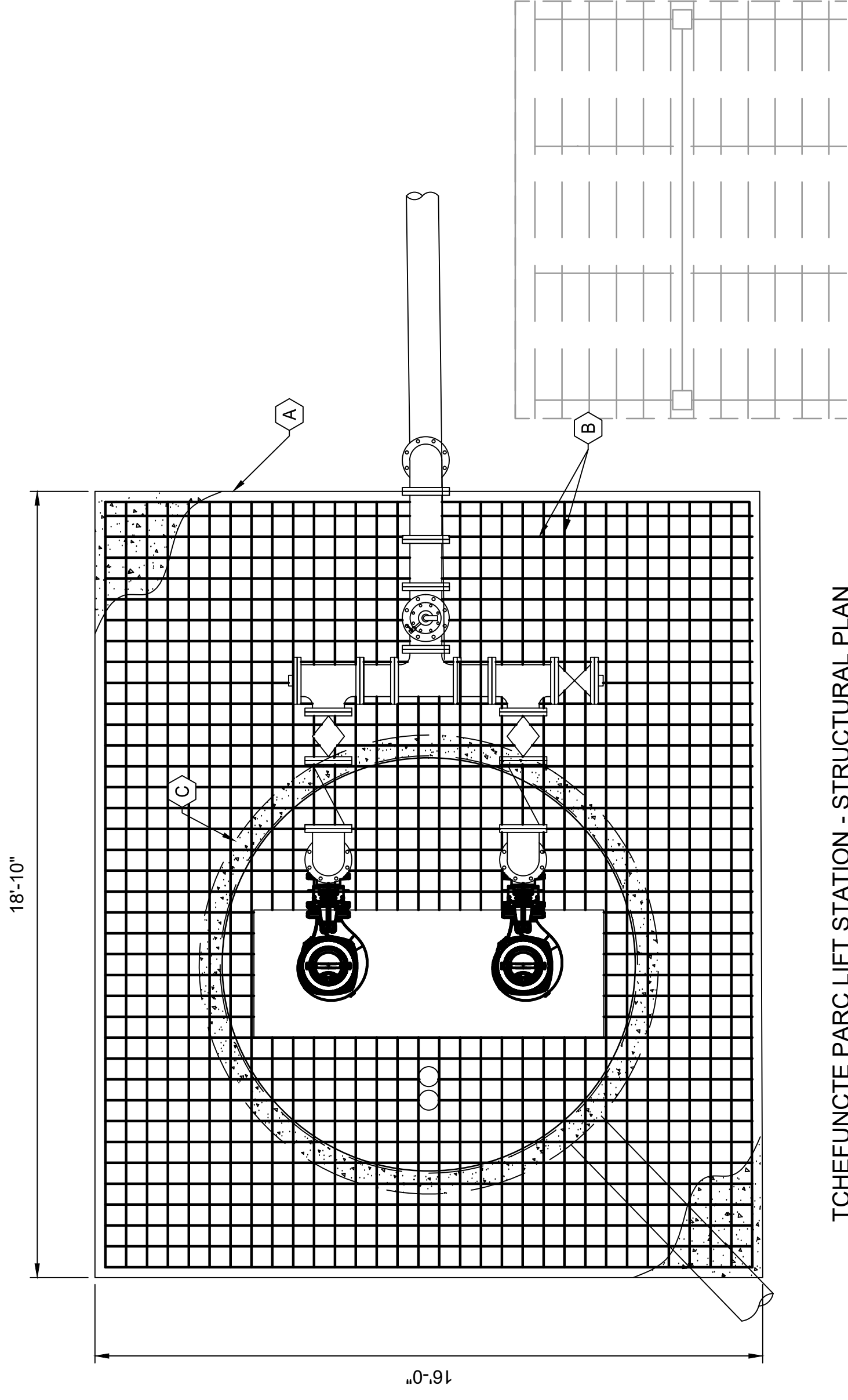
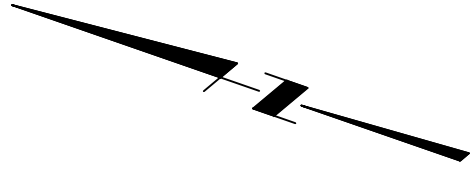


BREWSTER ROAD SEWER
CONSOLIDATION
THREE RIVERS - STRUCTURAL
PLAN AND SECTION

SHEET NO.
30S-01

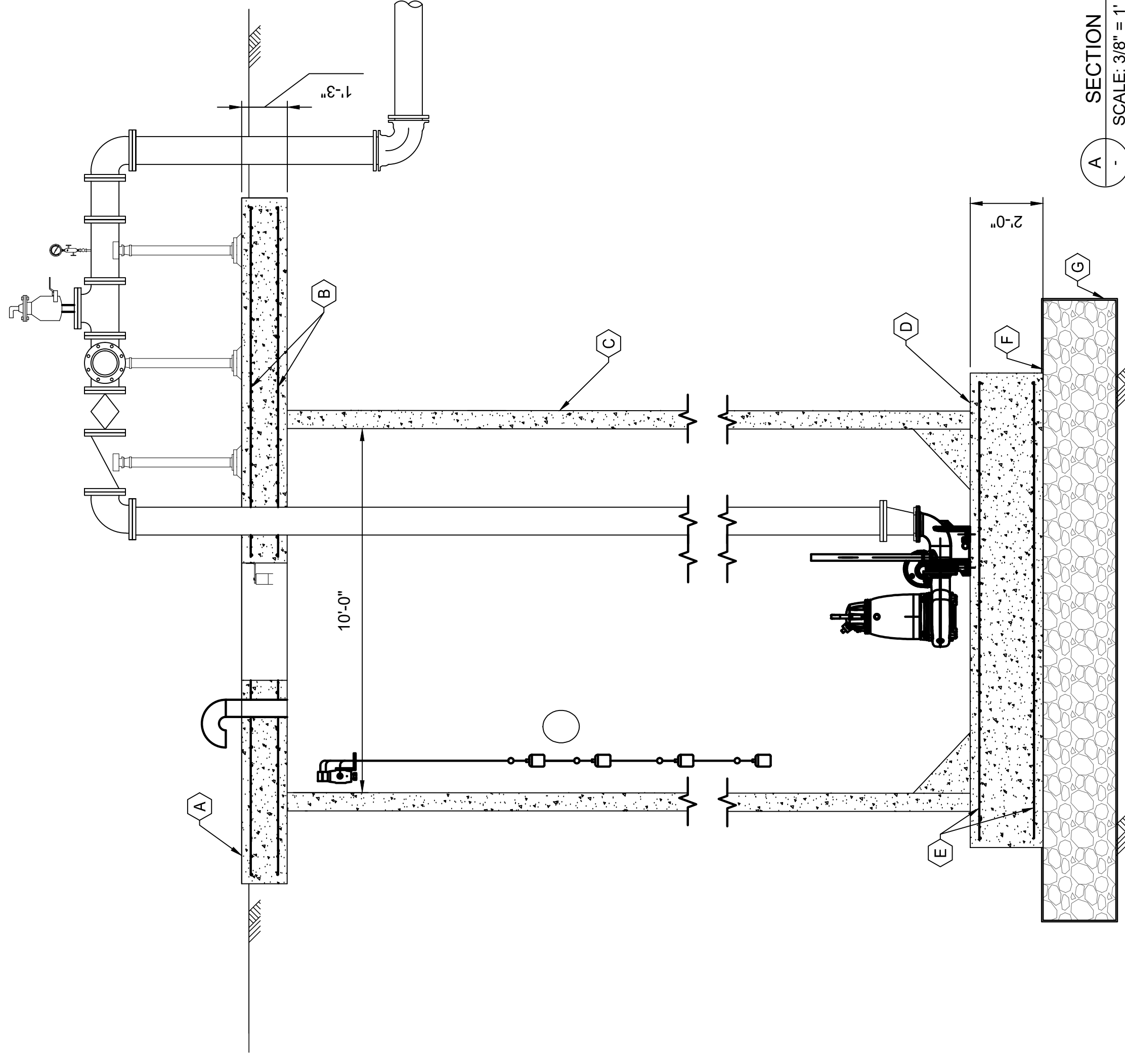


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TCHFUNCTE PARC LIFT STATION - STRUCTURAL PLAN

SCALE: 3/8" = 1' 0"



SECTION A -

SCALE: 3/8" = 1' 0"

GENERAL NOTES

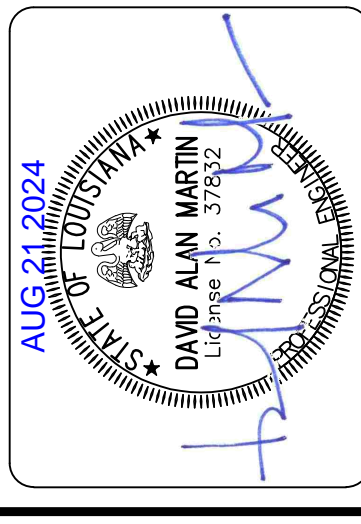
1. PROVIDE HOOKS, LAPS AND EMBEDMENT LENGTHS PER DETAIL S-143.
2. WELDED SPLICES MAY BE ALLOWED IN ACCORDANCE WITH DETAILS S-145 AND S-146. MECHANICAL SPLICES ARE NOT ALLOWED.
3. FORM STRUCTURES IN ACCORDANCE WITH FORMING DETAILS, DETAIL S-152.
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5. PROVIDE ADDITIONAL REINFORCING AT RECTANGULAR OPENINGS IN ACCORDANCE WITH DETAIL S-148. WHERE OPENINGS ARE CREATED IN SLABS OR WALL WITH TWO MATS OF REINFORCING, PROVIDE ADDITIONAL REINFORCING IN BOTH MATS.
6. SUPPORT ALL REINFORCEMENT PRIOR TO AND DURING CONCRETE PLACEMENT PER DETAIL S-204 AND SPECIFICATIONS.
7. BACKFILL ALL EXCAVATIONS WITH COMPACTED GRANULAR FILL.
8. CONSTRUCTION SHORING IS NOT SHOWN AND IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
9. ADJUST DIMENSIONS OF STRUCTURE TO ACCOMMODATE EQUIPMENT AS REQUIRED AT NO ADDITIONAL COST TO OWNER.
10. UNLESS OTHERWISE NOTED, FURNISH CLASS A1 STRUCTURAL CONCRETE FOR CAST-IN-PLACE CONCRETE.

SHEET KEYNOTES

- A. REQ'D CAST-IN-PLACE PORTLAND CEMENT CONCRETE TOP SLAB, 15" THICK
- B. REQ'D REINFORCING STEEL, NO. 6, O.C.E.W., T & B
- C. REQ'D PRECAST PORTLAND CEMENT CONCRETE WET WELL. PROVIDE 30" WIDE STRIP OF FILTER FABRIC AT EACH JOINT
- D. REQ'D CAST-IN-PLACE PORTLAND CEMENT CONCRETE BOTTOM SLAB, 24" THICK
- E. REQ'D REINFORCING STEEL, NO. 6, O.C.E.W., T & B.
- F. REQ'D STONE BEDDING, 24" THICK
- G. REQ'D GEOTEXTILE FABRIC
- H. UNDISTURBED EARTH

No.	DESCRIPTION OF REVISION	DATE:
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DESIGNED BY:	M. LOKER
DRAWN BY:	J. HITT
CHECKED BY:	J. CATALANOTTO
PROJECT No.:	DU 168,170, 175, 177
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED



BREWSTER ROAD SEWER
CONSOLIDATION
TCHEFUNCTE PARC -
STRUCTURAL PLAN AND SECTION

SHEET NO.
40S-01



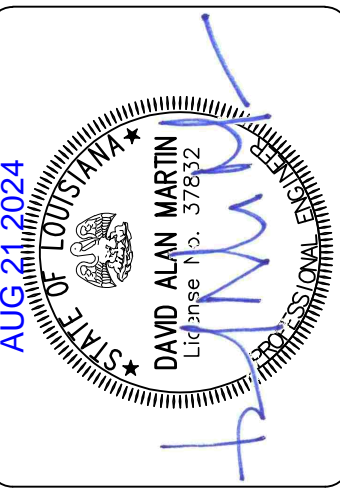
DEPT. OF UTILITIES
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GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

NO.	DESCRIPTION OF REVISION	DATE:

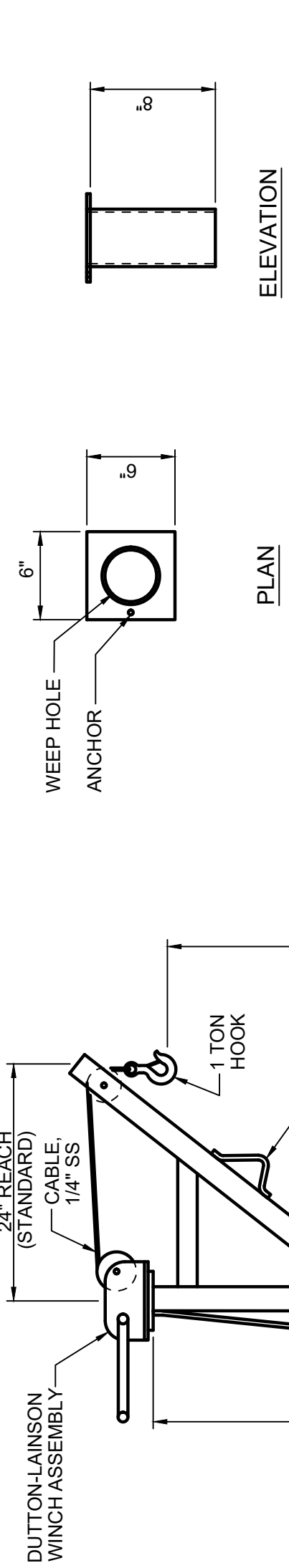
DESIGNED BY: M LOKER	PROJECT No.: DU 168,170.	ISSUE DATE: 08/20/2024	SHEET SIZE: ANSI D 34x22	SCALE: AS NOTED
DRAWN BY: J. HITT	CHECKED BY: J. CATLANOTTO	APPROVED BY: D. MARTIN		
	175, 177			



BREWSTER ROAD SEWER
CONSOLIDATION

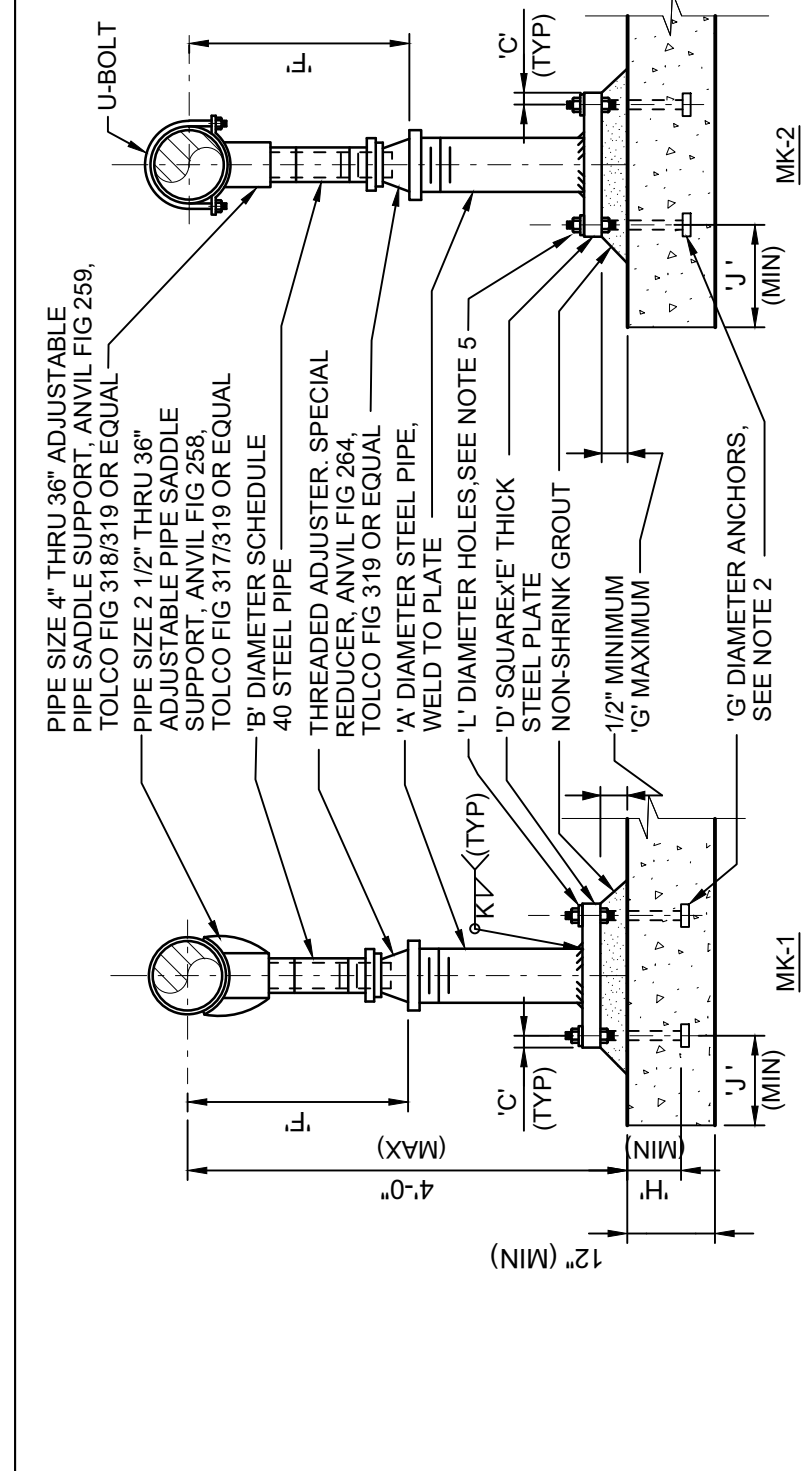
MECHANICAL NOTES AND DETAILS

SHEET NO.
GM-01



- NOTES:**
- PORTABLE HOIST SHALL BE HALLIDAY PRODUCTS, MODEL [D1A24C] OR APPROVED EQUAL.
 - HOIST SOCKET SHALL BE HALLIDAY PRODUCTS, MODEL D1R LINED OR APPROVED EQUAL.
 - ALL MATERIALS OF CONSTRUCTION SHALL BE TYPE 316 STAINLESS STEEL.
 - EMBEDDED HOIST SOCKETS SHALL BE PROVIDED AT ALL LOCATIONS INDICATED. ONLY ONE HOIST SHALL BE PROVIDED.
 - PROVIDE AND INSTALL A BOLT DOWN FRP COVER WITH GASKET AT EACH HOIST SOCKET.
 - MAXIMUM LOAD PORTABLE HOIST IS [500] LBS.

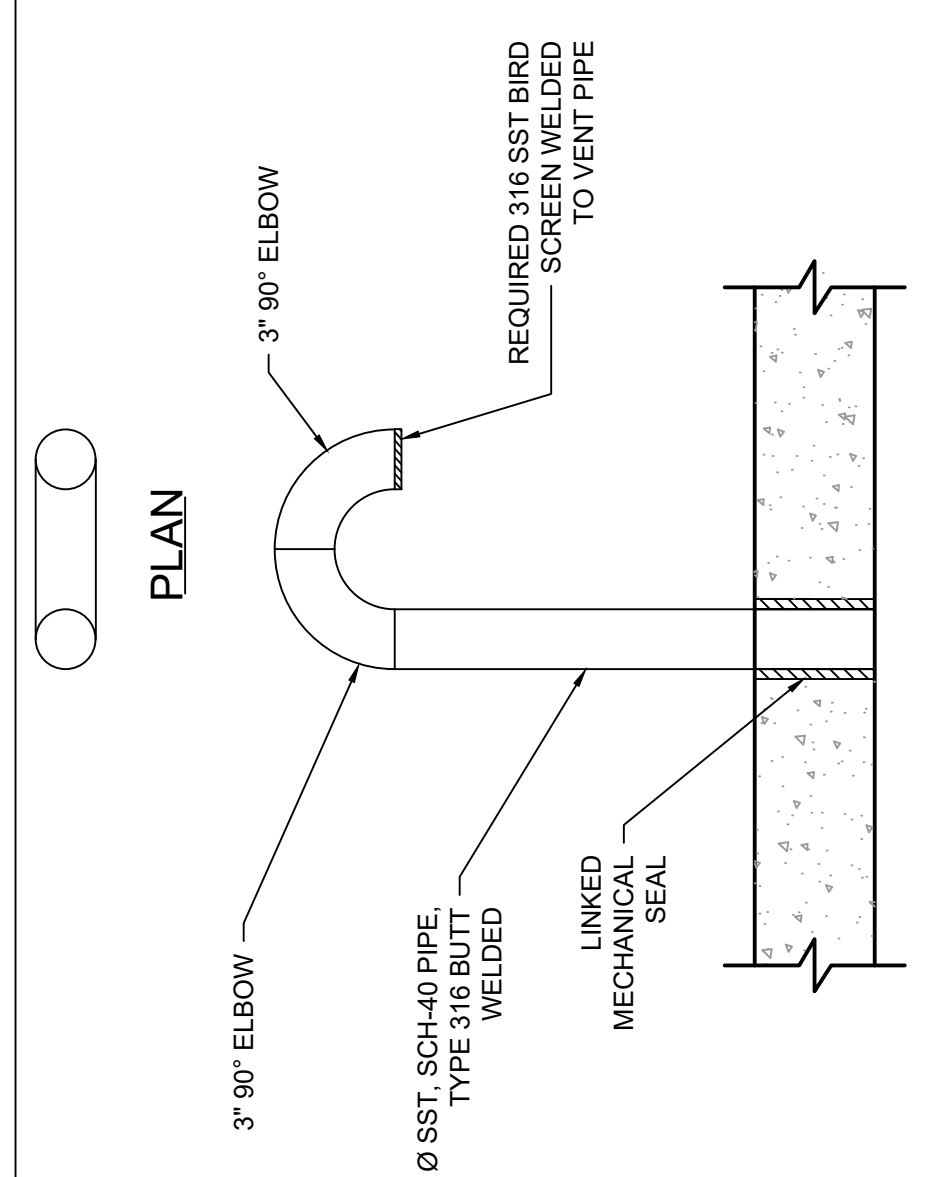
PORTABLE HOIST
M-451
FIXED REACH PORTABLE HOIST
M-451 REV 010118



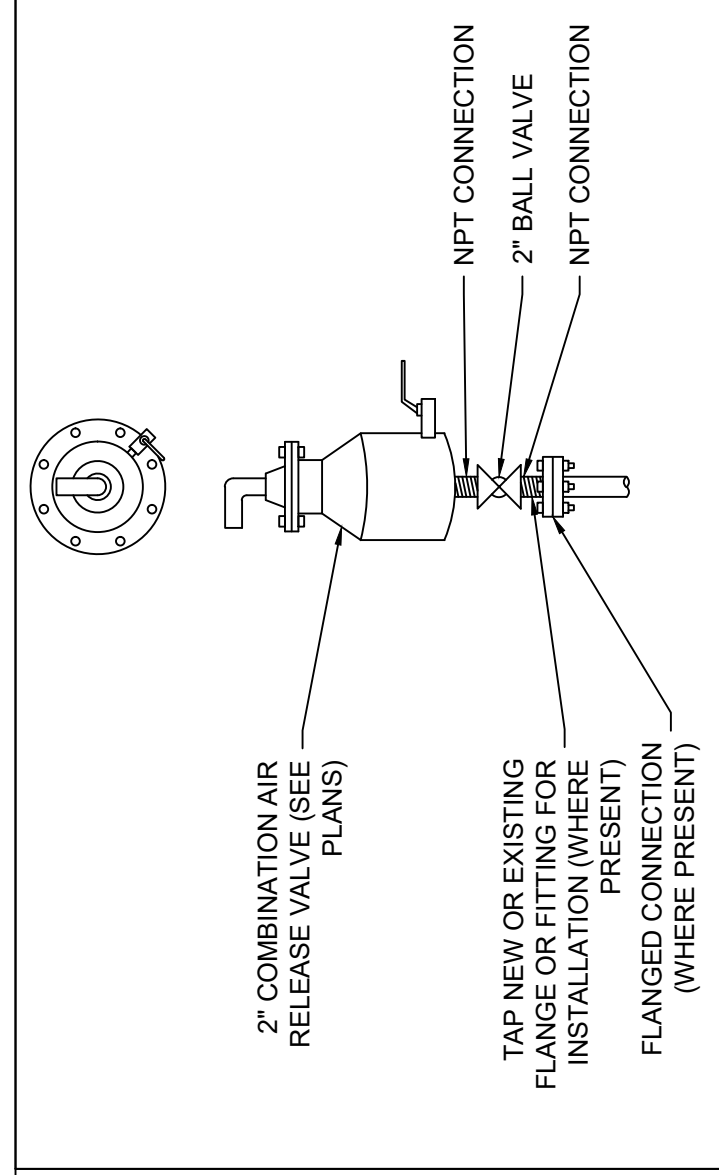
ADJ PIPE SUPPORT W OR W/O 'U' BOLT
(FOR PIPE 36" DIAMETER AND SMALLER)
M-108

NOMINAL PIPE DIAMETER (SCH 40 UNO)	DIMENSIONS IN INCHES													LOAD MAX (LBS)	W*
	A'	B'	C'	D'	E'	F' (MINIMUM)	F' (APPROX) (MAXIMUM)	G'	H'	J'	K'	L'			
2 1/2	*2.12/12	1 1/2	1	8	7/16	7	11 1/2	1/2	4	6	3/8	13/16	1400	500	
3	*2.12/12	1 1/2	1	8	7/16	7.5/16	11 13/16	1/2	4	6	3/8	13/16	1400	500	
3 1/2	*2.12/12	1 1/2	1	8	7/16	7.9/16	12 1/16	1/2	4	6	3/8	13/16	1400	500	
4	3	*2.12/13	1 1/4	10	5/8	10.1/4	14.3/4	5/8	5	8	7/16	1 1/16	2650	1100	
6	3	*2.12/13	1 1/4	10	5/8	11.9/16	16 1/16	5/8	5	8	7/16	1 1/16	2650	1100	
8	3	*2.12/13	1 1/4	10	5/8	13.9/16	18 1/16	5/8	5	8	7/16	1 1/16	2650	1100	
10	3	*2.12/13	1 1/4	10	5/8	14.5/8	19 1/8	5/8	5	8	7/16	1 1/16	2650	1100	
12	3	*2.12/13	1 1/4	10	5/8	15.5/8	20 1/8	5/8	5	8	7/16	1 1/16	2650	1100	
14	4	3	1.3/8	12	3/4	18.7/8	23.3/8	3/4	7	10.5	1/2	1.5/16	4200	2200	
16	4	3	1.3/8	12	3/4	19.7/8	24.3/8	3/4	7	10.5	1/2	1.5/16	4200	2200	
18	6 (SCH 80)	*4.13/12	1.5/8	14	1 1/4	22.1/4	26.3/4	7/8	8	12	11/16	1.9/16	6050	2775	
20	6 (SCH 80)	*4.13/12	1.5/8	14	1 1/4	23.1/4	27.3/4	7/8	8	12	11/16	1.9/16	6050	2775	
24	6 (SCH 80)	4	1.5/8	14	1 1/4	26.1/2	31	7/8	8	12	11/16	1.9/16	6050	2775	
30	6 (SCH 80)	4	1.7/8	16	1 1/4	29.5/8	34.1/8	1	8	12	11/16	1.13/16	8150	3100	
32	6 (SCH 80)	4	1.7/8	16	1 1/4	30.5/8	35.1/8	1	8	12	11/16	1.13/16	8150	3100	
36	6 (SCH 80)	4	1.7/8	16	1 1/4	32.5/8	37.1/8	1	8	12	11/16	1.13/16	8150	3100	

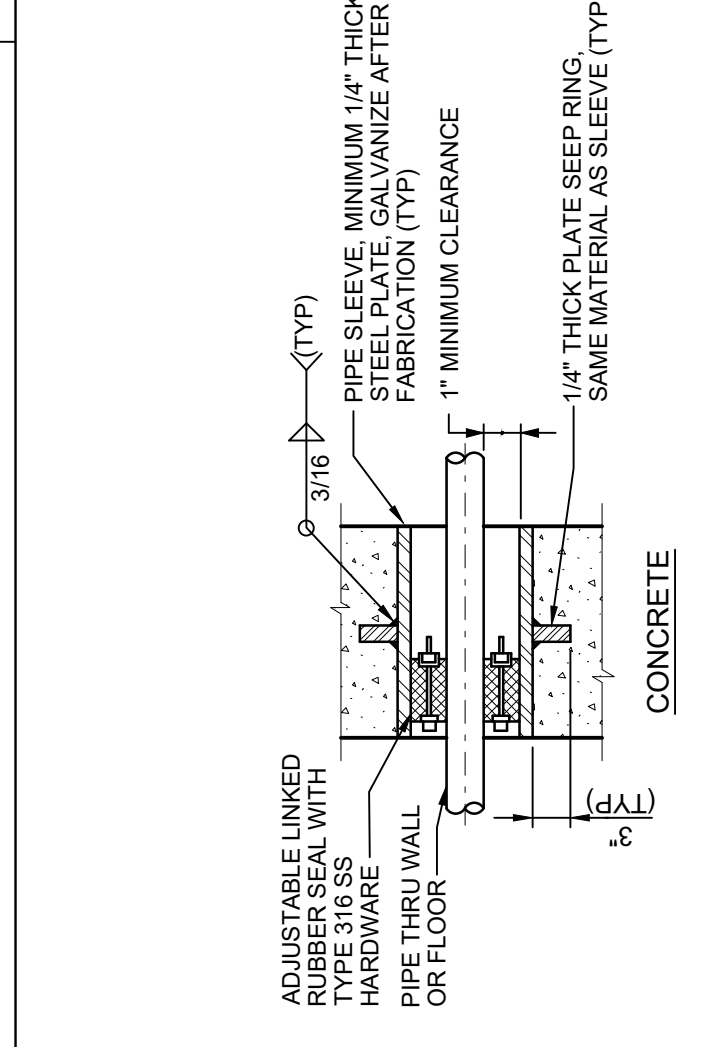
- NOTES:**
- HOT DIP GALVANIZE PARTS AFTER FABRICATION. UNO. PROVIDE 3/16 SS PIPE SADDLE SUPPORT, ANVIL FIG 259.
 - PROVIDE CAST-IN-PLACE HEAVY HEX HEAD ASTM F1554 GR 36 ANCHORS. UNO. REFER TO TABLE FOR MAXIMUM ALLOWABLE SERVICE LOAD ON EACH SUPPORT.
 - REFER TO TABLE FOR MAXIMUM ALLOWABLE SERVICE LOAD ON EACH SUPPORT.
 - FOR ALL ANCHORS AND WASHERS, PROVIDE SQUARE WASHERS PER ASS. PLATE WITH 3/16" FILLETS. USE 1 3/4" SOX 3/16" THICK WASHERS FOR 36" ANCHORS.
 - IF ADHESIVE ANCHORS ARE USED (GIMPSON SET XP OR EQUAL), USE REDUCED MAX LOADS IN COLUMN "W". OVERSIZED HOLES AND WASHERS ARE NOT REQUIRED.
 - THE SUPPORTS, DESIGNED FOR SEISMIC LOADS, ARE ALSO ADEQUATE FOR A DESIGN WIND SPEED (V_W) OF UP TO 165 MPH WITH A MAXIMUM HEIGHT ABOVE GRADE OF 40'. WIND FORCE ASSUMPTIONS: EXPOSURE CATEGORY C. Kz=1.0. Kz=1.04. Kd=0.95. G=0.85. CF=1.2 (DESIGNED PER ASCE 7-10 SECTION 29.9 - OTHER STRUCTURES).



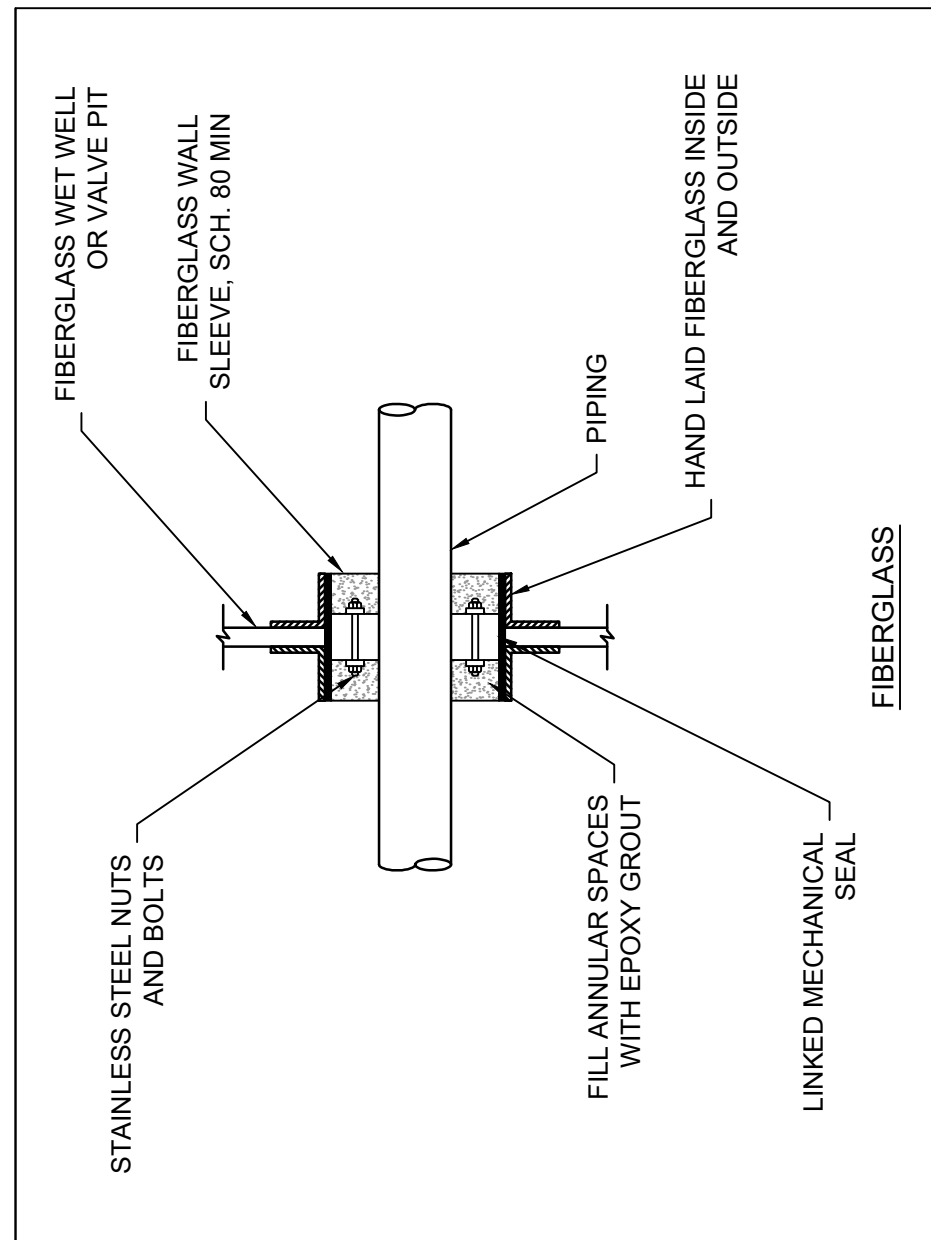
M-157
TYPICAL FOUL AIR VENT - SLAB
C-640 REV 010118



M-158
AIR RELEASE VALVE MOUNTING
C-640 REV 010118



M-111
SLEEVED PIPE OPENING
N.T.S.



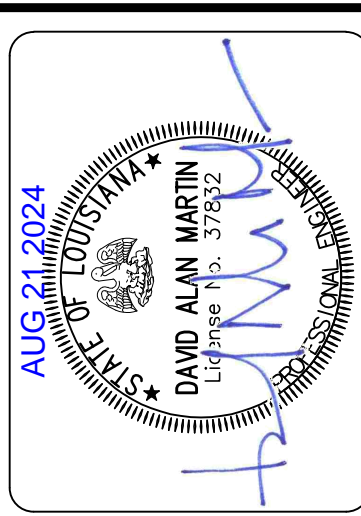
M-112
FIBERGLASS WET WELL OR VALVE PIT



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

No.	DESCRIPTION OF REVISION	DATE:
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DESIGNED BY:	M. LOKER
DRAWN BY:	J. HITT
CHECKED BY:	J. CATALANOTTO
PROJECT No.:	DU 168,170.
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED



BREWSTER ROAD SEWER
CONSOLIDATION
MECHANICAL SCHEDULE

SHEET NO.
GM-03

GENERAL NOTES

- REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS
- SHEET KEYNOTES**
- REFER TO SPECIFICATIONS FOR ACCESSORIES
 - REFER TO PUMP DATA TABLE. THIS PAGE FOR ADDITIONAL REQUIREMENT.
 - FURNISH EQUIPMENT TO SATISFACTORILY OPERATE AT MINIMUM SPEED, MAXIMUM SPEEDS, AND ALL SPEEDS IN BETWEEN.

VALVE SCHEDULE			
VALVE NO	VALVE DESCRIPTION	VALVE SIZE	SPECIFICATION SECTION
20-CV-01	RUBBER FLAPPER CHECK VALVE	3"	43 30 00
20-CV-02	RUBBER FLAPPER CHECK VALVE	3"	43 30 00
20-PV-01	ECCENTRIC PLUG VALVE	3"	43 30 00
20-PV-02	ECCENTRIC PLUG VALVE	3"	43 30 00
20-ARV-01	COMBINATION WASTEWATER AIR RELEASE VALVE	2"	43 30 00
30-CV-01	RUBBER FLAPPER CHECK VALVE	4"	43 30 00
30-CV-02	RUBBER FLAPPER CHECK VALVE	4"	43 30 00
30-PV-01	ECCENTRIC PLUG VALVE	4"	43 30 00
30-PV-02	ECCENTRIC PLUG VALVE	4"	43 30 00
30-PV-03	ECCENTRIC PLUG VALVE	4"	43 30 00
30-PV-04	ECCENTRIC PLUG VALVE	3"	43 30 00
30-ARV-01	COMBINATION WASTEWATER AIR RELEASE VALVE	2"	43 30 00
40-CV-01	RUBBER FLAPPER CHECK VALVE	10"	43 30 00
40-CV-02	RUBBER FLAPPER CHECK VALVE	10"	43 30 00
40-PV-01	ECCENTRIC PLUG VALVE	10"	43 30 00
40-PV-02	ECCENTRIC PLUG VALVE	10"	43 30 00
40-ARV-01	COMBINATION WASTEWATER AIR RELEASE VALVE	2"	43 30 00

EQUIPMENT SCHEDULE			
EQUIPMENT NO.	DESCRIPTION	SPECIFICATION SECTION	DETAIL REFERENCE
20-E-01	SELF - PRIMING CENTRIFUGAL PUMP	(A) (B) 43 20 00	N/A
20-E-02	SELF - PRIMING CENTRIFUGAL PUMP	(A) (B) 43 20 00	N/A
20-E-03	PUMP CONTROL PANEL	(A) (B) 40 91 00	N/A
20-E-04	FIXED TYPE DAVIT CRANE	(A) (B) 43 52 00	N/A
20-E-05	MAGNETIC FLOW METER	(A) (B) 40 91 00	M-304
20-E-06	PRESSURE GAUGE AND TRANSMITTER	(A) (B) 40 91 00	M-301
30-E-01	SUBMERSIBLE SEWAGE PUMP	(A) (B) 43 20 00	N/A
30-E-02	SUBMERSIBLE SEWAGE PUMP	(A) (B) 43 20 00	N/A
30-E-03	PUMP CONTROL PANEL	(A) (B) 40 91 00	N/A
30-E-04	FIXED TYPE DAVIT CRANE	(A) (B) 43 52 00	N/A
30-E-05	PRESSURE GAUGE AND TRANSMITTER	(A) (B) 40 91 00	M-301
40-E-01	SUBMERSIBLE SEWAGE PUMP	(A) (B) 43 20 00	N/A
40-E-02	SUBMERSIBLE SEWAGE PUMP	(A) (B) 43 20 00	N/A
40-E-04	PUMP CONTROL PANEL	(A) (B) 40 91 00	N/A
40-E-05	FIXED TYPE DAVIT CRANE	(A) (B) 43 52 00	N/A
40-E-06	MAGNETIC FLOW METER	(A) (B) 40 91 00	M-304
40-E-07	PRESSURE GAUGE	(A) (B) 40 91 00	M-301

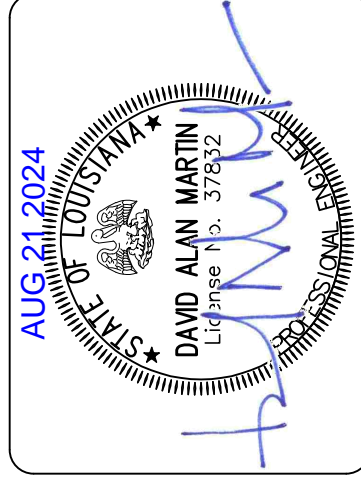
PUMP DATA TABLE					
EQUIPMENT ID	AREA	DESCRIPTION	DUTY	PUMPING PERFORMANCE	
				HIGH SPEED OPERATION	LOW SPEED OPERATION
20-E-01/20-E-02	FAIRFIELD OAKS PS	2	SELF PRIMING HORIZONTAL SEWAGE HANDLING	150	120
30-E-01/30-E-02	THREE RIVERS PS	2	SUBMERSIBLE NON CLOG CONTINUOUS	13	900
40-E-01/40-E-02	TCHEFUNCTE PARC PS	2	SUBMERSIBLE NON CLOG CONTINUOUS	71	35
			BELT AND SHEAVE	40	50
			CLASS 1 DIVISION 1	50	200
			RAILS AND LIFTING CHAIN	19	46
			240 V, 3-PHASE, 60 HZ	300	2000
				850	1200
				7.5	20
				43 20 08	43 20 06



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

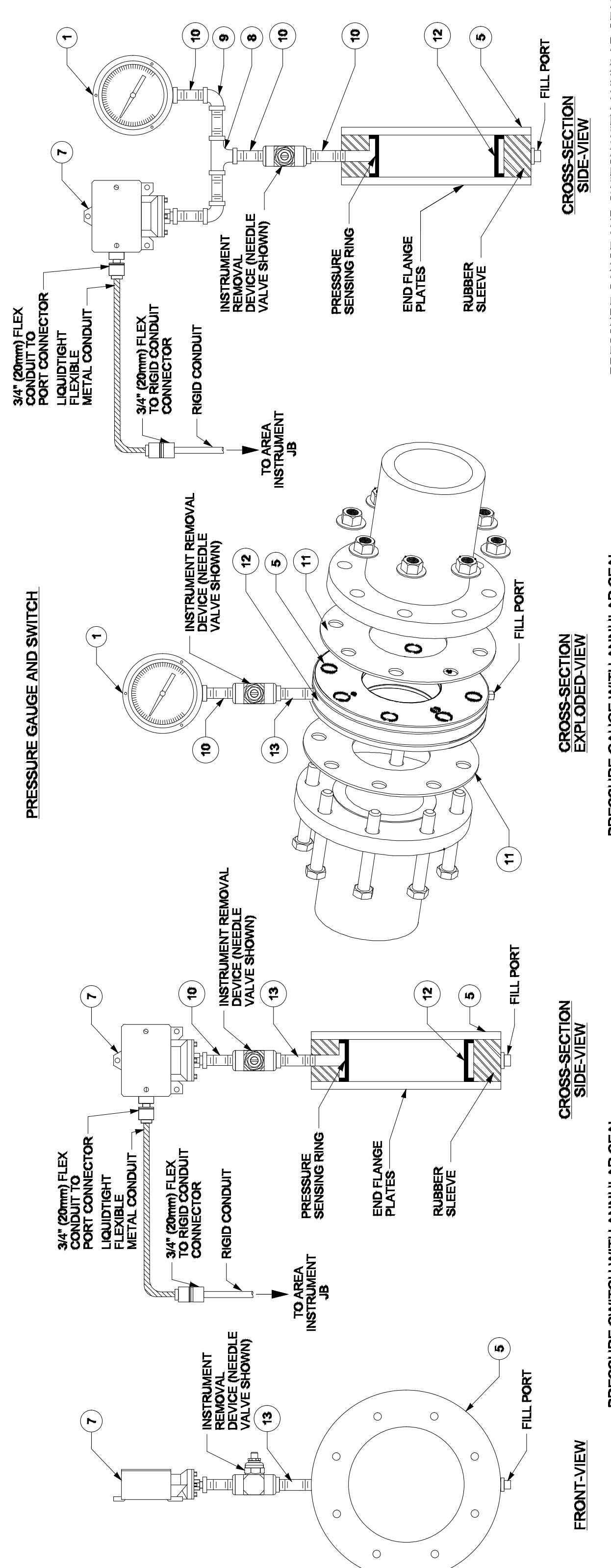
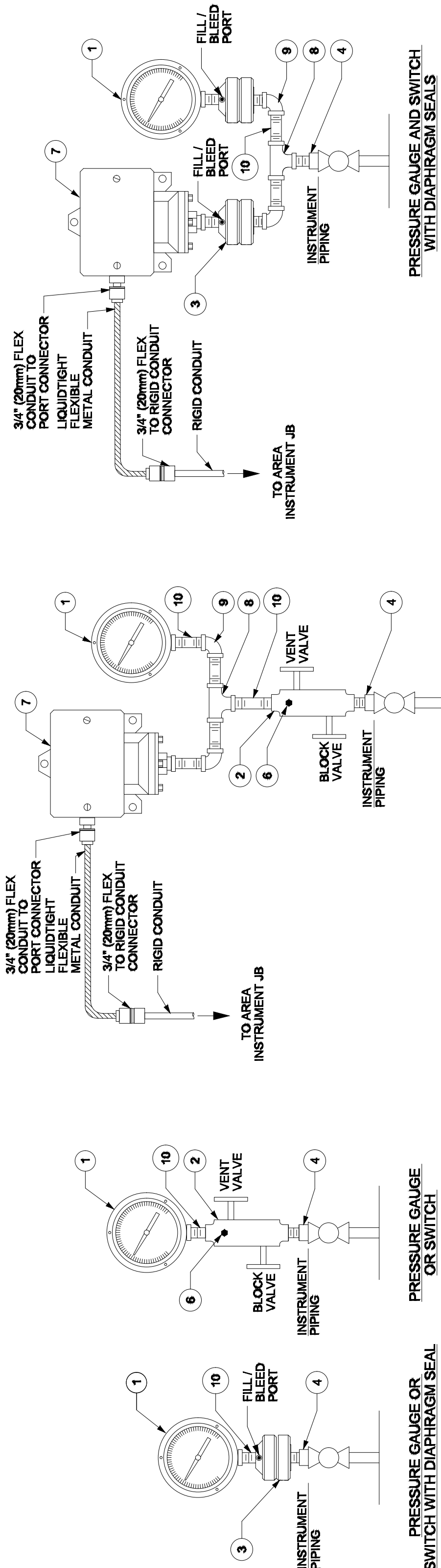
NO.	DATE:	DESCRIPTION OF REVISION
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DESIGNED BY:	M. LOKER
DRAWN BY:	J. HITT
CHECKED BY:	J. CATLANOTTO
SUBMITTED BY:	FAIRWAY CE
PROJECT No.:	DU 168,170.
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED



BREWSTER ROAD SEWER
CONSOLIDATION
MECHANICAL NOTES AND DETAILS

SHEET NO.
GM-02



GENERAL NOTES:

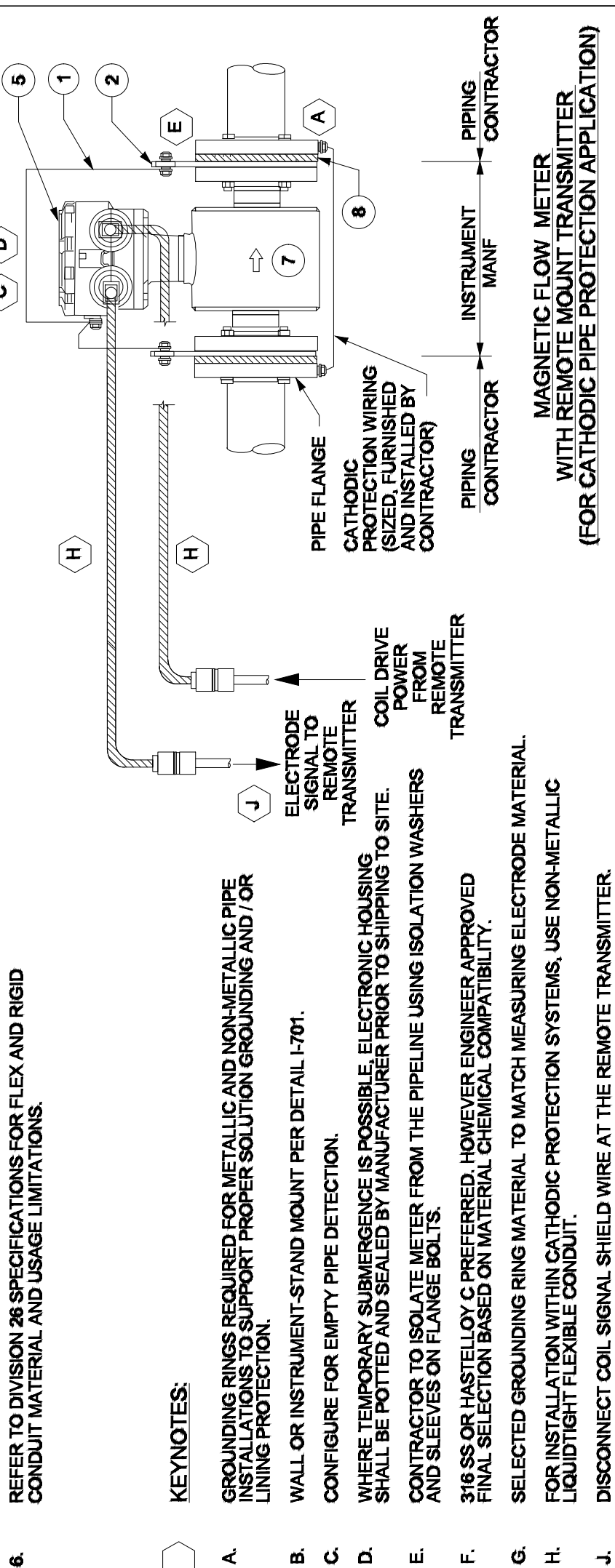
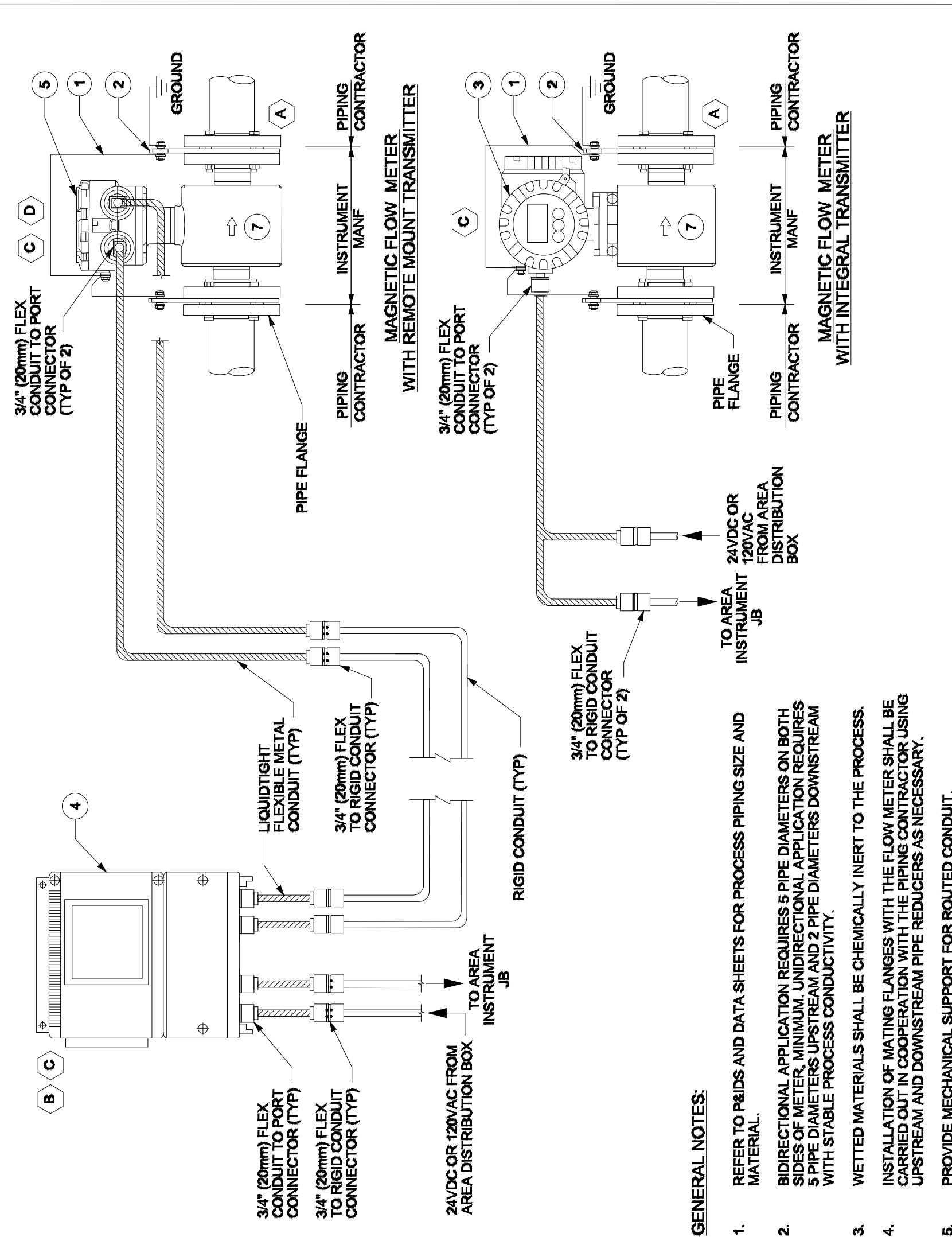
- POTENTIALLY WETTED MATERIALS SHALL BE CHEMICALLY INERT TO THE PROCESS.
- REFER TO P&IDs AND DATA SHEETS FOR PROCESS PIPING SIZE AND MATERIAL.
- PIPING SIDE ISOLATION VALVES FURNISHED AND INSTALLED BY MECHANICAL CONTRACTOR.
- REFER TO DIVISION 26 SPECIFICATIONS FOR FLEX AND RIGID CONDUIT MATERIAL AND USAGE LIMITATIONS.

KEYNOTES:

- FOR AMBIENT TEMPERATURE APPLICATIONS LOWER THAN -10 degC, ETHYLENE GLYCOL FILL FLUID REQUIRED IN LIEU OF STANDARD SILICONE OIL.
- FURNISH 1/4" (6mm) OD MALE CONNECTOR AND 1/4" OD (1.5mm WALL THICKNESS) 3/16SS DOWN TURNED DRAIN TUBING FOR FIELD INSTALLATION. ENSURE VENT / DRAIN IS DIRECTED TO SAFE LOCATION.

ITEM	QTY	DESCRIPTION	SUPPLY	MATERIAL RATING (WATER / AIR)	MATERIAL RATING (CHEMICAL)
1	1	LIQUID-FILLED PRESSURE GAUGE	MANF	316 SS	316 SS OR PVC
2	1	1/2" (15mm) 2 VALVE MANIFOLD WITH INTEGRAL BLEED	MANF	316 SS	316 SS OR PVC
3	AR	ISOLATION DIAPHRAGM SEAL; SILICONE OIL FILL FLUID	MANF	316 SS	HASTELLOY C OR PVC
4	1	HEX REDUCING BUSHING 1"x1/2" (25mmx15mm)	CONT	316 SS	316 SS OR PVC
5	2	END FLANGES (CLASS TO SUIT PIPING)	MANF	EPOXY COATED CARBON STEEL	316 SS OR PVC
6	1	1/4" NPT VENT PIPE PLUG	MANF	316 SS	316 SS OR PVC
7	1	PRESSURE SWITCH	MANF	316 SS	316 SS OR PVC
8	1	TEE 1/2" (15mm)	CONT	316 SS	316 SS OR PVC
9	2	ELBOW 1/2" (15mm)	CONT	316 SS	316 SS OR PVC
10	AR	1/2" MALE TO MALE NIPPLE	CONT	316 SS	316 SS OR PVC
11	2	GASKETS	CONT	VITON	VITON
12	1	ANNULAR SEAL; SILICONE OIL FILL FLUID	MANF	TEFLON COATED BUNAN	PIPE OIL TEFLOON COATED VITON
13	1	INSTRUMENT REMOVAL DEVICE AND 1/2" STEM	MANF	316 SS	316 SS OR PVC

M-301
PRESSURE GAUGE / SWITCH



GENERAL NOTES:

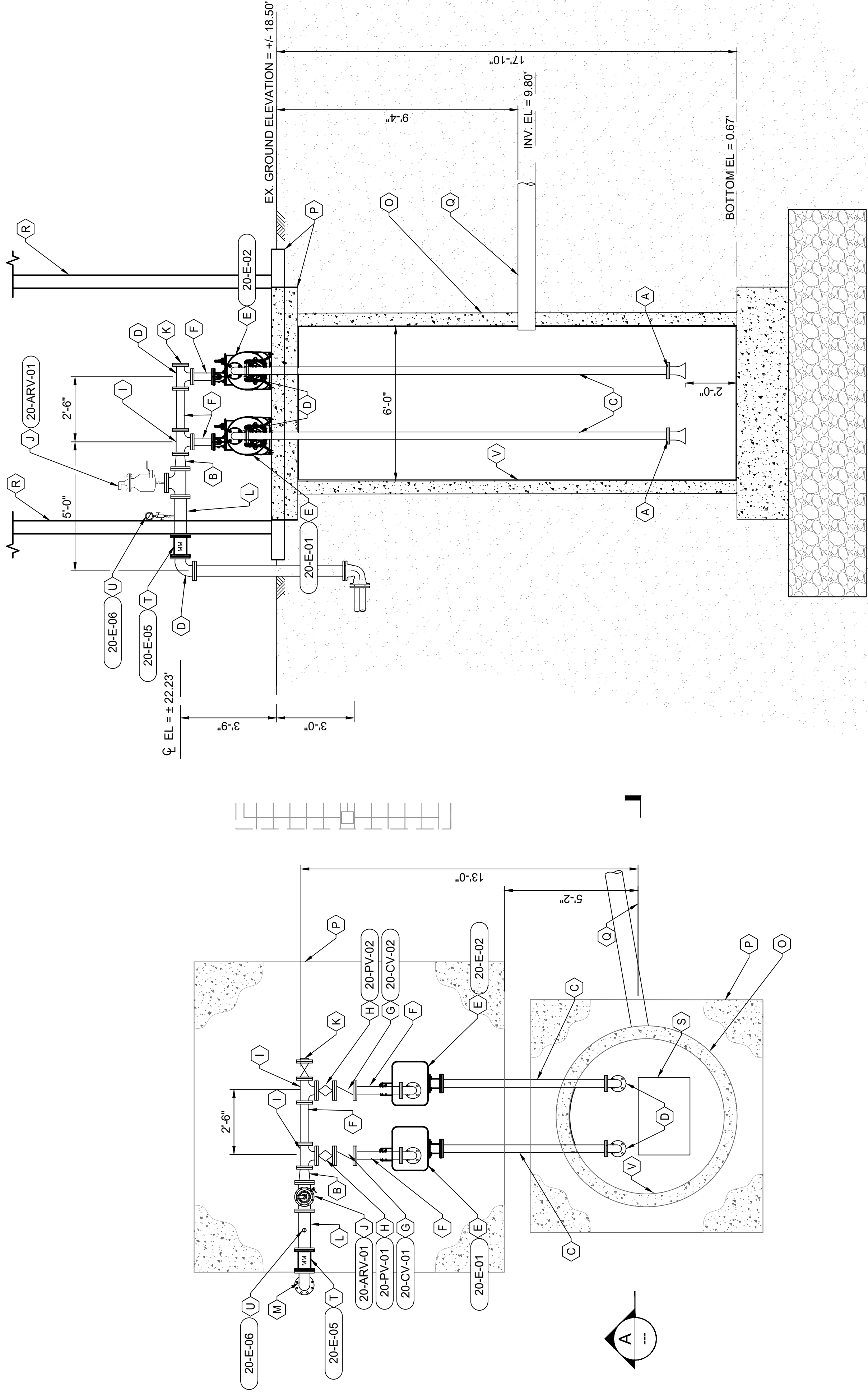
- REFER TO P&IDs AND DATA SHEETS FOR PROCESS PIPING SIZE AND MATERIAL.
- BIDIRECTIONAL APPLICATION REQUIRES 5 PIPE DIAMETERS ON BOTH SIDES OF METER. MINIMUM UNIDIRECTIONAL APPLICATION REQUIRES 5 PIPE DIAMETERS UPSTREAM AND 2 PIPE DIAMETERS DOWNSTREAM WITH STABLE PROCESS CONDUCTIVITY.
- WETTED MATERIALS SHALL BE CHEMICALLY INERT TO THE PROCESS.
- INSTALLATION OF MATING FLANGES WITH THE FLOW METER SHALL BE CARRIED OUT IN COOPERATION WITH THE PIPING CONTRACTOR USING UPSTREAM AND DOWNSTREAM PIPE REDUCERS AS NECESSARY.
- PROVIDE MECHANICAL SUPPORT FOR ROUTED CONDUIT.
- REFER TO DIVISION 26 SPECIFICATIONS FOR FLEX AND RIGID CONDUIT MATERIAL AND USAGE LIMITATIONS.

KEYNOTES:

- GROUNDING RINGS REQUIRED FOR METALLIC AND NON-METALLIC PIPE INSTALLATIONS TO SUPPORT PROPER SOLUTION GROUNDING AND / OR LINING PROTECTION.
- WALL OR INSTRUMENT STAND MOUNT PER DETAIL I-701.
- CONFIGURE FOR EMPTY PIPE DETECTION.
- WHERE TEMPORARY SUBMERGENCE IS POSSIBLE, ELECTRONIC HOUSING SHALL BE POTTED AND SEALED BY MANUFACTURER PRIOR TO SHIPPING TO SITE.
- CONTRACTOR TO ISOLATE METER FROM THE PIPELINE USING ISOLATION WASHERS AND SLEEVES ON FLANGE BOLTS.
- 316 SS OR HASTELLOY C PREFERRED. HOWEVER ENGINEER APPROVED FINAL SELECTION BASED ON MATERIAL CHEMICAL COMPATIBILITY.
- FOR INSTALLATION WITHIN CATHODIC PROTECTION SYSTEMS, USE NON-METALLIC LIQUID-TIGHT FLEXIBLE CONDUIT.
- DISCONNECT COIL SIGNAL SHIELD WIRE AT THE REMOTE TRANSMITTER.

ITEM	QTY	DESCRIPTION	SUPPLY	MATERIAL/RATING (WATER)	MATERIAL/RATING (CHEMICAL)
1	1	AWG # 8 GROUNDING CONDUCTOR TO GROUND GRID	CONT	COPPER	COPPER
2	2	GROUNDING RING	MANF	316 SS	316 SS OR HASTELLOY C
3	1	INTEGRAL TRANSMITTER WITH DISPLAY AND DUAL CONDUIT PORTS	MANF	POWDER COATED ALUMINUM	POWDER COATED ALUMINUM
4	1	REMOTE TRANSMITTER WITH DISPLAY	MANF	POWDER COATED ALUMINUM	POWDER COATED ALUMINUM
5	1	METER REMOTE WIRE HOUSING FOR REMOTE TRANSMITTER WITH DUAL CONDUIT PORTS	MANF	POWDER COATED ALUMINUM	POWDER COATED ALUMINUM
6	EACH	COIL DRIVE AND ELECTRODE SIGNAL CABLES (SEPARATE CABLES; LENGTH AS REQUIRED)	CONT	PER MANF SPEC	PER MANF SPEC
7	-	METER MEASURING TUBE / FLANGES (LINER PER MANF RECOMMENDATION)	MANF	304 SS	(F)
8	2	INSULATING GASKET	CONT	EPDM / NEOPRENE	EPDM / NEOPRENE

M-304
MAGNETIC FLOW METER



FAIRFIELD OAKS LIFT STATION - MECHANICAL PLAN
SCALE: 3/8" = 1' 0"

A SECTION
SCALE: 3/8" = 1' 0"

GENERAL NOTES

- REFER TO CIVIL AND STRUCTURAL SHEETS FOR ADDITIONAL REQUIREMENTS.
- THE MECHANICAL DRAWINGS ARE NOT FABRICATION DRAWINGS. VERIFY ALIGNMENT, FIT, AND DIMENSIONS OF PIPING PRIOR TO FABRICATION.
- USE FLANGED FITTINGS AND VALVES WITHIN WET WELL AND VALVE VAULT UNLESS NOTED OTHERWISE.
- USED STAINLESS STEEL FASTENERS WITHIN WET WELL AND VALVE VAULT UNLESS NOTED OTHERWISE.

SHEET KEYNOTES

- REQD FLANGED 3" SUCTION PIPE BELL FITTING
- REQD FLANGED REDUCER 4" X 3"
- REQD FLANGED 3" DIAMETER SUCTION PIPING
- REQD FLANGED 3" 90° ELBOW
- REQD SELF-PRIMING PUMPS PER SPECIFICATIONS AND PUMP DATA TABLE
- REQD FLANGED 3" DIAMETER SPOOL PIECE
- REQD 3" CHECK VALVE
- REQD 3" PLUG VALVE
- REQD 3" TEE FITTING
- REQD 2" COMBINATION AIR - 2" RELEASE VALVE M-158
- REQD 3" BLIND FLANGE TAPPED TO ACCEPT CAMLOCK FITTING
- REQD 4" DIAMETER SPOOL PIECE
- REQD 4" DIAMETER FLANGED 90° ELBOW
- REQD FORCEMAIN. (SEE SHEET 20PP-04 FOR CONTINUATION)
- REQD CONCRETE WET WELL. (SEE STRUCTURAL PLAN FOR DETAILS)
- REQD CONCRETE SLAB. (SEE STRUCTURAL PLAN FOR DETAILS)
- REQD 8" PVC GRAVITY MAIN. (SEE SHEET 20C-02 FOR DETAILS)
- REQD STEEL FRAMED CANOPY (SEE STRUCTURAL PLAN FOR DETAILS)
- REQD ACCESS HATCH 24" X 36"
- REQD MAGNETIC FLOW METER M-304
- REQD PRESSURE GAUGE M-301
- REQD WET WELL COATING PER SECTION 09 96 00
- REQD ELECTRICAL PANEL (SEE ELECTRICAL PLAN FOR DETAILS)

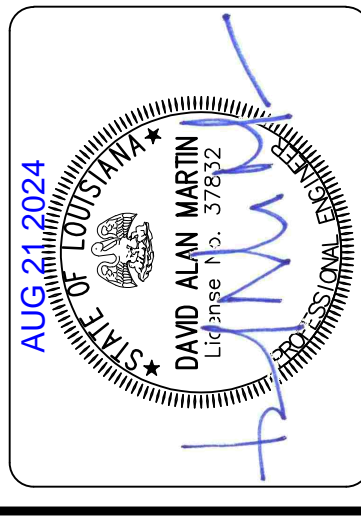
PUMP STATION CONTROLS

FLOAT	DESCRIPTION	ELEVATION
HHWL	HIGH WATER LEVEL ALARM	9.80'
HWL	LAG PUMP "ON"	8.80'
LWL	LEAD PUMP "ON"	7.80'
LLWL	ALL PUMPS OFF	5.14'

BREWSTER ROAD SEWER
CONSOLIDATION
FAIRFIELD OAKS MECH PLANS
AND SECTION

SHEET NO.
20M-01

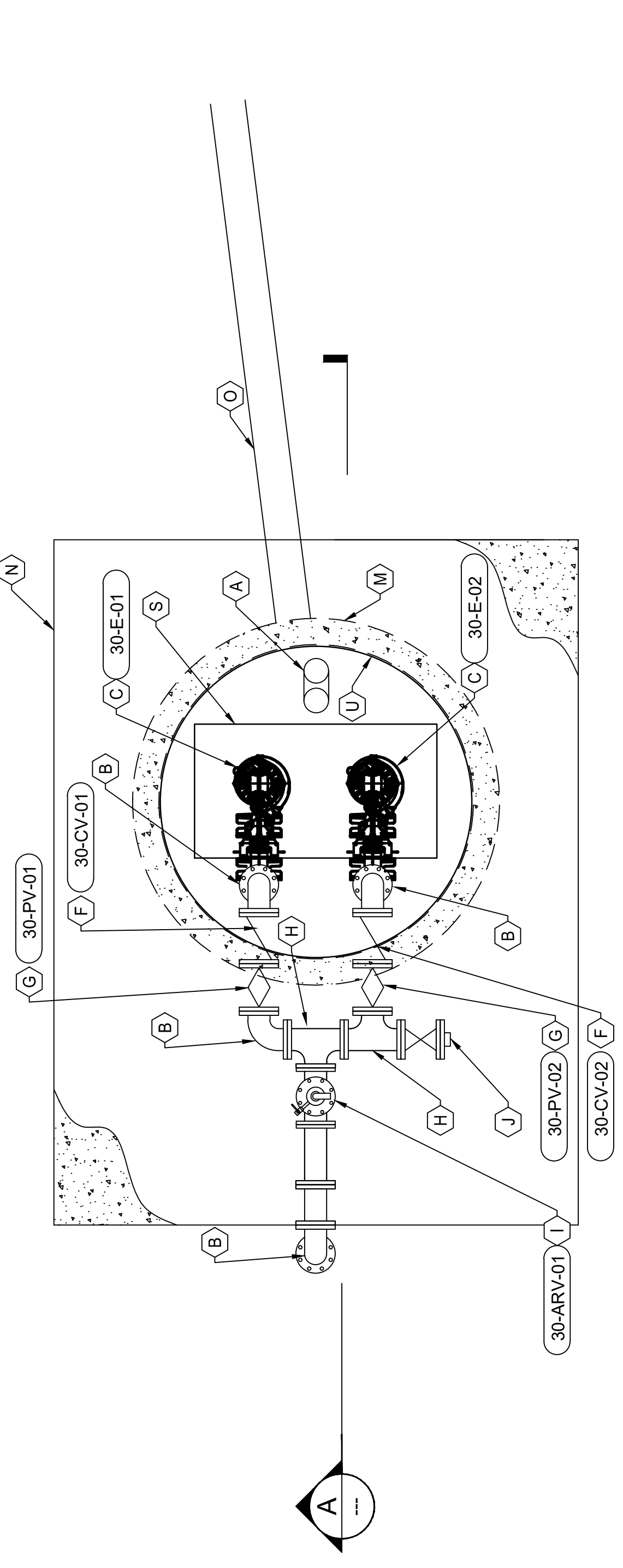
DESIGNED BY: M LOKER
DRAWN BY: J. HITT
CHECKED BY: J. CATLANOTTO
SUBMITTED BY: FAIRWAY CE
PROJECT No.: DU 168,170,
175, 177
ISSUE DATE: 08/20/2024
APPROVED BY: D. MARTIN
SHEET SIZE: ANSI D 34x22
SCALE: AS NOTED



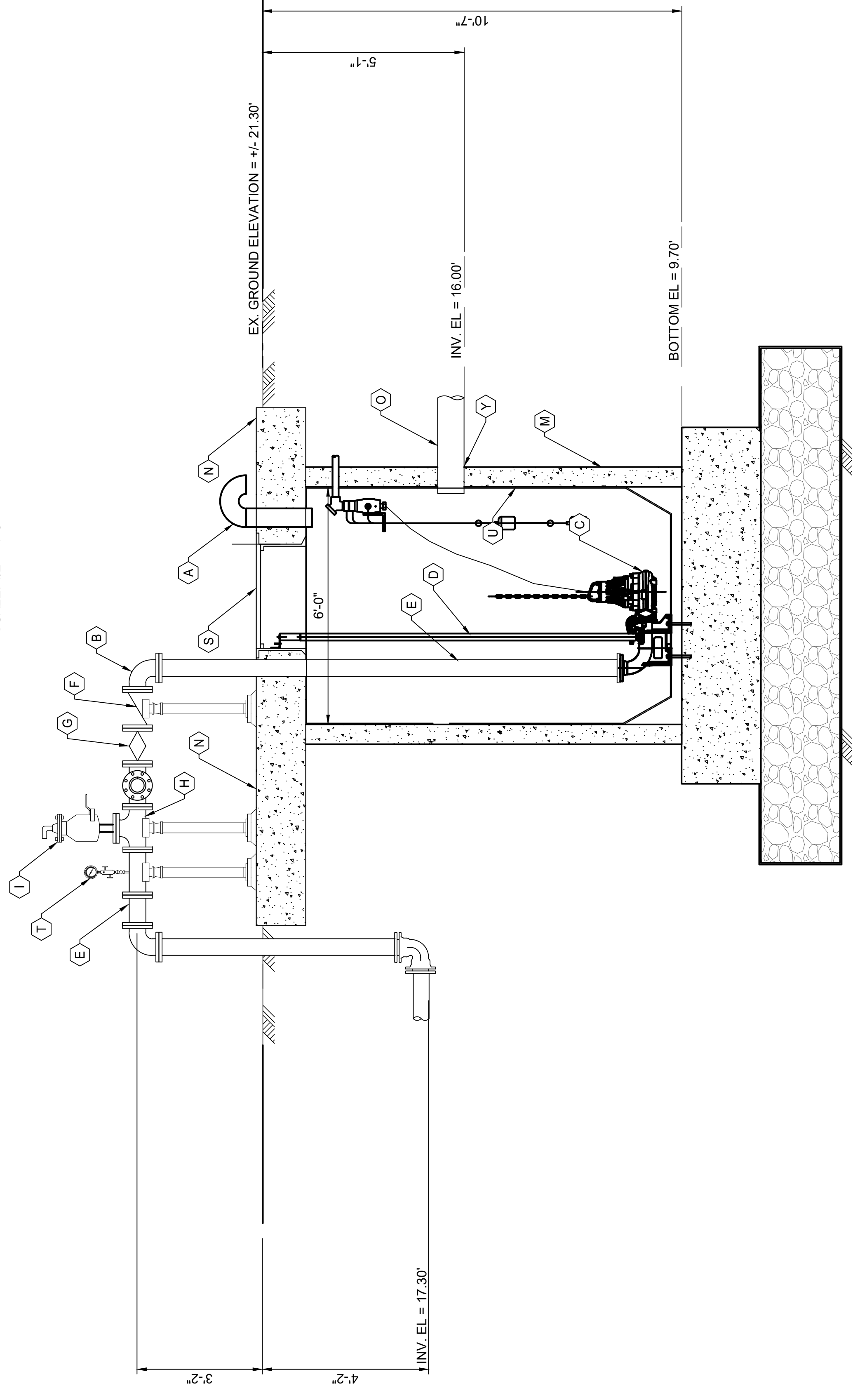
No.	DESCRIPTION OF REVISION	DATE:
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DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433



THREE RIVERS LIFT STATION - MECHANICAL PLAN
SCALE: 1/2" = 1' 0"



SECTION
SCALE: 1/2" = 1' 0"

GENERAL NOTES

- REFER TO CIVIL AND STRUCTURAL SHEETS FOR ADDITIONAL REQUIREMENTS.
- THE MECHANICAL DRAWINGS ARE NOT FABRICATION DRAWINGS. VERIFY ALL ALIGNMENT, FIT, AND DIMENSIONS OF ALL PIPING PRIOR TO FABRICATION.
- USED FLANGED FITTINGS AND VALVES WITHIN WET WELL AND VALVE VAULT UNLESS NOTED OTHERWISE.
- USED STAINLESS STEEL FASTENERS WITHIN WET WELL AND VALVE VAULT UNLESS NOTED OTHERWISE.

SHEET KEYNOTES

- A. REQ'D PASSIVE VENT M-157
- B. REQ'D FLANGED 4" 90° ELBOW
- C. REQ'D SUBMERSIBLE PUMP AND BASE ELBOW
- D. REQ'D GUIDE RAILS
- E. REQ'D FLANGED 4" DIAMETER SPOOL PIECE
- F. REQ'D 4" CHECK VALVE
- G. REQ'D 4" PLUG VALVE
- H. REQ'D 4" X 4" X 4" FLANGED TEE FITTING
- I. REQ'D 4" AIR RELEASE VALVE M-158
- J. REQ'D 4" BLIND FLANGE TAPPED TO ACCEPT CAMLOCK FITTING
- K. REQ'D PIPE SUPPORTS M-108
- L. REQ'D FORCEMAIN. (SEE SHEET 30PP-01 FOR CONTINUATION)
- M. REQ'D CONCRETE WET WELL. (SEE STRUCTURAL PLAN FOR DETAILS)
- N. REQ'D CONCRETE SLAB. (SEE STRUCTURAL PLAN FOR DETAILS)
- O. REQ'D 8" PVC GRAVITY MAIN. (SEE PLAN FOR DETAILS)
- P. REQ'D ELECTRICAL PANEL (SEE ELECTRICAL PLANS FOR DETAILS)
- Q. NOT USED
- R. NOT USED
- S. REQ'D ACCESS HATCH. SIZE AND LOCATION AS DIRECTED BY PUMP SUPPLIER.
- T. REQ'D PRESSURE GAUGE (AS PER DETAIL M-301) M-301
- U. REQ'D WET WELL COATING PER SECTION 09 96 00
- V. NOT USED
- W. REQ'D 3" PLUG VALVE
- X. REQ'D 3" DUCK BILL VALVE
- Y. REQ'D SLEEVED PIPE OPENING M-111

PUMP STATION CONTROLS

FLOAT	DESCRIPTION	ELEVATION
HWL	HIGH WATER LEVEL ALARM	16.00'
HWL	LAG PUMP "ON"	15.00'
LWL	LEAD PUMP "ON"	14.00'
LLWL	ALL PUMPS OFF	11.87'

BREWSTER ROAD SEWER
CONSOLIDATION

THREE RIVERS MECH PLANS AND
SECTION

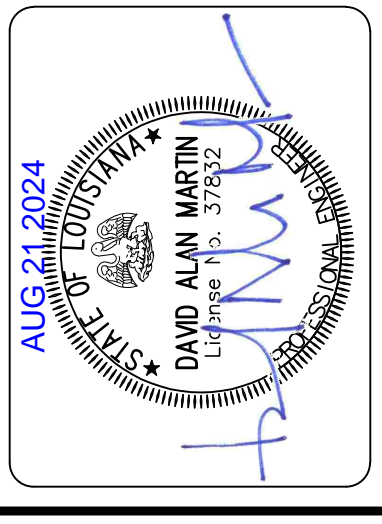
SHEET NO.
30M-01



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

No.	DESCRIPTION OF REVISION	DATE:
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DESIGNED BY:	M. LOKER
DRAWN BY:	J. HITT
CHECKED BY:	J. CATLANOTTO
PROJECT No.:	DU 168,170.
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED

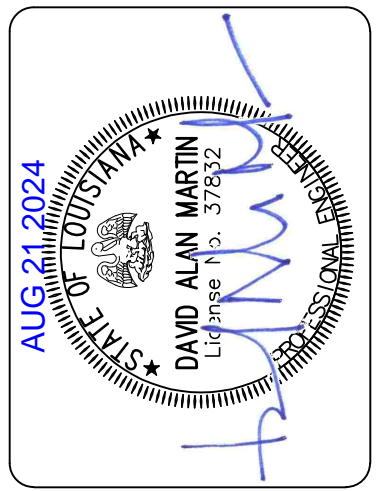




DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

No.	DESCRIPTION OF REVISION	DATE:
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DESIGNED BY:	M. LOKER
DRAWN BY:	J. HITT
CHECKED BY:	J. CATALANOTTO
PROJECT No.:	DU 168,170, 175, 177
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED



BREWSTER ROAD SEWER
CONSOLIDATION
TCHEFUNCTE PARC MECH PLANS
AND SECTION

SHEET NO.
40M-01

GENERAL NOTES

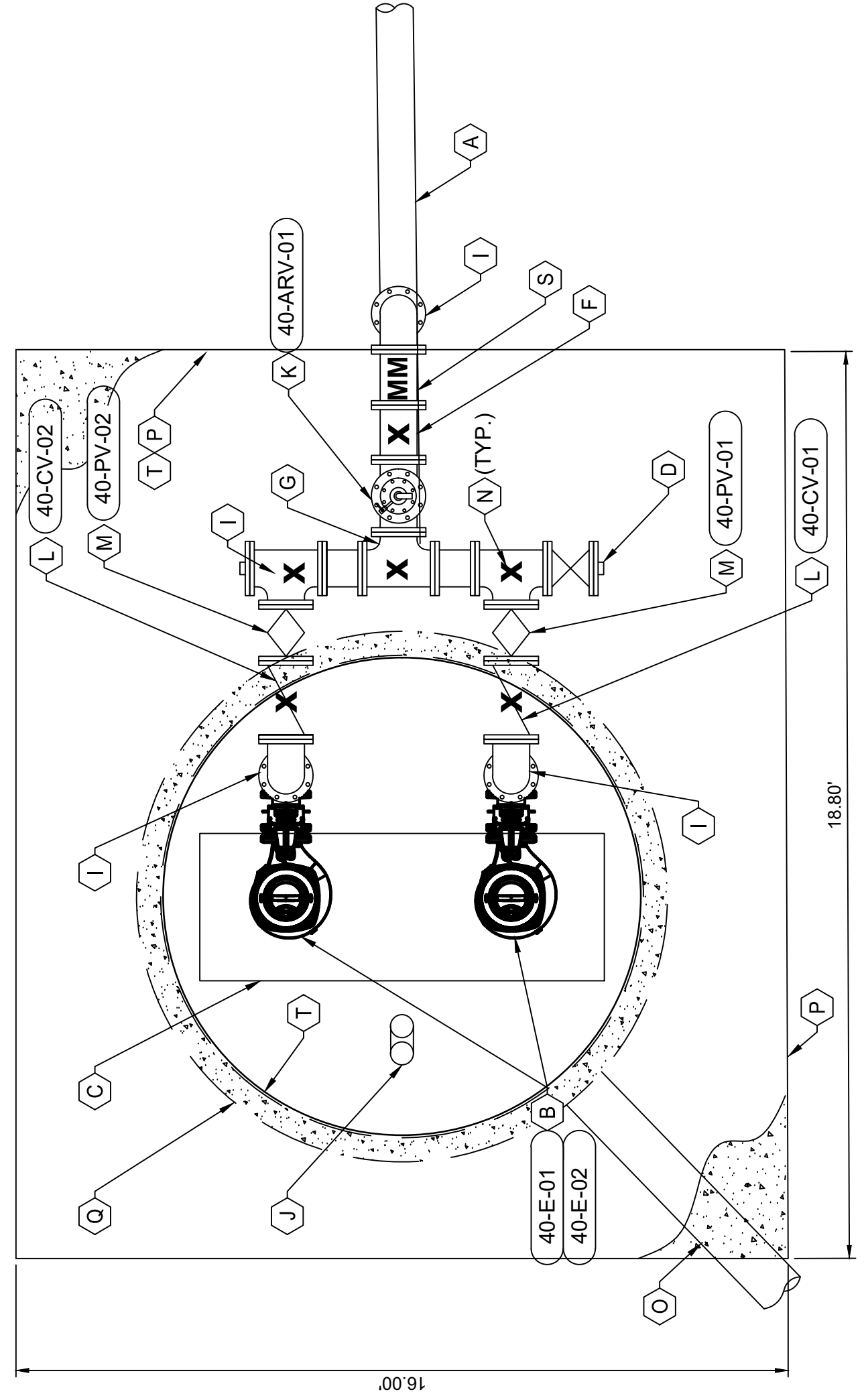
- REFER TO CIVIL AND STRUCTURAL SHEETS FOR ADDITIONAL REQUIREMENTS
- THE MECHANICAL DRAWINGS ARE NOT FABRICATION DRAWINGS. VERIFY ALL ALIGNMENT, FIT, AND DIMENSIONS OF ALL PIPING PRIOR TO FABRICATION.
- USED FLANGED FITTINGS AND VALVES WITHIN WET WELL AND VALVE VAULT UNLESS NOTED OTHERWISE.
- USED STAINLESS STEEL FASTENERS WITHIN WET WELL AND VALVE VAULT UNLESS NOTED OTHERWISE.

SHEET KEYNOTES

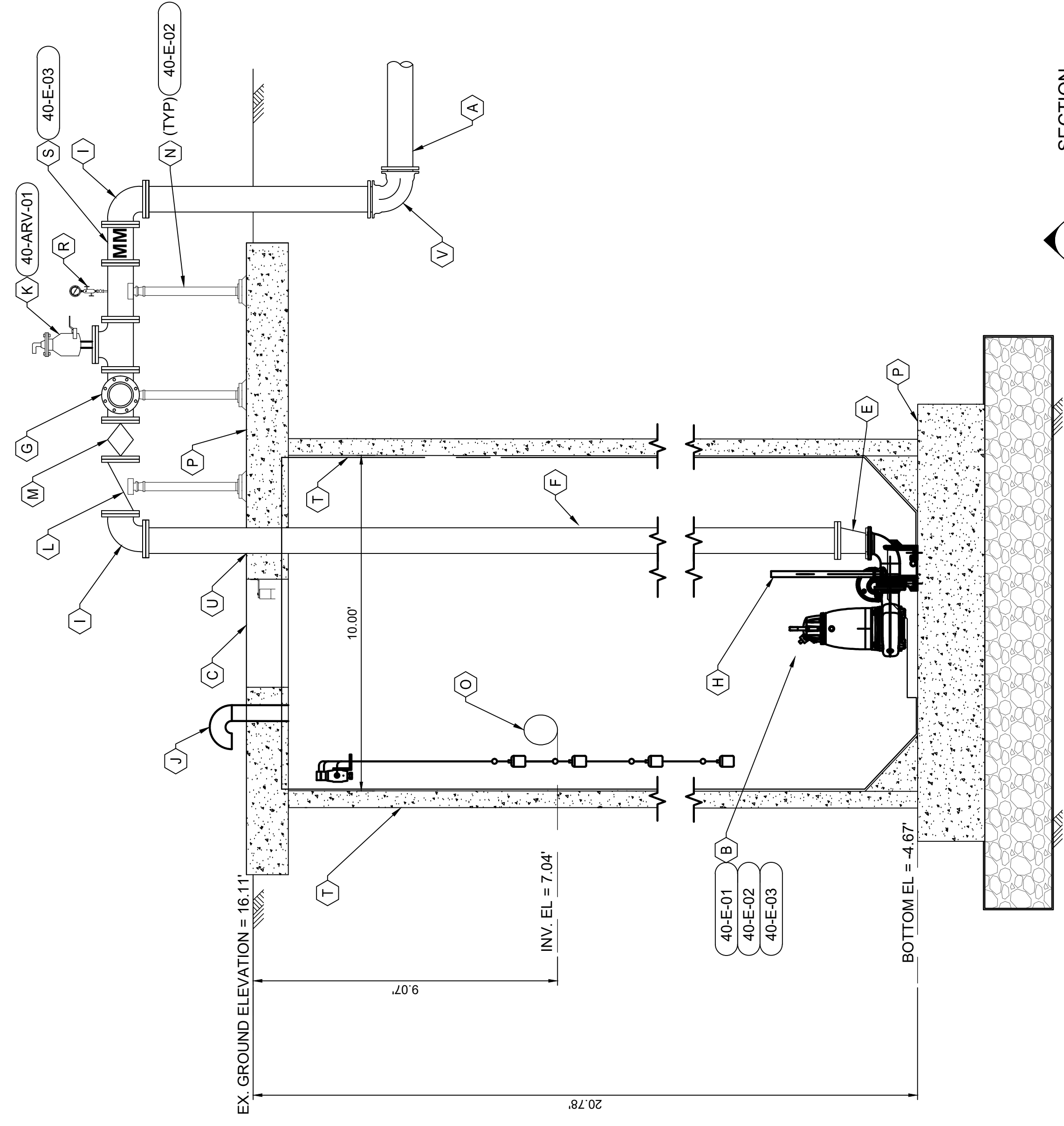
- REQD FORCE MAIN (SEE SHEET 40PP-01 FOR RECONTINUATION)
- SUBMERSIBLE PUMP AND BASE ELBOW
- REQD ACCESS HATCH
- REQD BLIND FLANGE TAPPED TO ACCEPT 8" CAM LOCK FITTING
- REQD FLANGED ECCENTRIC REDUCER 8" X 6"
- REQD FLANGED DI SPOOL, 8" DIAMETER
- REQD FLANGED 8" X 8" X 8" X 8" CROSS
- REQD GUIDE RAILS
- REQD FLANGED 90° ELBOW, 8" DIAMETER
- REQD PASSIVE VENT **M-157**
- REQD 8" AIR RELEASE VALVE **M-158**
- REQD 8" CHECK VALVE
- REQD 8" PLUG VALVE
- REQD PIPE SUPPORT (DENOTED BY **X**) **M-108**
- PROPOSED 12" INFLUENT GRAVITY MAIN (SEE SHEET 40C-02 FOR DETAILS)
- REQD SLAB (PER STRUCTURAL PLAN)
- REQD WET WELL (SEE STRUCTURAL PLAN)
- REQD PRESSURE GAUGE **M-301**
- REQD MAGNETIC FLOW METER **M-304**
- REQD WET WELL COATING PER SECTION 09 96 00
- REQD SLEEVED PIPE OPENING **M-111**
- REQD MJ 90° ELBOW, 8"

PUMP STATION CONTROLS

FLOAT	DESCRIPTION	ELEVATION
HHWL	HIGH WATER LEVEL ALARM	7.04'
HWL	LAG PUMP "ON"	6.54'
LWL - 2	LEAD PUMP NO. 2 "ON"	6.04'
LWL - 1	LEAD PUMP NO. 1 "ON"	6.57'
LLWL	ALL PUMPS OFF	0.30'



TCHEFUNCTE PARC LIFT STATION - MECHANICAL PLAN
SCALE: 3/8" = 1' 0"



SECTION
SCALE: 3/8" = 1' 0"

ELECTRICAL SYMBOLS

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		
HOME RUN TO PANEL "LP1", CIRCUITS #1, 3, 7. CONDUCTORS SHALL BE NOTED IN PANEL SCHEDULE MINIMUM CONDUIT SIZE SHALL BE 3/4" WITH #12 & #12 GROUND		LP1-1, 3, 7
CONDUIT RUN-CHANGE IN ELEVATION		
CONDUIT BENDS TOWARD OBSERVER		
CONDUIT BENDS AWAY FROM OBSERVER		
CONDUIT CAPPED, OR SEALED		
FLEXIBLE LIQUID - TIGHT CONDUIT CONNECTION		
INDICATES CONDUIT NUMBER FROM MCC OR PANEL "IM" CIRCUIT 1		IM 1
EXIT LIGHT, SHOWN WITH TWO ILLUMINATED SIDES. ARROWS INDICATE DIRECTION OF EXIT		C
"C" INDICATES FIXTURE TYPE		C
CEILING OR PENDANT INCANDESCENT, "L" INDICATES FIXTURE TYPE. "2" INDICATES FIXTURE CONTROLLED BY SWITCH "2"		L 2
WALL BRACKET FLOOD, SPOTLIGHT, OR WALLPACK EXPOSED BACK AND CONCEALED CONDUIT "B" INDICATES FIXTURE TYPE. "TC" INDICATES FIXTURE CONTROLLED BY TIMER CONTROLLED SWITCH		B TC
POLE MOUNTED FIXTURE DISTRIBUTION TYPE AS INDICATED ON PLAN		
FLUORESCENT LIGHTING FIXTURE UNSWITCHED (SWITCH AT LIGHTING PANEL ONLY)		
FLUORESCENT LIGHTING FIXTURE ON EMERGENCY CIRCUIT		E
FLUORESCENT LIGHTING FIXTURE ON NORMAL POWER		A
BATTERY EMERGENCY TYPE "D" LIGHT FIXTURE		D
SINGLE POLE SWITCH, "a" INDICATES CIRCUIT SWITCH NUMBER		S ^a
DOUBLE POLE SWITCH, FLUSH MOUNT		\$ 2
THREE-WAY SWITCH, SURFACE MOUNT		\$ 3
FOUR-WAY SWITCH		S ₄
KEY-OPERATED SWITCH		S _K
SWITCH AND PILOT LIGHT		S _P
MANUAL MOTOR STARTER		S _M

WALL		
FLOOR		
120V SINGLE RECEPTACLE, 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		
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 7°C.O. STUB UP INTO SUSPENDED CEILING		
LIGHTING PANEL		
POWER PANEL		
GROUND CONNECTION - BOLTED TYPE		
GROUND CONNECTION - EXOTHERMIC TYPE		
NEMA 4X S.S. DISCONNECT SWITCH (CONTINUOUS RATING AS NOTED)		30A
LOCAL COMBINATION STARTER		
CONTACTOR		
OVERLOAD		
JUNCTION BOX OR FITTING		
FIELD INSTRUMENT I.E.: "LSH" LEVEL SWITCH HIGH "SV" SOLENOID VALVE "HS" HAND SWITCH "PSL" PRESSURE SWITCH LOW		PS
LINE VOLTAGE THERMOSTAT		T
HEATER		H
HORN		
BELL		
TIMER SWITCH CONTROL		
GROUND ROD 3/4" X 10'-0" (UNLESS OTHERWISE NOTED)		
GROUND WELL		
MOTOR OPERATED VALVE (STARTER NOT INTEGRAL)		M
MOTOR OPERATED VALVE WITH INTEGRAL STARTER		M

	COMBINATION ACROSS-THE-LINE, NON-REVERSING NEMA SIZE 2 MAGNETIC STARTER
	COMBINATION ACROSS-THE-LINE, NON REVERSING REDUCED VOLTAGE SOFT START, NEMA SIZE II
	COMBINATION NEMA SIZE 3 MAGNETIC STARTER: SS - SOLID STATE MOTOR STARTER WITH NEMA RATED BY-PASS CONTACTOR AND OVERLOAD RELAYS
	CONTACTOR, SIZE 1 AS NOTED
	MOLDED CASE CIRCUIT BREAKER, 3 POLE UNLESS OTHERWISE NOTED, 50A TRIP RATING. *NA - NON-AUTOMATIC *MCP - MOTOR CIRCUIT PROTECTOR *TM - THERMAL MAGNETIC
	LIGHTING ARRESTOR AND SURGE CAPACITOR
	MOTOR; 10HP AS NOTED
	TRANSFORMER WITH GROUNDED SECONDARY, KVA SIZE & VOLTAGE RATIO AS NOTED
	POTENTIAL TRANSFORMER RATIO AND NUMBER P.T.'S AS NOTED DRAW-OUT INDICATED
	CURRENT TRANSFORMER, RATIO AND NUMBER OF C.T.'S AS NOTED
	LOCAL CONTROL PANEL
	LOW VOLTAGE 3 PHASE 480V SWGR DRAW-OUT CIRCUIT BREAKER
	ELECTRICAL MOTOR OPERATED VALVE, WITH INTEGRAL REVERSING STARTER
	UNFUSED DISCONNECT SWITCH, SIZE AS NOTED "60A" (60 AMP) WHERE NOTED
	FUSE DISCONNECT SWITCH
	OVERHEAD POLE LINE FUSE CUTOFF
	CONTROL RELAY OR COIL TD2 TIME DELAY RELAY NO. 2 OR CONTROL RELAY NO. 1 MAIN CONTACTOR COIL
	NORMALLY OPEN CONTACT
	NORMALLY CLOSED CONTACT
	NORMALLY OPEN LIMIT SWITCH
	NORMALLY CLOSED LIMIT 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

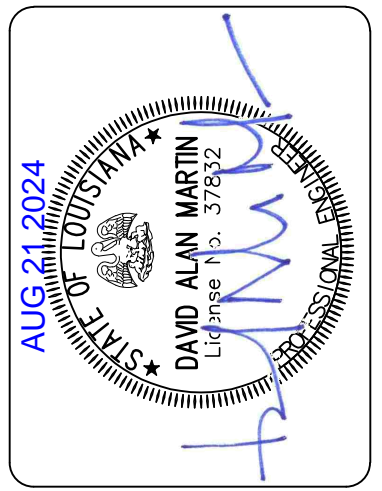
	TIMED CONTACTS - CONTACT ACTION DELAYED AFTER COIL IS ENERGIZED
	NORMALLY OPEN WITH THE TIME DELAY CLOSING
	NORMALLY CLOSED WITH THE TIME DELAY OPENING
	DE-ENERGIZED NORMALLY OPEN WITH INSTANT CLOSING AND TIME DELAY OPENING
	NORMALLY CLOSED WITH INSTANT CLOSING AND TIME DELAY CLOSING
	NO/NC MAINTAINED PUSHBUTTON

	NORMALLY CLOSE PUSHBUTTON, MOMENTARY OPEN
	TWO-POSITION SELECTOR SWITCH: H-HAND, M-MANUAL, R-REMOTE, L-LOCAL, A-AUTOMATIC, O-OFF
	THREE-POSITION SELECTOR SWITCH (SAME AS ABOVE)
	THREE-POSITION SPRING RETURN-TO-CENTER MOMENTARY CONTACT SWITCH ("LATCH-UNLATCH," "ON-OFF," ETC.)

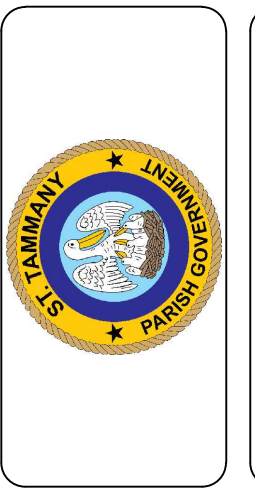
ELECTRICAL ABBREVIATIONS

AA	ALARM ANNUNCIATOR	AA	THOUSAND CIRCULAR MILS
AC	AIR CONDITIONING	AC	MAGNETIC FLOW METER
AF	AMPERE FRAME SIZE OF CKT. BKR.	AF	MANHOLE
AMP	AMPERES, AMPERAGE	AMP	MINUTES, MINIMUM
APPR	APPROVED	MOV	MOTOR OPERATED VALVE
ARC	ALUMINUM RIGID CONDUIT	MS	MANUAL MOTOR STARTER
AT	AMPERE TRIP	MT, MTD	MOUNT, MOUNTED
ATS	AUTOMATIC TRANSFER SWITCH	NA	NON-AUTOMATIC
AUTO	AUTOMATIC	NF	NON-FUSED
BATT	BATTERY	NO, NOS	NUMBER, NUMBERS
BKW	BARE COPPER WIRE	NP	NAMEPLATE
BKR	BREAKER	NOT IN CONTRACT	NOT IN THIS SECTION
BBL	BUBBLER	NOT TO SCALE	NOT TO CENTER
C	CABINET	OL	OVERLOAD RELAY
CC	CENTER TO CENTER	OL	OVERLOAD RELAY
CD	CONTROL DEVICE	PB	PUSHBUTTON
CHLOR	CHLORINE, CHLORINATION	PLC	PROGRAMMABLE LOGIC CONTROLLER
CKT	CIRCUIT	PNL	PANEL
CO	CONDUIT ONLY	PNLBD	PANEL BOARD
COND	CONDUIT	POS	POSITION
COMP	COMPARTMENT	POT	POTENTIOMETER
COMPR	COMPRESSOR	PRI	PRIMARY
CPT	CONTROL POWER TRANSFORMER (IN INDIVIDUAL STARTER CUBICLE)	PS	PRESSURE SWITCH
CR	CURRENT RELAY (MAGNETICALLY HELD)	PVC	POLYVINYL CHLORIDE
CU	COPPER	PWR	POWER
DB	DUCTBANK	REC, RECPTS	RECEPTACLE, RECEPTACLES
DISC	DISCONNECT	REQD	REQUIRED
DISTR	DISTRIBUTION	RM	RUN CONTACTOR COIL
DWG	DRAWING	SA	STATUS ANNUNCIATOR
ECC	EQUIPMENT GROUND CONDUCTOR	SCH	SCHEDULE
ELEV	ELEVATION	SEC	SECTIONS, SECONDARY
EMERG	EMERGENCY	SECT	SECTION
ENCL	ENCLOSURE	SEL SW	SELECTOR SWITCH
EQPT	EQUIPMENT	SEQ	SEQUENCE
EXH	EXHAUST	SHLD	SHIELDED
EXIST	EXISTING	SHT	SHEET
FDR	FEEDER	SIG	SIGNAL
FLEX	FLEXIBLE	SM	START CONTACTOR COIL
FLUOR	FLUORESCENT	SPECS	SPECIFICATIONS
FUT	FUTURE	SP HTR	SPACE HEATER
GALV	GALVANIZED	ST	SHUNT TRIP
GEN	GENERATOR	STA	STATION
GFI	GROUND FAULT INTERRUPTER	STD	STANDARD
GRD	GROUND	STL	STEEL
HH	HAND HOLE	STR	STARTER
HOA	HAND-OFF-AUTOMATIC	SV	SOLENOID VALVE
HTR	HEATER	SW	SWITCH
HLL	HIGH LIQUID LEVEL SWITCH	SYS	SYSTEM
HZ	HERTZ	TACH	TACHOMETER
INCAND	INCANDESCENT	TEMP	TEMPERATURE
IND	INDICATION (SYSTEM)	TERM	TERMINAL
INSTR	INSTRUMENT	THERM	THERMOSTAT
ISC	SHORT CIRCUIT CURRENT, AMPS	TR	TIME DELAY RELAY
JBOX	JUNCTION BOX	TS	TIME SWITCH
LOC	LOCAL	TYP	TYPICAL
LOS	LOCAL CONTROL PANEL	UG	UNDERGROUND
LCP	LOCAL CONTROL PANEL	VP	VARIABLE SPEED DRIVE
LS	LIMIT SWITCH	VFD	VARIABLE SPEED DRIVE
LGT	LIGHT, LIGHTS	W	WEATHERPROOF
LTG	LIGHTING	WFMR	WEATHERPROOF
LTM	LIGHTING	XMTR	TRANSMITTER
MA	MILLIAMPS	XP	EXPLOSION-PROOF
MAN	MANUAL		
MAG	MAGNETIC		
MAX	MAXIMUM		
MCC	MOTOR CONTROL CENTER		
MCB	MAIN CONTROL BOARD		

DESIGNED BY: M. LOKER
CHECKED BY: J. CATLANOTTO
SUBMITTED BY: J. FARWAY CE
PROJECT No.: DU 168,170.
ISSUE DATE: 08/20/2024
APPROVED BY: D. MARTIN
SHEET SIZE: ANSI D 34x22
AS NOTED



BREWSTER ROAD SEWER CONSOLIDATION ELECTRICAL SYMBOLS AND ABBREVIATIONS



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ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

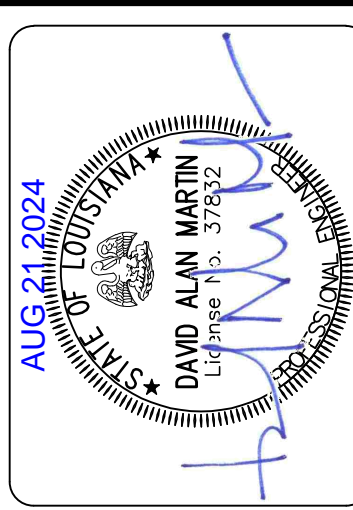
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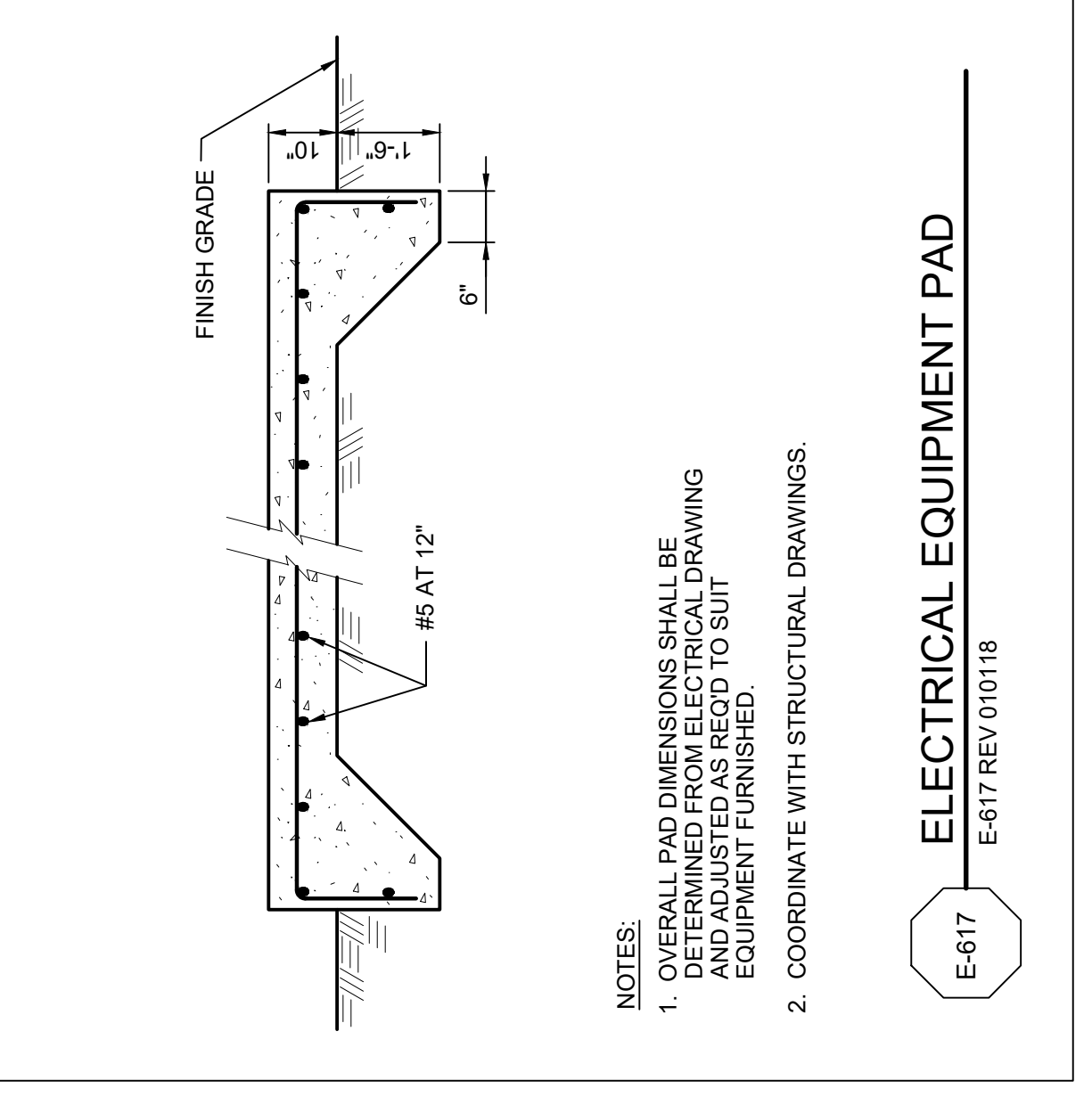
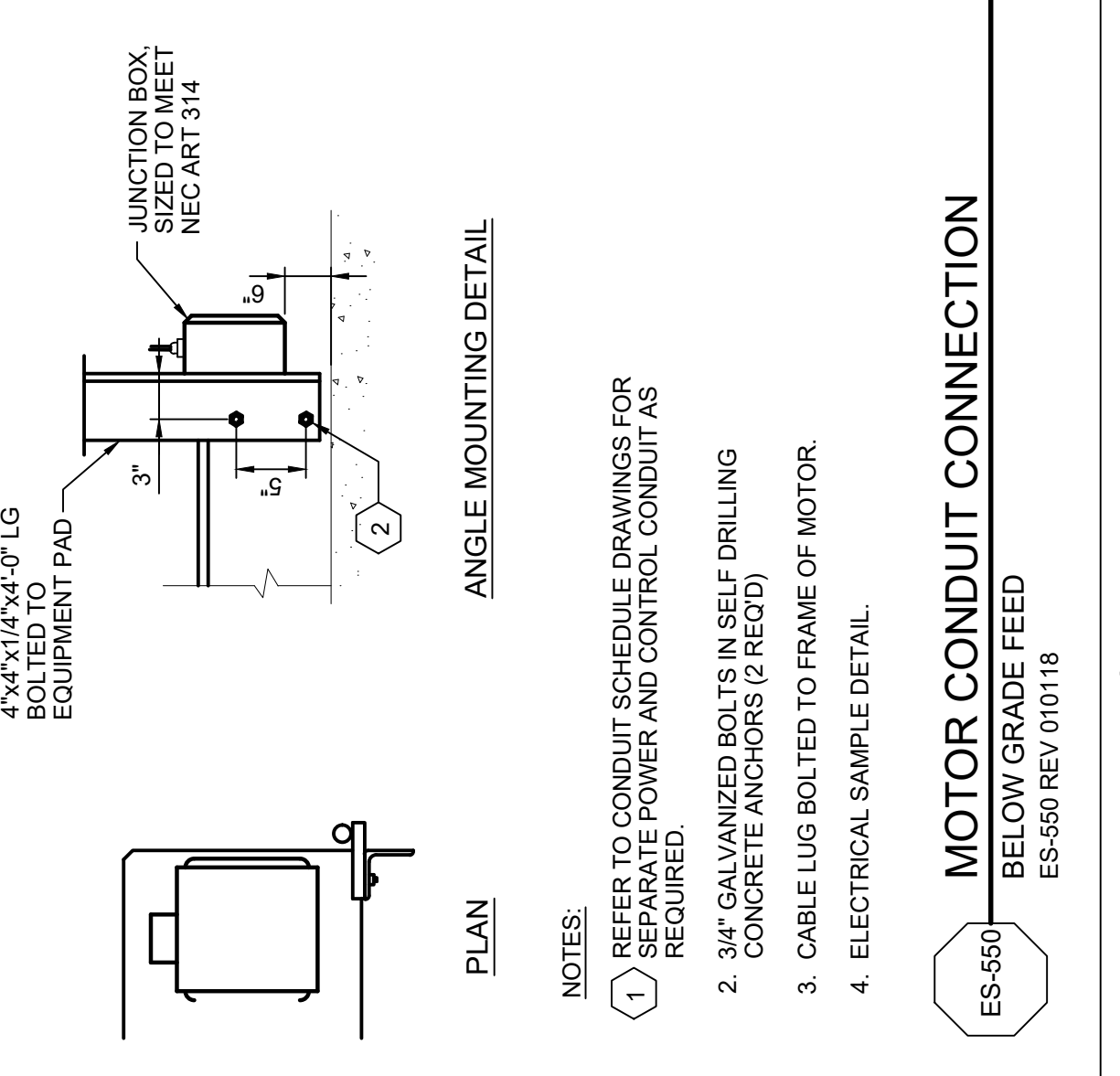
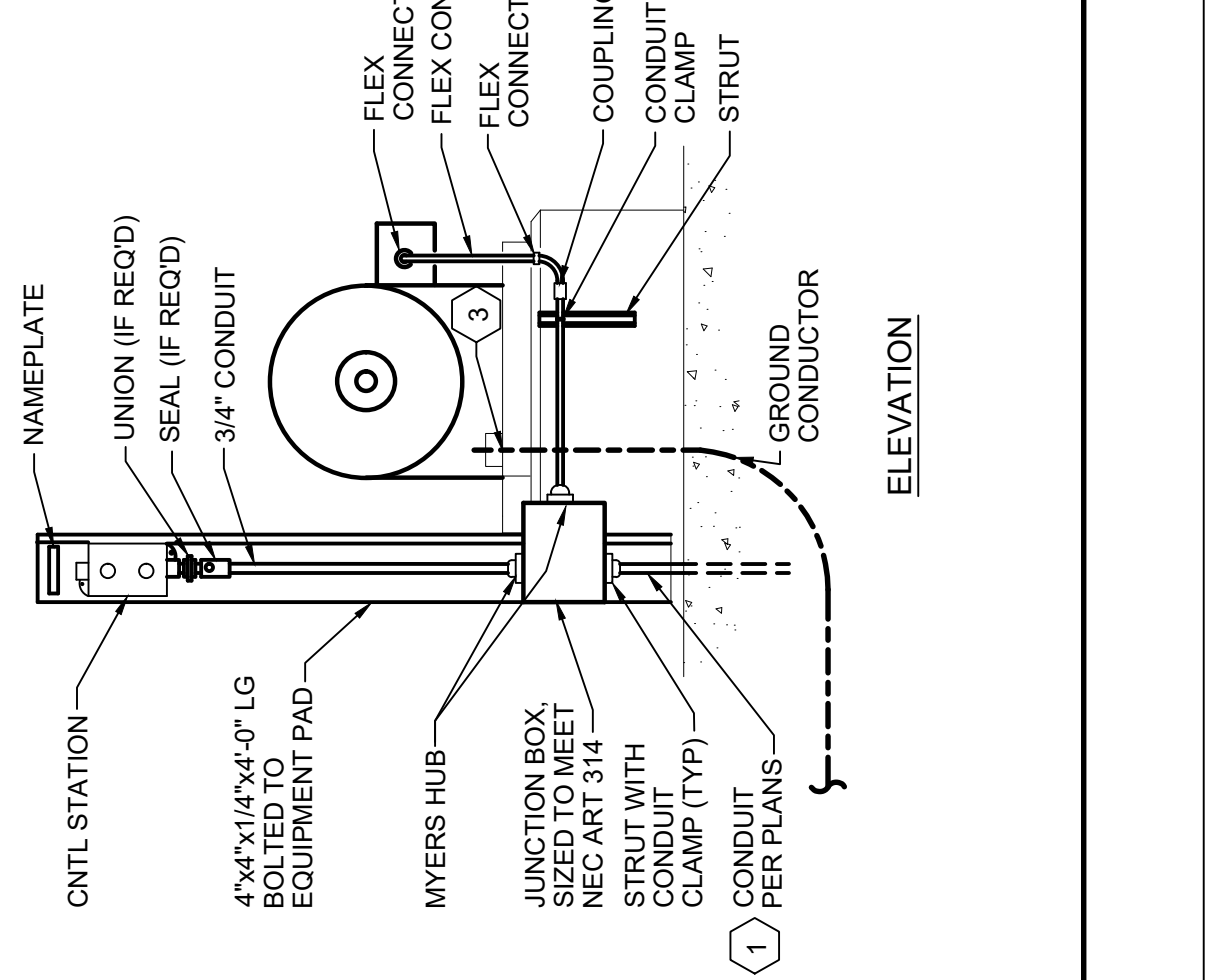
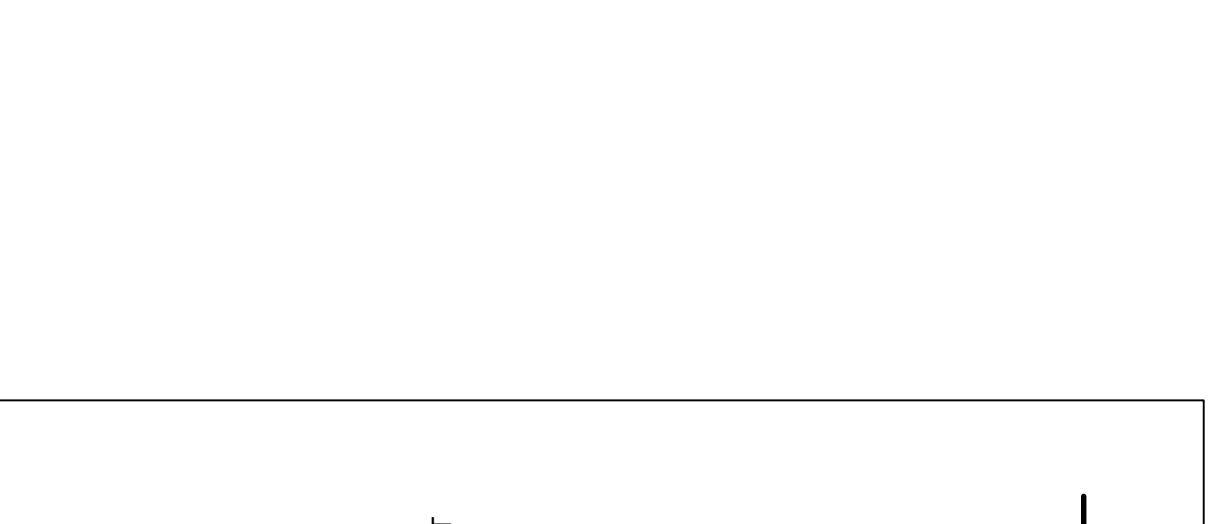
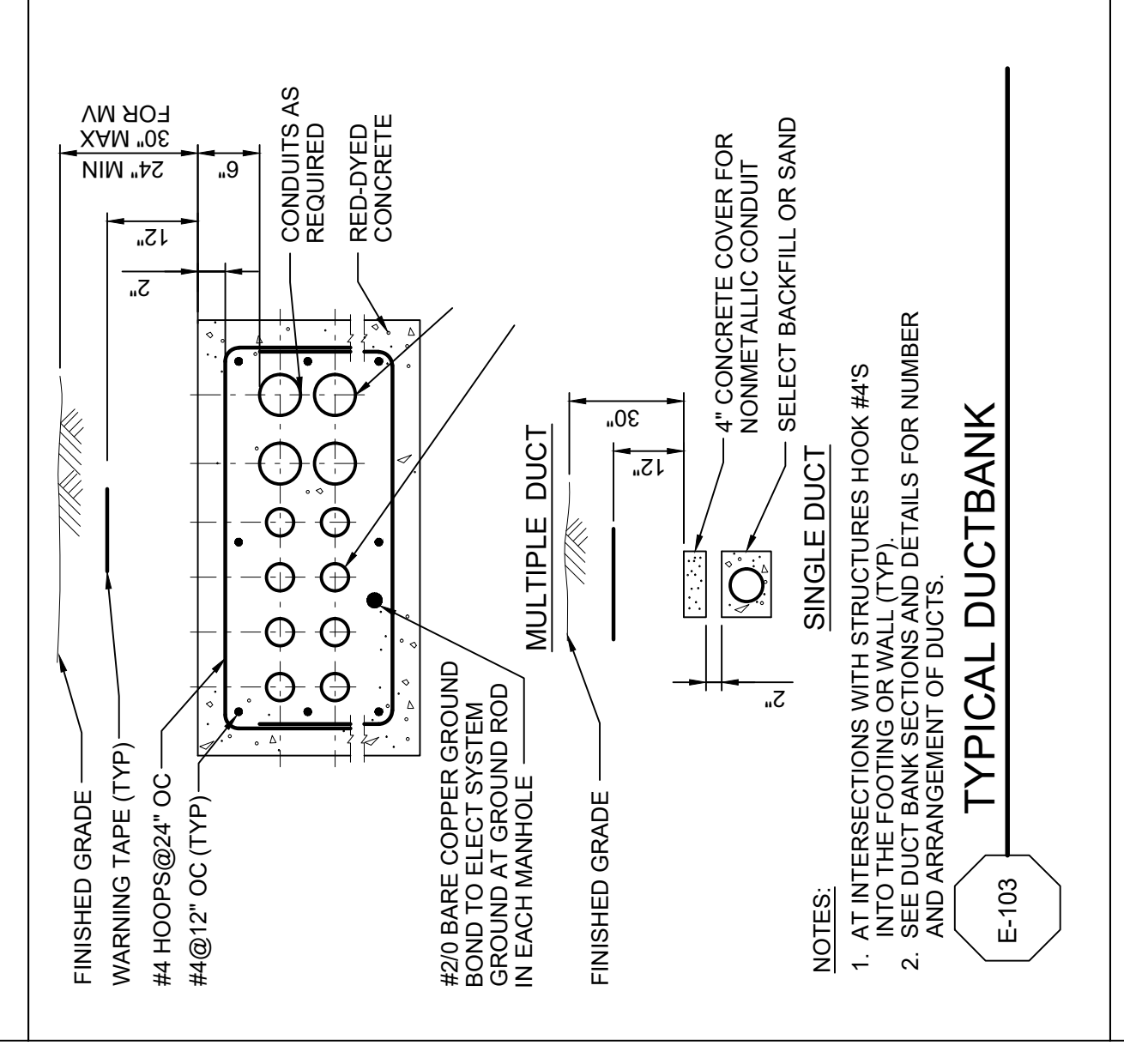
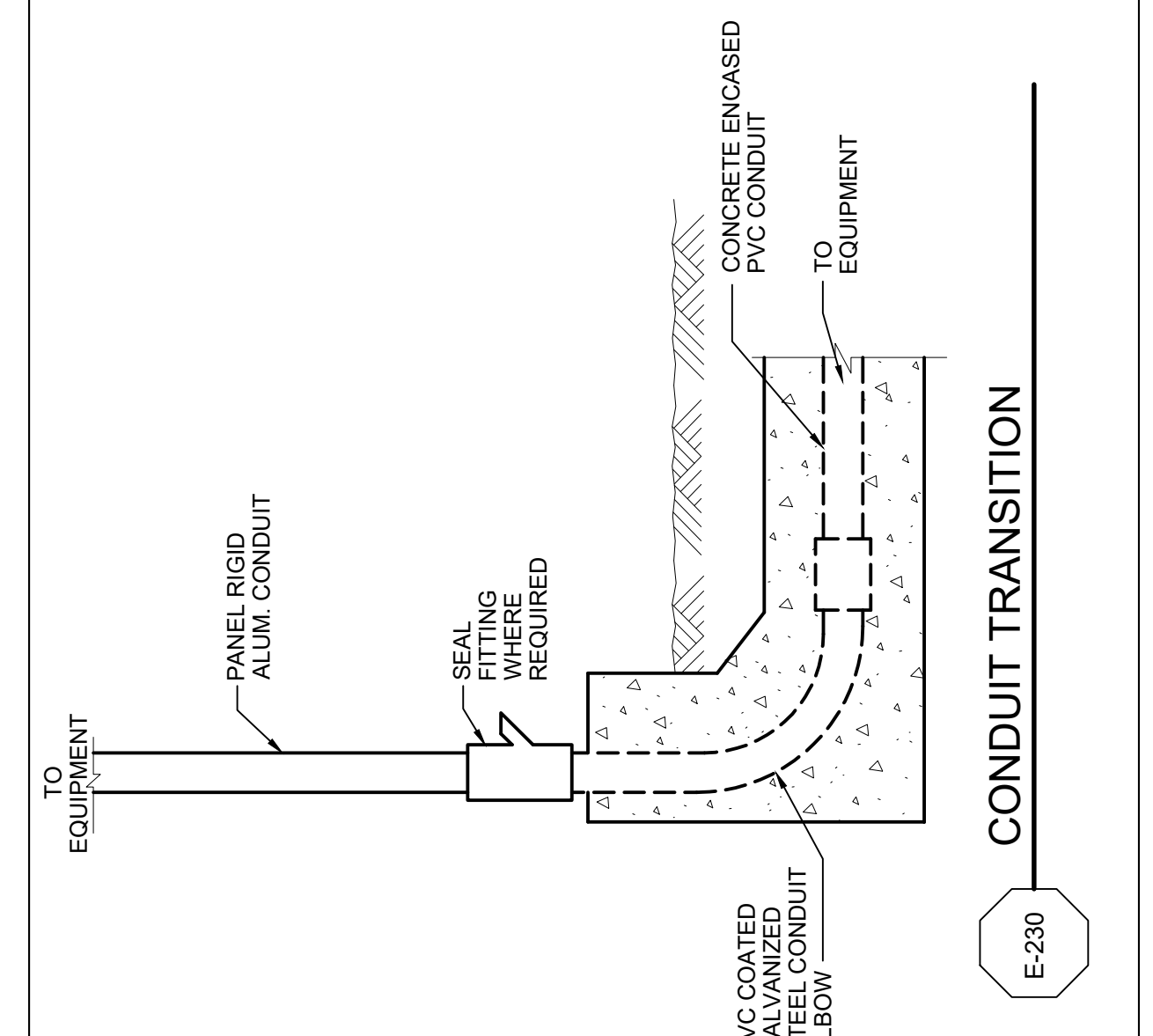
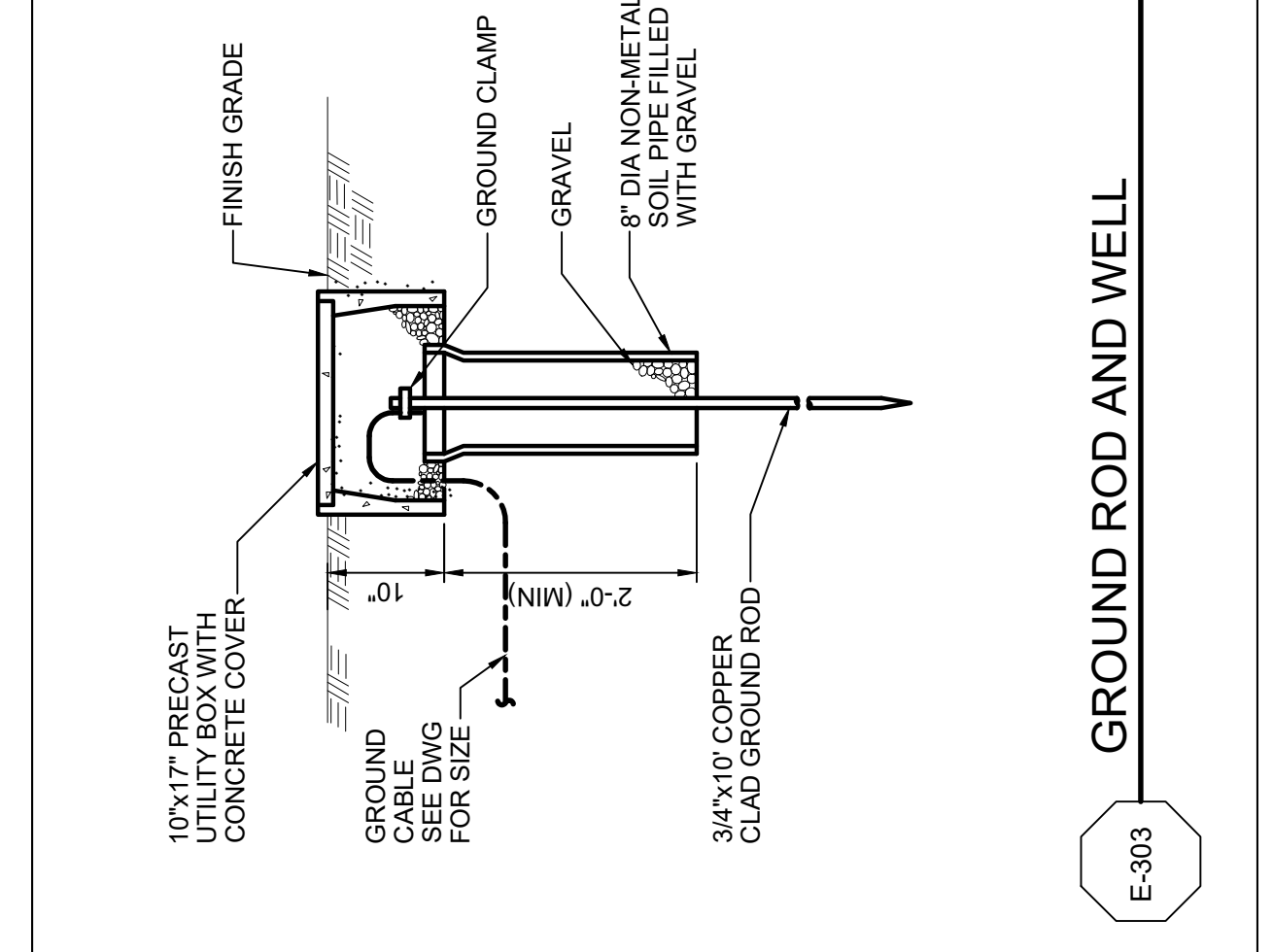
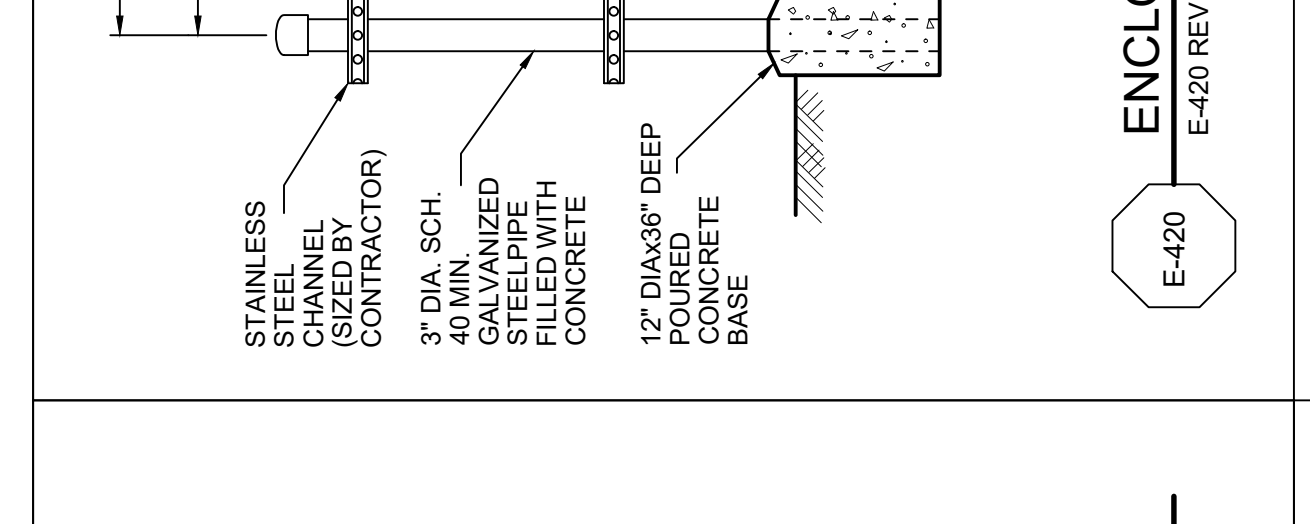
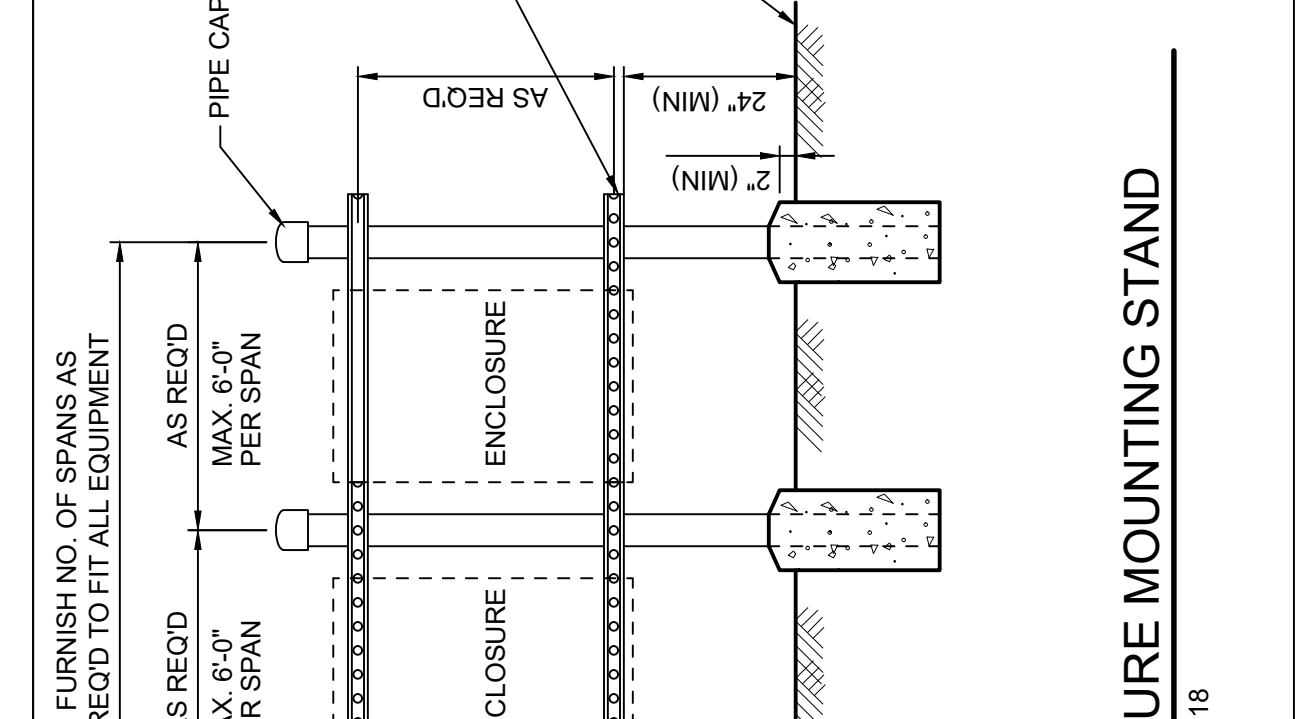
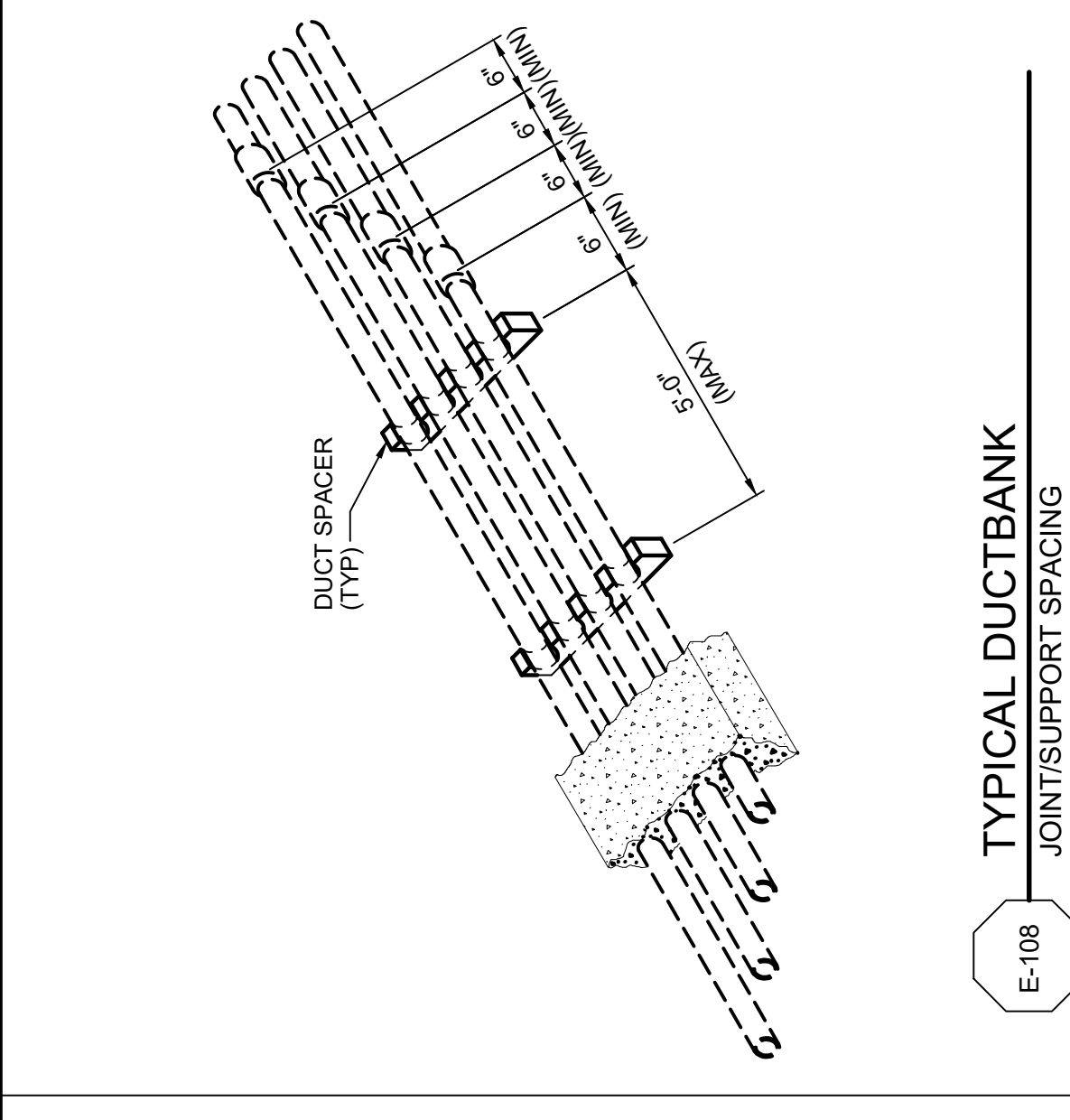
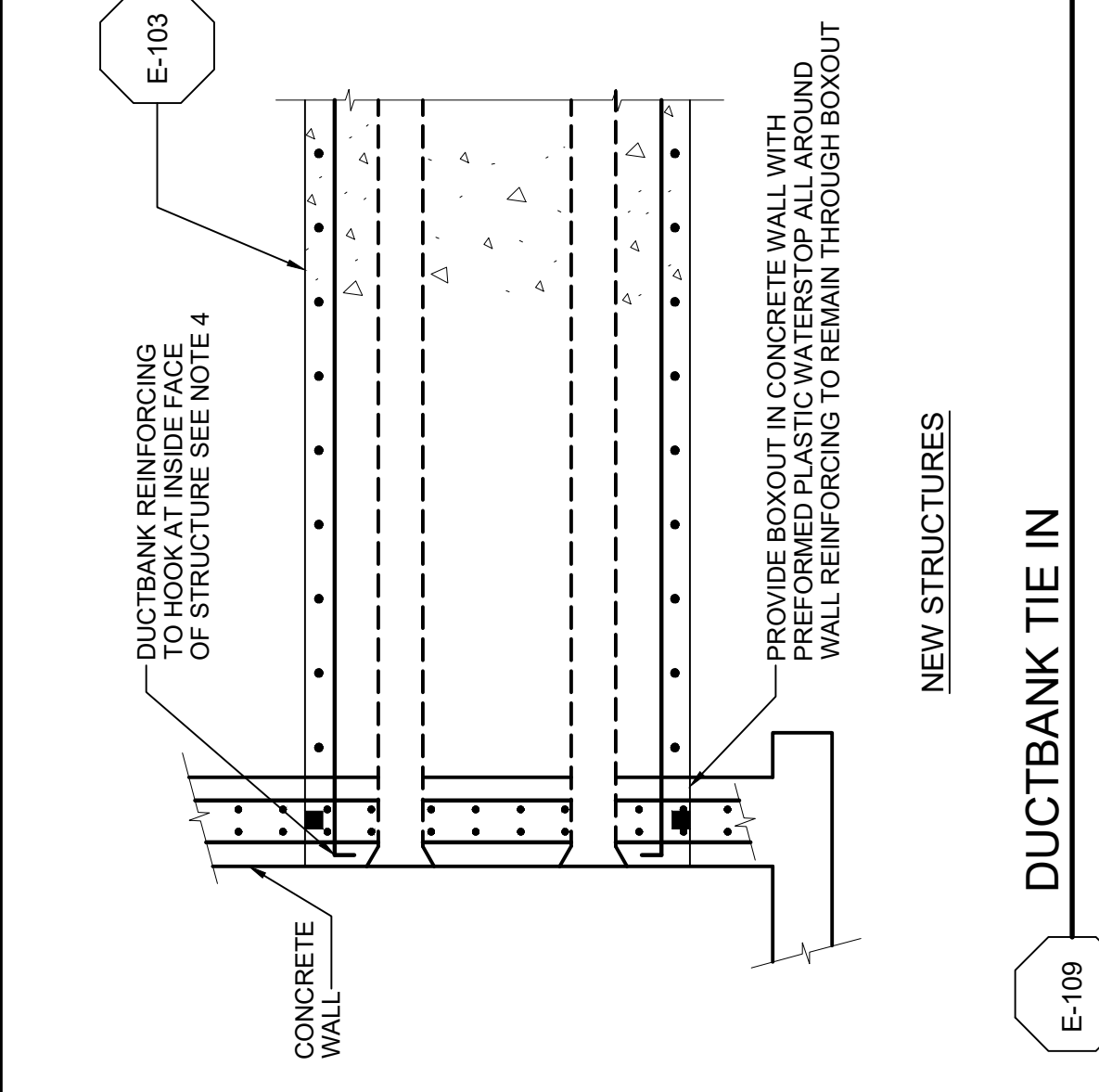
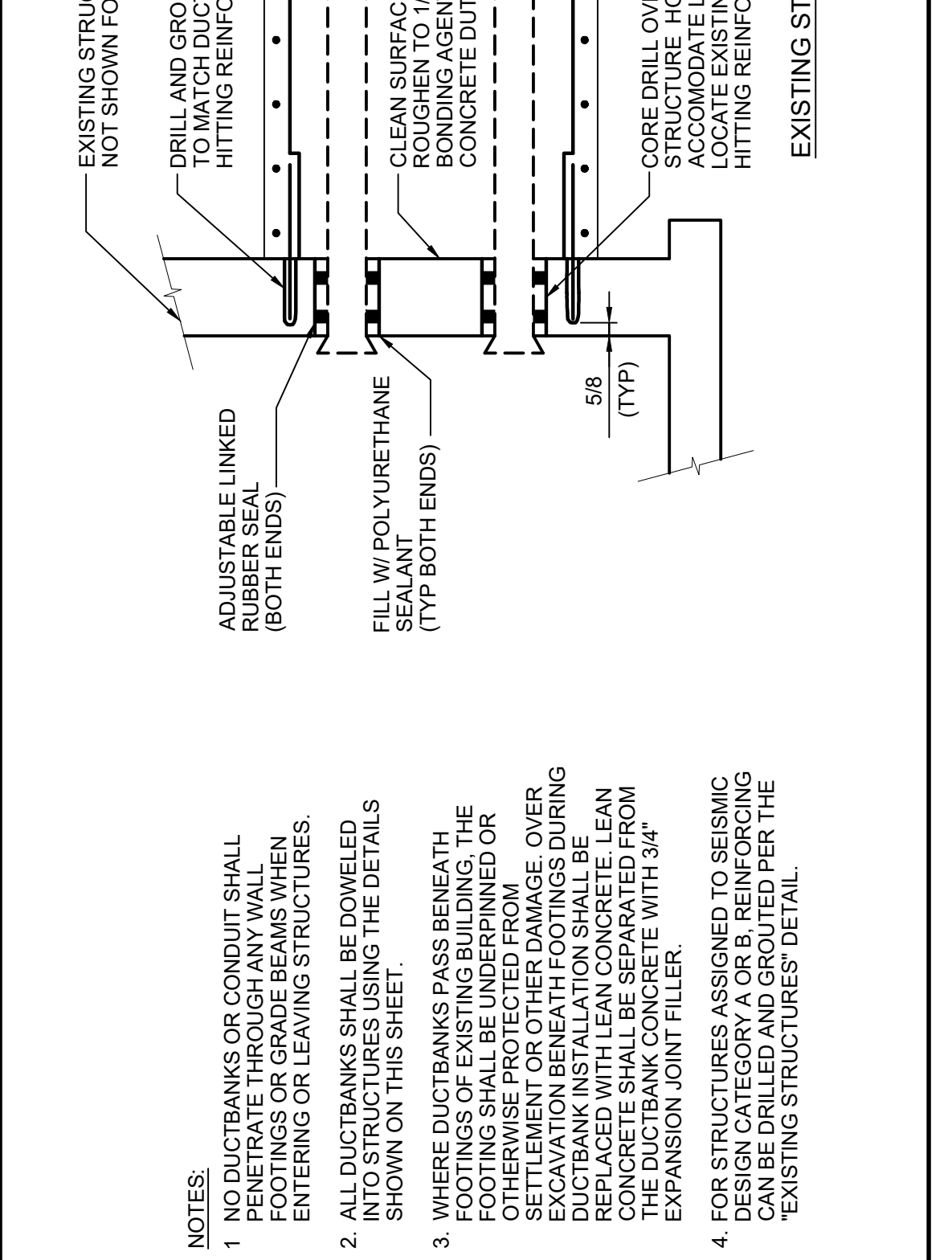
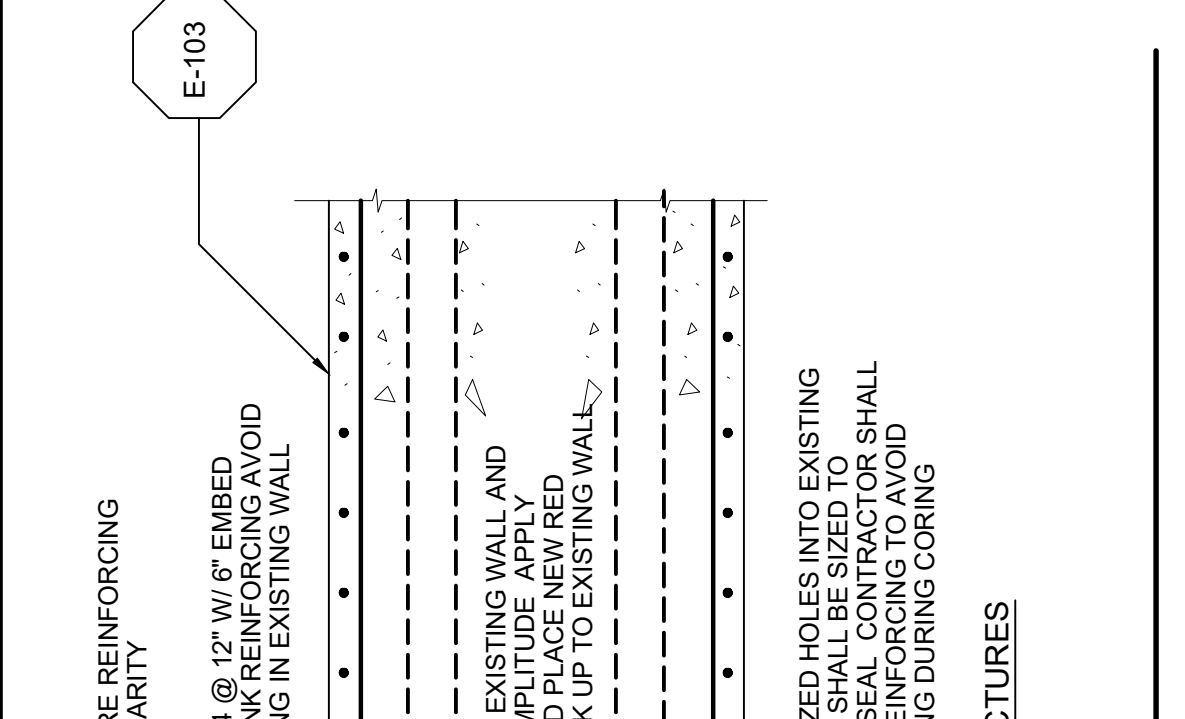
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DESIGNED BY:	M. LOKER
DRAWN BY:	J. HITT
CHECKED BY:	J. CATLANOTTO
PROJECT No.:	DU 168,170.
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED



BREWSTER ROAD SEWER
 CONSOLIDATION
 ELECTRICAL DETAILS I

SHEET NO.
GE-02



- NOTES:
1. NO DUCTBANKS OR CONDUIT SHALL PENETRATE THROUGH ANY WALL, FOOTINGS OR GRADE BEAMS WHEN ENTERING OR LEAVING STRUCTURES.
 2. ALL DUCTBANKS SHALL BE DOWELED INTO STRUCTURES USING THE DETAILS SHOWN ON THIS SHEET.
 3. WHERE DUCTBANKS PASS BENEATH FOOTINGS OF EXISTING BUILDING, THE FOOTINGS SHALL BE UNDERPINNED OR OTHERWISE PROTECTED FROM SETTLEMENT OR OTHER DAMAGE OVER THE DUCTBANK INSTALLATION. ALL DUCTBANK INSTALLATION SHALL BE REPLACED WITH LEAN CONCRETE. LEAN CONCRETE SHALL BE SEPARATED FROM THE DUCTBANK CONCRETE WITH 3/4\"/>
 - 4. FOR STRUCTURES ASSIGNED TO SEISMIC DESIGN CATEGORY A OR B, REINFORCING CAN BE DRILLED AND GROUTED PER THE 'EXISTING STRUCTURES' DETAIL.

- NOTES:
1. REFER TO CONDUIT SCHEDULE DRAWINGS FOR SEPARATE POWER AND CONTROL CONDUIT AS REQUIRED.
 2. 3/4\"/>
 - 3. CABLE LUG BOLTED TO FRAME OF MOTOR.
 - 4. ELECTRICAL SAMPLE DETAIL.

- NOTES:
1. OVERALL PAD DIMENSIONS SHALL BE DETERMINED FROM ELECTRICAL DRAWING AND ADJUSTED AS REQ'D TO SUIT EQUIPMENT FURNISHED.
 2. COORDINATE WITH STRUCTURAL DRAWINGS.

E-103

E-103

E-103

E-230

E-617

E-108

E-420

E-303

E-230

E-617

EXISTING STRUCTURES

NEW STRUCTURES

DUCTBANK TIE IN

CONDUIT TRANSITION

TYPICAL DUCTBANK

ENCLOSURE MOUNTING STAND

GROUND ROD AND WELL

MOTOR CONDUIT CONNECTION

ELECTRICAL EQUIPMENT PAD



DEPT. OF UTILITIES
ST. TAMMANY PARISH
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COVINGTON, LA 70433

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DESIGNED BY:	M. LOKER
DRAWN BY:	J. HITT
CHECKED BY:	J. CATLANOTTO
SUBMITTED BY:	FAIRWAY CE
PROJECT No.:	DU 168,170.
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED



BREWSTER ROAD SEWER
CONSOLIDATION
TYPICAL FEEDER SCHEDULE AND
PANELBOARD SCHEDULE 1

SHEET NO.
GE-03

SHEET GENERAL NOTES

- REFER TO SPECIFICATIONS SECTION 26 00 00 FOR GENERAL SPECIFICATIONS FOR ELECTRICAL CONSTRUCTION.
- REFER TO GENERAL ELECTRICAL SHEETS FOR ELECTRICAL DETAILS.
- SEE ONE LINE DIAGRAMS FOR ADDITIONAL REQUIREMENTS.
- SEE RISER DIAGRAMS FOR ADDITIONAL REQUIREMENTS.
- ELECTRICAL DRAWINGS ARE DIAGRAMMATIC IN NATURE AND ARE NOT FABRICATION DRAWINGS.

SHEET KEY NOTES ◊

- CONDUIT AND CABLE BY SERVING UTILITY
- VERIFY CABLE SIZE WITH SERVING UTILITY
- VERIFY CONDUIT SIZE WITH SERVING UTILITY
- MAIN FUSED DISCONNECT IS SERVICE EQUIPMENT
- PROVIDE MAIN BONDING JUMPER IN MAIN FUSED DISCONNECT
- VERIFY CONDUIT SIZE WITH EQUIPMENT SUPPLIER
- SEAL OFF REQD
- GROUND CABLE SHIELD AS REQD BY MANUFACTURER
- FURNISH PULL STRING FOR SERVING UTILITY
- VERIFY REQD AMPACITY WITH PUMP SUPPLIER
- DO NOT USE HIGH LEG
- PORTABLE GENERATOR BY OTHERS (NOT IN THIS CONTRACT)
- RUN 204 NOT REQUIRED. PROVIDE MEYERS HUB IN TRANSFER SWITCH FOR CABLE PASS THROUGH
- RUN 304 NOT REQUIRED. PROVIDE MEYERS HUB IN TRANSFER SWITCH FOR CABLE PASS THROUGH

CONDUIT AND CABLE SCHEDULE - AREA 30 (THREE RIVERS PUMP STATION)

RUN	FROM	TO	CONDUIT	CABLE	REMARKS
300	SERVING UTILITY DISTRIBUTION	SERVING UTILITY TRANSFORMER	BY SERVING UTILITY	BY SERVING UTILITY	◊ A
301	SERVING UTILITY TRANSFORMER	METER ENCLOSURE	MIN. 2" C	BY SERVING UTILITY	◊ B ◊ C ◊ I
302	METER ENCLOSURE	MAIN FUSED DISCONNECT	2" C	4 NO. 4/0 AWG, NO. 4 AWG G	◊ D ◊ E
303	MAIN FUSED DISCONNECT	MANUAL TRANSFER SWITCH	2" C	4 NO. 4/0 AWG, NO. 4 AWG G	
304	MANUAL TRANSFER SWITCH	PORTABLE GENERATOR	2" C	4 NO. 4/0 AWG, NO. 4 AWG G	◊ N
305	MANUAL TRANSFER SWITCH	CONTROL PANEL	2" C	4 NO. 4/0 AWG, NO. 4 AWG G	
306	CONTROL PANEL	LEVEL TRANSDUCER IN WET WELL	MIN. 3/4" C	FACTORY CABLE	◊ F ◊ G ◊ H
307	CONTROL PANEL	BACKUP FLOAT SWITCH IN WET WELL	MIN. 3/4" C	FACTORY CABLE	◊ F ◊ G
308	CONTROL PANEL	PUMP TERMINAL JUNCTION BOX	1" C	3 NO. 8 AWG, 1 NO. 10 AWG G, 4 NO. 10 AWG	◊ J
309	PUMP TERMINAL JUNCTION BOX	PUMP 1 MOTOR IN WET WELL	MIN. 1" C	FACTORY CABLE - POWER & GROUND	◊ G
310	PUMP TERMINAL JUNCTION BOX	PUMP 1 RELAYS IN WET WELL (SEAL) FAIL, TEMP.	MIN. 1" C	FACTORY CABLE - CONTROL	◊ G ◊ F
311	CONTROL PANEL	PUMP TERMINAL JUNCTION BOX	1" C	3 NO. 8 AWG, 1 NO. 10 AWG, G, 4 NO. 10 AWG	◊ J
312	PUMP TERMINAL JUNCTION BOX	PUMP 1 MOTOR IN WET WELL	MIN. 1" C	FACTORY CABLE - POWER & GROUND	
313	PUMP TERMINAL JUNCTION BOX	PUMP 1 RELAYS IN WET WELL (SEAL) FAIL, TEMP.	MIN. 1" C	FACTORY CABLE - CONTROL	
314	CONTROL PANEL	PANELBOARD "30"	3/4" C	3 NO. 8 AWG, 1 NO. 10 AWG	◊ K
315	PANELBOARD "30"	SITE LIGHT	3/4" C	2 NO. 12 AWG, NO. 12 AWG G	
316	PANELBOARD "30"	CONTROL POWER	3/4" C	2 NO. 12 AWG, 12 AWG G	
317	PANELBOARD "30"	CONVENIENCE OUTLET	3/4" C	2 NO. 12 AWG, 1 NO. 12 G	
318	CONTROL PANEL	FLOW METER SENSOR	3/4" C	FACTORY CABLE	

CONDUIT AND CABLE SCHEDULE - AREA 20 (FAIRFIELD OAKS PUMP STATION)

RUN	FROM	TO	CONDUIT	CABLE	REMARKS
200	SERVING UTILITY DISTRIBUTION	SERVING UTILITY TRANSFORMER	BY SERVING UTILITY	BY SERVING UTILITY	◊ A
201	SERVING UTILITY TRANSFORMER	METER ENCLOSURE	MIN. 2" C	BY SERVING UTILITY	◊ B ◊ C ◊ I
202	METER ENCLOSURE	MAIN FUSED DISCONNECT	2" C	4 NO. 4/0 AWG, NO. 4 AWG G	◊ D ◊ E
203	MAIN FUSED DISCONNECT	MANUAL TRANSFER SWITCH	2" C	4 NO. 4/0 AWG, NO. 4 AWG G	
204	MANUAL TRANSFER SWITCH	PORTABLE GENERATOR	--	--	◊ M
205	MANUAL TRANSFER SWITCH	CONTROL PANEL	2" C	4 NO. 4/0 AWG, NO. 4 AWG G	
206	CONTROL PANEL	FLOAT SWITCH IN WET WELL	MIN. 3/4" C	FACTORY CABLE	◊ F ◊ G
207	CONTROL PANEL	FLOAT SWITCH IN WET WELL	MIN. 3/4" C	FACTORY CABLE	◊ F ◊ G
208	CONTROL PANEL	PUMP TERMINAL JUNCTION BOX	1" C	3 NO. 8 AWG, 1 NO. 10 AWG G, 2 NO. 10 AWG	◊ J
209	PUMP TERMINAL JUNCTION BOX	PUMP 1 MOTOR ON TOP SLAB	MIN. 1" C	3 NO. 8 AWG, 1 NO. 10 AWG G	
210	PUMP TERMINAL JUNCTION BOX	PUMP 1 CASE HEATER	MIN. 1" C	2 NO. 12 AWG	
211	CONTROL PANEL	PUMP TERMINAL JUNCTION BOX	1" C	3 NO. 8 AWG, 1 NO. 10 AWG, G, 2 NO. 10 AWG	◊ J
212	PUMP TERMINAL JUNCTION BOX	PUMP 2 MOTOR ON TOP SLAB	MIN. 1" C	FACTORY CABLE - POWER & GROUND	
213	PUMP TERMINAL JUNCTION BOX	PUMP 2 CASE HEATER	MIN. 1" C	FACTORY CABLE - CONTROL	
214	CONTROL PANEL	PANELBOARD "20"	3/4" C	3 NO. 8 AWG, 1 NO. 10 AWG	◊ K
215	PANELBOARD "20"	SITE LIGHT	3/4" C	2 NO. 12 AWG, NO. 12 AWG G	
216	PANELBOARD "20"	CONTROL POWER	3/4" C	2 NO. 12 AWG, 12 AWG G	
217	PANELBOARD "20"	CONVENIENCE OUTLET	3/4" C	2 NO. 12 AWG, 1 NO. 12 AWG G	
218	CONTROL PANEL	FLOW METER SENSOR	3/4" C	FACTORY CABLE	◊ F
219	CONTROL PANEL	FLOAT SWITCH IN WET WELL	MIN. 3/4" C	FACTORY CABLE	◊ F ◊ G

CONDUIT AND CABLE SCHEDULE - AREA 40 (TCHEFUNCTE PARC PUMP STATION)

RUN	FROM	TO	CONDUIT	CABLE	REMARKS
400	UTILITY DISTRIBUTION	UTILITY TRANSFORMER	BY SERVING UTILITY	BY SERVING UTILITY	(A)
401	UTILITY TRANSFORMER	METER ENCLOSURE	3" C	2 SETS 4-NO. 3/0 AWG	(B) (C) (I)
402	METER ENCLOSURE	MAIN FUSED DISCONNECT	3" C	2 SETS 4-NO. 3/0 AWG, NO. 3/0 AWG G.	
403	MAIN FUSED DISCONNECT	AUTOMATIC TRANSFER SWITCH	3" C	2 SETS 4-NO. 3/0 AWG, NO. 3/0 AWG G.	
404	AUTOMATIC TRANSFER SWITCH	REQ'D AUXILIARY GENERATOR	3" C	2 SETS 4-NO. 3/0 AWG, NO. 3/0 AWG G.	
405	AUTOMATIC TRANSFER SWITCH	PUMP CONTROL PANEL	3" C	2 SETS 4-NO. 3/0 AWG, NO. 3/0 AWG G.	
406	PUMP CONTROL PANEL	ULTRASONIC LEVEL TRANSDUCER IN WET WELL	3/4" C MIN	FACTORY CABLE	
407	PUMP CONTROL PANEL	BACKUP FLOAT SWITCH IN WET WELL	3/4" C MIN	FACTORY CABLE	
408	PUMP CONTROL PANEL	PUMP TERMINAL JUNCTION BOX	1-1/2" C	3 NO. 3 AWG, NO. 8 AWG G	
409	PUMP CONTROL PANEL	PUMP TERMINAL JUNCTION BOX	3/4" C	4 EA. NO. 12 AWG	
410	PUMP TERMINAL JUNCTION BOX	PUMP NO. 1 MOTOR IN WET WELL	1-1/2" C MIN	FACTORY CABLE	
411	PUMP CONTROL PANEL	PUMP TERMINAL JUNCTION BOX	1-1/2" C	3 NO. 3 AWG, NO. 8 AWG G	
412	PUMP CONTROL PANEL	PUMP TERMINAL JUNCTION BOX	3/4" C	4 EA. NO. 12 AWG	
413	PUMP TERMINAL JUNCTION BOX	PUMP NO. 2 MOTOR IN WET WELL	1-1/2" C MIN	FACTORY CABLE	
414	PUMP CONTROL PANEL	PANELBOARD "40"	3/4" C	2 EA. NO. 8 AWG, NO. 10 AWG G.	
415	PANELBOARD "40"	CONTROL POWER	3/4" C	2 EA. NO. 12 AWG, NO. 12 AWG G.	
416	PANELBOARD "40"	SITE LIGHT	3/4" C	2 EA. NO. 12 AWG, NO. 12 AWG G.	
417	PANELBOARD "40"	CONVENIENCE OUTLET	3/4" C	2 EA. NO. 12 AWG, NO. 12 AWG G.	
418	PUMP CONTROL PANEL	FLOW METER SENSOR	3/4" C	FACTORY CABLE	

PANELBOARD SCHEDULE - PANELBOARD "P-20"

CKT. NO.	AMP - POLES	WIRE SIZE	SERVICING
1	20-1	#12 AWG	CONTROL PANEL POWER
2	20-1	#12 AWG	SITE LIGHT
3	20-1	#12 AWG	CONVENIENCE OUTLET
4	-	-	-
5	-	-	-
6	-	-	-
7	-	-	-
8	-	-	-
9	-	-	-
10	-	-	-
11	-	-	-
12	-	-	-
13	-	-	-
14	-	-	-
15	-	-	-
16	-	-	-

PANELBOARD SCHEDULE - PANELBOARD "P-30"

CKT. NO.	AMP - POLES	WIRE SIZE	SERVICING
1	20-1	#12 AWG	CONTROL PANEL POWER
2	20-1	#12 AWG	SITE LIGHT
3	20-1	#12 AWG	CONVENIENCE OUTLET
4	-	-	-
5	-	-	-
6	-	-	-
7	-	-	-
8	-	-	-
9	-	-	-
10	-	-	-
11	-	-	-
12	-	-	-
13	-	-	-
14	-	-	-
15	-	-	-
16	-	-	-

PANELBOARD SCHEDULE - PANELBOARD "P-40"

CKT. NO.	AMP - POLES	WIRE SIZE	SERVICING
1	20-1	#12 AWG	CONTROL PANEL POWER
2	20-1	#12 AWG	SITE LIGHT
3	20-1	#12 AWG	CONVENIENCE OUTLET
4	-	-	-
5	-	-	-
6	-	-	-
7	-	-	-
8	-	-	-
9	-	-	-
10	-	-	-
11	-	-	-
12	-	-	-
13	-	-	-
14	-	-	-
15	-	-	-
16	-	-	-

SHEET GENERAL NOTES

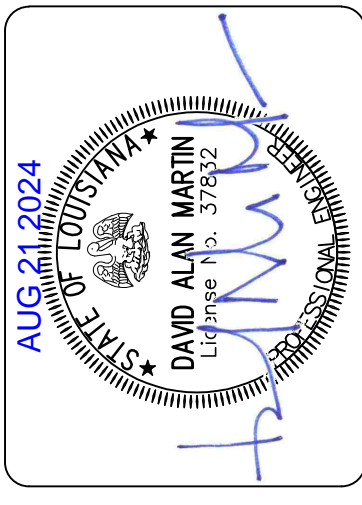
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- ELECTRICAL DRAWINGS ARE DIAGRAMMATIC IN NATURE AND ARE NOT FABRICATION DRAWINGS.

SHEET KEY NOTES ◊

- CONDUIT AND CABLE BY SERVING UTILITY
- VERIFY CABLE SIZE WITH SERVING UTILITY
- VERIFY CONDUIT SIZE WITH SERVING UTILITY
- MAIN FUSED DISCONNECT IS SERVICE EQUIPMENT
- PROVIDE MAIN BONDING JUMPER IN MAIN FUSED DISCONNECT
- VERIFY CONDUIT SIZE WITH EQUIPMENT SUPPLIER
- SEAL OFF REQ'D
- GROUND CABLE SHIELD AS REQ'D BY MANUFACTURER
- FURNISH PULL STRING FOR SERVING UTILITY
- VERIFY REQ'D AMPACITY WITH PUMP SUPPLIER
- DO NOT USE HIGH LEG

NO.	DESCRIPTION OF REVISION	DATE:
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DESIGNED BY: M. LOKER	DRAWN BY: J. HITT
CHECKED BY: J. CATLANOTTO	FAIRWAY CE
PROJECT No.: DU 168,170.	175, 177
ISSUE DATE: 08/20/2024	D. MARTIN
APPROVED BY: D. MARTIN	ANSI D 34x22
SHEET SIZE:	AS NOTED



BREWSTER ROAD SEWER
CONSOLIDATION
TYPICAL FEEDER SCHEDULE AND
PANELBOARD SCHEDULE II

SHEET NO.
GE-04



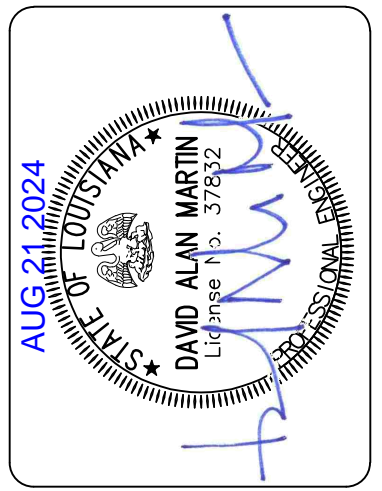
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No.	DESCRIPTION OF REVISION	DATE:

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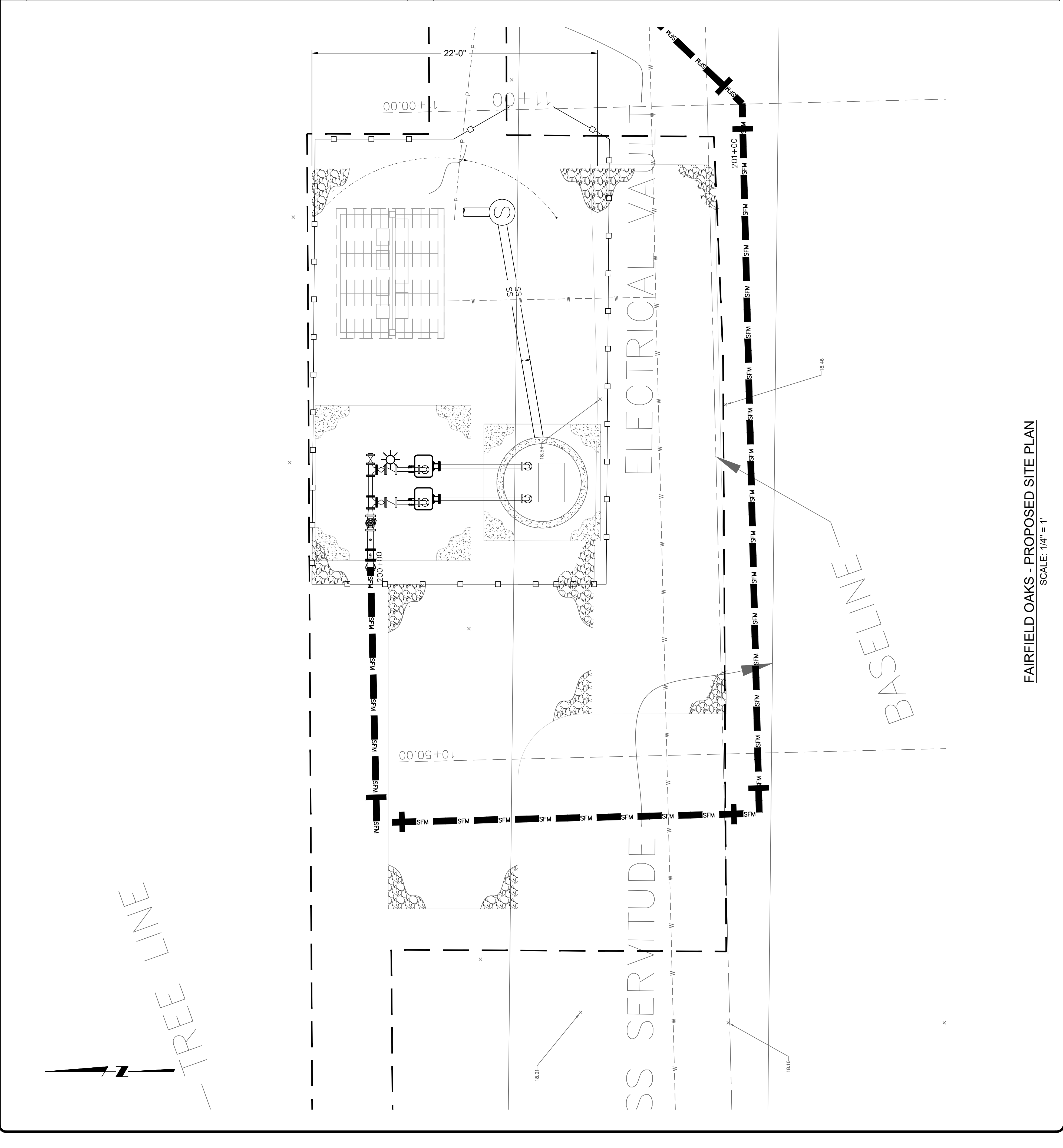
DESIGNED BY: M. LOKER
DRAWN BY: J. HITT
CHECKED BY: J. CATALANOTTO
SUBMITTED BY: FAIRWAY CE
PROJECT No.: DU 168,170,
175, 177
ISSUE DATE: 08/20/2024
APPROVED BY: D. MARTIN
SHEET SIZE: ANSI D 34x22
SCALE: AS NOTED

BREWSTER ROAD SEWER
CONSOLIDATION
SITE PLAN
FAIRFIELD OAKS - ELECTRICAL

SHEET NO.
20E-01

- GENERAL NOTES**
- ELECTRICAL SITE PLAN IS DEVELOPED BASED UPON SURVEY PREPARED BY ALL SOUTH CONSULTING ENGINEERS, L.L.C. TITLED, "FAIRFIELD OAKS, TOHEUNCTE PARC. & THREE RIVERS WWTP SEWER CONSOLIDATION PROJECT," AND DATED 08/2023.
 - REFER TO RISER DIAGRAMS, PUMP CONTROL PANEL DIAGRAMS, FOR ADDITIONAL REQUIREMENTS AND SPECIFICATIONS.
 - REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS & CONDUIT.
 - VERIFY PRIMARY VOLTAGE AND AVAILABLE FAULT CURRENT WITH SERVING UTILITY PRIOR TO EQUIPMENT PROCUREMENT.
 - RUN ALL BELOW - GRADE CONDUIT IN DUCT BANKS PER DETAIL E-103.
 - PROVIDE DUCT BANK SUPPORTS AND JOINTS PER DETAIL E-108.
 - TRANSITION FROM BELOW GRADE TO ABOVE GRADE CONDUIT PER DETAIL E-230. PROVIDE EXPLOSION PROOF SEALS WHERE SHOWN AND/OR OTHERWISE REQUIRED PER NATIONAL ELECTRICAL CODE.
 - TIE IN DUCT BANKS TO EXISTING / REQ'D NEW STRUCTURES PER DETAIL E-109.

SHEET KEY NOTES ◻



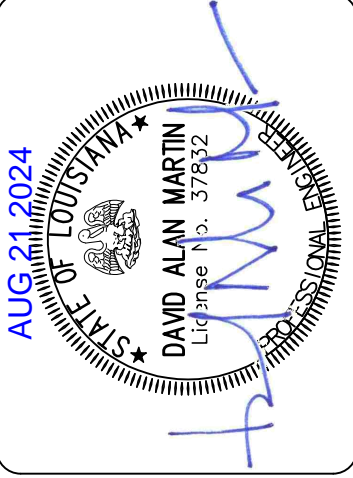
FAIRFIELD OAKS - PROPOSED SITE PLAN
SCALE: 1/4" = 1'



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

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DESIGNED BY: M LOKER	DRAWN BY: J. HITT
CHECKED BY: J. CATALANOTTO	FARWAY CE
PROJECT No.: DU 168,170.	175, 177
ISSUE DATE: 08/20/2024	APPROVED BY: D. MARTIN
SHEET SIZE: ANSI D 34x22	AS NOTED



BREWSTER ROAD SEWER
CONSOLIDATION
FAIRFIELD OAKS - SINGLE LINE
DIAGRAM

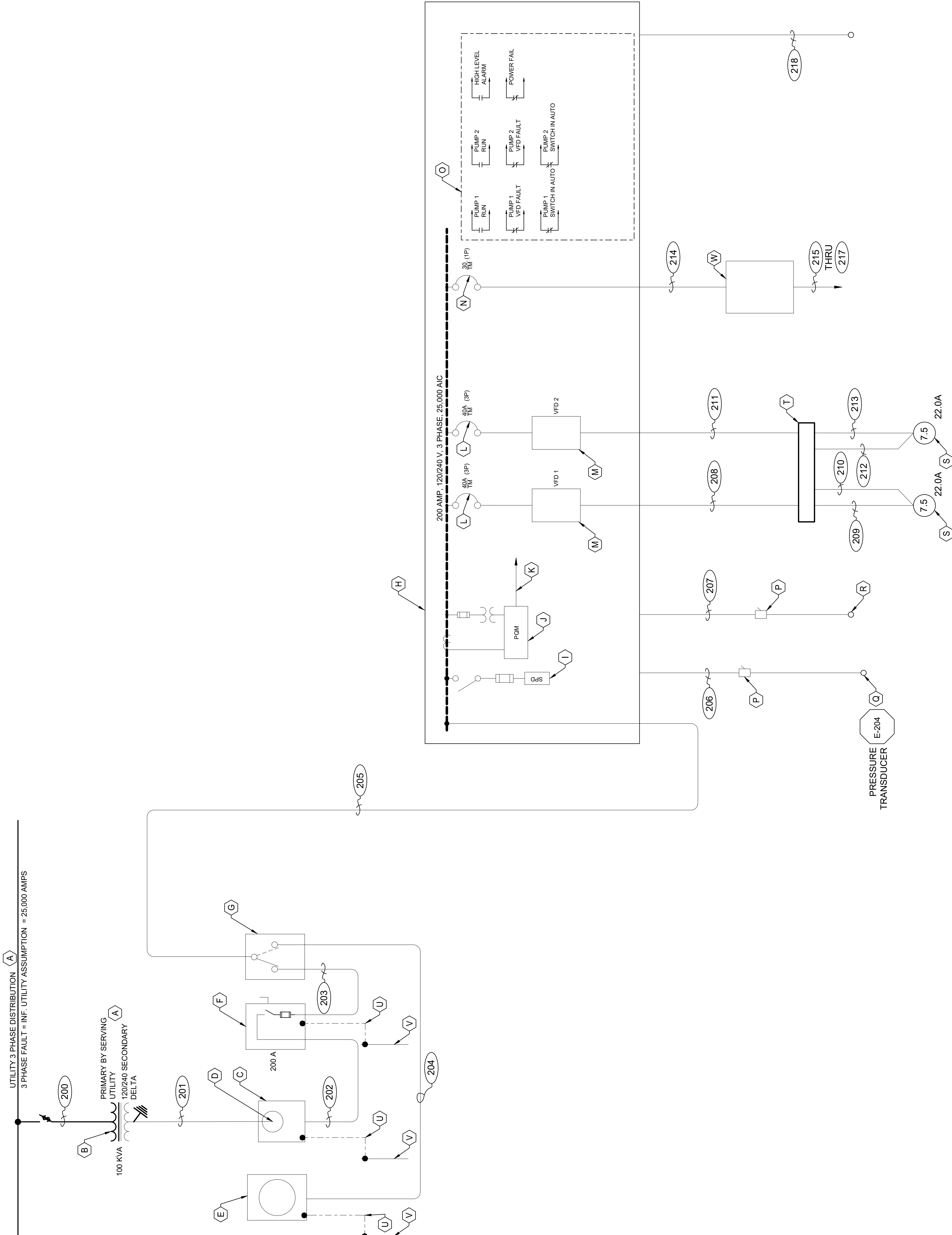
SHEET NO.
20E-02

SHEET GENERAL NOTES

- REFER TO RISER DIAGRAMS, PUMP CONTROL PANEL DIAGRAMS, FOR ADDITIONAL REQUIREMENTS AND SPECIFICATIONS.
- REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS & CONDUIT.
- VERIFY PRIMARY VOLTAGE AND AVAILABLE FAULT CURRENT WITH SERVING UTILITY PRIOR TO EQUIPMENT PROCUREMENT.
- RUN ALL BELOW - GRADE CONDUIT IN DUCT BANKS PER DETAIL E-103.
- PROVIDE DUCT BANK SUPPORTS AND JOINTS PER DETAIL E-108.
- TRANSITION FROM BELOW GRADE TO ABOVE GRADE CONDUIT PER DETAIL E-230. PROVIDE EXPLOSION PROOF SEALS WHERE SHOWN AND/OR OTHERWISE REQUIRED PER NATIONAL ELECTRICAL CODE.
- TIE IN DUCT BANKS TO EXISTING / REQ'D NEW STRUCTURES PER DETAIL E-109.
- VERIFY BREAKER AND CABLE SIZES FOR ALL FURNISHED EQUIPMENT AND INCLUDE ALL COSTS IN THE PRICE OF THE WORK.
- SEE CABLE AND CONDUIT SCHEDULES FOR ADDITIONAL REQUIREMENTS.
- SEE PANEL SCHEDULES FOR ADDITIONAL REQUIREMENTS.

SHEET KEY NOTES

- VERIFY TRANSFORMER SIZE AND AVAILABLE FAULT CURRENT WITH SERVING UTILITY PRIOR TO PROCURING ELECTRICAL EQUIPMENT
- PAD MOUNTED UTILITY TRANSFER BY SERVING UTILITY. TRANSFORMER PAD BY CONTRACTOR
- REQ'D METER ENCLOSURE BY CONTRACTOR
- METER BY SERVING UTILITY
- PORTABLE GENERATOR SET BY OTHERS (NOT IN THIS CONTRACT)
- REQ'D FUSED MAIN DISCONNECT SWITCH, SINGLE THROW, 200 AMP WITH 200 AMP FUSE (SERVICE EQUIPMENT)
- REQ'D MANUAL TRANSFER SWITCH PER SECTION 22.00.0
- REQ'D CONTROL PANEL, NEMA 4X ENCLOSURE
- REQ'D SURGE PROTECTIVE DEVICE
- REQ'D PHASE MONITOR
- TO CONTROLS SECTION
- REQ'D THERMAL MAGNETIC BREAKER. VERIFY REQ'D SIZE WITH PUMP SUPPLIER PRIOR TO BIDE AND INCLUDE ALL COSTS IN THE PRICE OF THE WORK
- REQ'D PROGRAMMABLE VARIABLE FREQUENCY DRIVE
- REQ'D THERMAL MAGNETIC BREAKER
- REQ'D DRY CONTACTS FOR FUTURE MONITORING
- REQ'D SEAL OFF FITTING
- REQ'D PRESSURE TRANSDUCER
- REQ'D BACKUP FLOAT SWITCH
- REQ'D PUMP MOTOR. VERIFY FLA WITH SUPPLIER
- REQ'D NEMA 4X TERMINAL BOX. MIN. 24" X 24" X 12" (VERIFY PRIOR)
- REQ'D GROUNDING CONDUCTOR PER NEC TO GROUND ELECTRODE SYSTEM
- REQ'D GROUND ELECTRODE SYSTEM
- REQ'D "PANELBOARD 20"



SHEET GENERAL NOTES

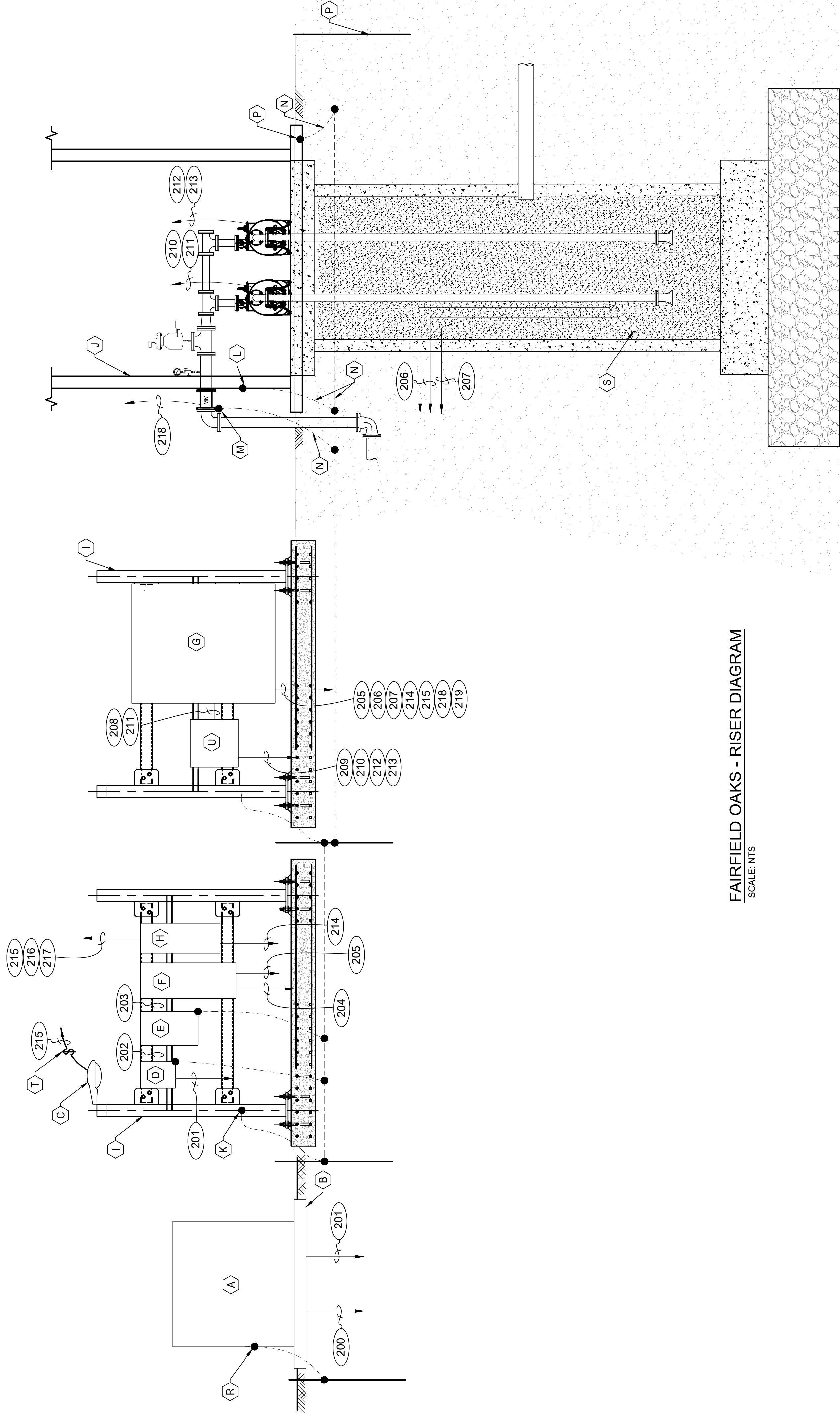
1. REFER TO ONE RISER DIAGRAMS, AND PUMP CONTROL PANEL ONE LINE DIAGRAMS FOR ADDITIONAL REQUIREMENTS.
2. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS & CONDUIT.
3. VERIFY PRIMARY VOLTAGE AND AVAILABLE FAULT CURRENT WITH SERVING UTILITY PRIOR TO EQUIPMENT PROCUREMENT.
4. RUN ALL BELOW - GRADE CONDUIT IN DUCT BANKS PER DETAIL E-103.
5. PROVIDE DUCT BANK SUPPORTS AND JOINTS PER DETAIL E-108.
6. TRANSITION FROM BELOW GRADE TO ABOVE GRADE CONDUIT PER DETAIL E-230. PROVIDE EXPLOSION PROOF SEALS WHERE SHOWN AND/OR OTHERWISE REQUIRED PER NATIONAL ELECTRICAL CODE.
7. TIE IN DUCT BANKS TO EXISTING / REQ'D NEW STRUCTURES PER DETAIL E-109.
8. SEE CABLE AND CONDUIT SCHEDULES FOR ADDITIONAL REQUIREMENTS.
9. SEE PANEL SCHEDULES FOR ADDITIONAL REQUIREMENTS.

SHEET KEY NOTES

- A. REQ'D PAD MOUNT TRANSFORMER BY SERVING UTILITY. VERIFY RATING WITH SERVING UTILITY.
- B. REQ'D PORTLAND CEMENT CONCRETE TRANSFORMER PAD PER SERVING UTILITY STANDARDS.
- C. REQ'D SITE LIGHT FIXTURE & PHOTOCELL
- D. REQ'D METER ENCLOSURE PER SERVING UTILITY STANDARDS. METER BY SERVING UTILITY.
- E. REQ'D FUSED DISCONNECT SWITCH, SINGLE THROW, 200 AMP WITH 200 AMP FUSE (SERVICE EQUIPMENT)
- F. REQ'D MANUAL TRANSFER SWITCH PER SECTION 26 00 00
- G. REQ'D PUMP CONTROL PANEL
- H. REQ'D PANELBOARD "P-20" (SEE PANEL SCHEDULE)
- I. REQ'D EQUIPMENT CANOPY PER STRUCTURAL
- J. STRUCTURAL STEEL
- K. BOND EQUIPMENT RACK TO GROUND ELECTRODE SYSTEM PER NEC REQUIREMENTS.
- L. BOND CANOPY STRUCTURAL STEEL TO GROUND ELECTRODE SYSTEM PER NEC REQUIREMENTS.
- M. BOND FLOW METER GROUND RING TO GROUND ELECTRODE SYSTEM PER NEC REQUIREMENTS.
- N. REQ'D GROUND JUMPER PER NEC REQUIREMENTS.
- O. REQ'D GROUND ELECTRODE SYSTEM (MIN. 2 RODS)
- P. BOND REINFORCING STEEL TO GROUND ELECTRODE SYSTEM PER NEC REQUIREMENTS.
- Q. BOND METER ENCLOSURE TO GROUND ELECTRODE SYSTEM PER NEC REQUIREMENTS.
- R. GROUND TRANSFORMER PER SERVING UTILITY REQUIREMENTS
- S. REQ'D FLOAT SWITCHES
- T. REQ'D SWITCH FOR LIGHTING CIRCUIT
- U. REQ'D JUNCTION BOX



CLASSIFIED AREA, CLASS I, DIVISION 1



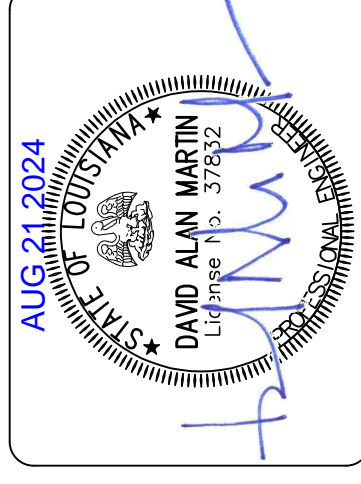
FAIRFIELD OAKS - RISER DIAGRAM
SCALE: NTS



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

No.	DESCRIPTION OF REVISION	DATE:
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DESIGNED BY:	M. LOKER
DRAWN BY:	J. HITT
CHECKED BY:	J. CATLANOTTO
PROJECT No.:	DU 168,170.
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED



**BREWSTER ROAD SEWER
CONSOLIDATION**
FAIRFIELD OAKS - RISER
DIAGRAM

SHEET NO.
20E-03

BREWSTER ROAD SEWER CONSOLIDATION

FAIRFIELD OAKS - CONTROL - DIAGRAM 1



DESIGNED BY: M. LOKER
 DRAWN BY: J. HITT
 CHECKED BY: J. CATLANOTTO
 SUBMITTED BY: FAIRWAY CE
 PROJECT No.: DU 168,170, 175, 177
 ISSUE DATE: 08/20/2024
 APPROVED BY: D. MARTIN
 SHEET SIZE: ANSI D 34x22
 SCALE: AS NOTED

REVISIONS:

No.	DESCRIPTION OF REVISION	DATE
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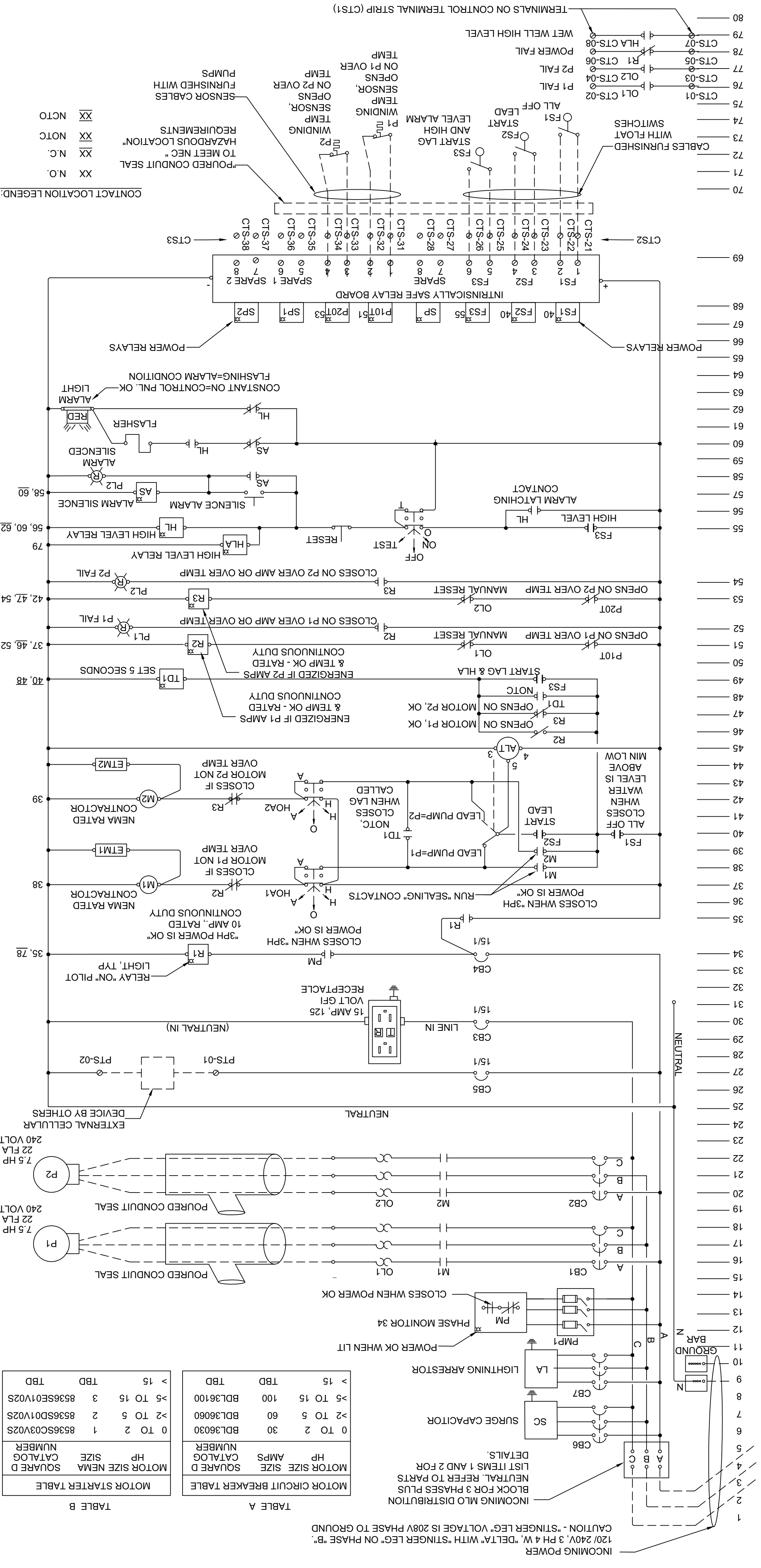


DEPT. OF UTILITIES
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 GOVERNMENT
 620 N. TYLER STREET
 COVINGTON, LA 70433

PARTS LIST FOR 120/240 VOLT CONTROL PANEL

- INCOMING MAIN POWER DISTRIBUTION BLOCK - BLACK PHENOLIC, 3 POLE, 380 AMP, 600 VOLT, 100KA WITHSTAND RATING WITH RGS FUSE PROTECTION, FINGER SAFE GUARDS
- INCOMING WIRE RANGE - 1 PRIMARY PORT PER POLE, #4 TO #500 KCMIL
- DISTRIBUTION WIRE RANGE AND NUMBER - SIX SECONDARY PORTS PER POLE, #14 TO #210
- MEGR/CAT# SQUARE D #9080LBA365106, DIMS: DXHXW = 3.1'x5.5'x8.5", WITH CLEAR COVER
- MEGR/CAT# SQUARE D #9080LBA165106, DIMS: DXHXW = 3.1'x5.5'x3.2", WITH CLEAR COVER
- GROUND TERMINAL STRIP - 20 POSITION, #6 WIRE MAX, MOUNT TO BACKPLANE
- GROUND TERMINAL STRIP #9080LBS1
- SURGE CAPACITOR - RATED VOLTAGE 650V, 3 PHASE, 4 WIRE, DELTA #CA-603
- LIGHTNING ARRESTOR - 600 VOLTS MAX, DELTA TYPE SERVICE, 3 POLE, 4 WIRE, RATED 40KA SURGE PER PHASE, MOUNT ON BRACKET INSIDE CONTROL PANEL, SQUARE D #SDSA36500, OR DELTA #LA-303
- PMP1 PHASE MONITOR PROTECTOR - 3-POLE PHENOLIC FUSE HOLDER WITH 3 - 5 (FIVE) AMP 250 VOLT CLASS R FUSES, SQUARE D #F8321R
- PHASE MONITOR - 3 PHASE, 190-220 VOLT, ADJUSTABLE, WITH GREEN "POWER OK" LIGHT, SPDT 10 AMP RATED CONTACT, UNDERVOLTAGE, PHASE REVERSAL, PHASE LOSS, PLUG IN OCTAL BASE, 8 PIN, RELAY ONLY ALLOWS FOR "A-B-C" ROTATION, DIVERSIFIED ELECTRONICS #SLA-230-ASA
- 3-POLE OCTAL BASE, 11 PIN OCTAL BASE, IDEC #SR2P-06
- CB1, CB2 - THERMAL MAGNETIC SQUARE D, 3 POLE, 600 VOLT, 25 KAIC AT 240V AMPERAGE RATING, BY PUMP MOTOR HP AS SHOWN IN TABLE A, POWER SHALL BE THROUGH LUGS ON BOTH ENDS.
- M2 MOTOR STARTER - SQUARE D, FVNR OPEN TYPE, 3 POLE, 600 VOLT, NEMA SIZE SHOWN IN TABLE B BY PUMP MOTOR HP, # NO/NC FORM "C" AUX CONTACTS, 120 VOLT COIL
- SELECT BASED ON PUMP MOTOR FLA
- GFI RECEPTACLE, 15 AMP, 125 VOLT, FLUSH MOUNT IN 16 BOX W/ COVER ON BACKPLANE
- CB3, THERMAL-MAGNETIC, 15/1, 125 VOLTS, FULL SIZE, 10KAIC, FOR GFI RECEPTACLE, SQUARE D #Q015
- CB4, THERMAL-MAGNETIC, 15/1, 125 VOLTS, FULL SIZE, 10KAIC, FOR CONTROLS, SQUARE D #Q015
- SR2P-06
- PHASE MONITOR BASE - 8 PIN OCTAL BASE, (SINGLE STACK), SNAPON DIN RAIL MOUNT, 300 VOLT, 10 AMP, IDEC #SR2P-06
- CB1, CB2 - THERMAL MAGNETIC SQUARE D, 3 POLE, 600 VOLT, 25 KAIC AT 240V AMPERAGE RATING, BY PUMP MOTOR HP AS SHOWN IN TABLE A, POWER SHALL BE THROUGH LUGS ON BOTH ENDS.
- M2 MOTOR STARTER - SQUARE D, FVNR OPEN TYPE, 3 POLE, 600 VOLT, NEMA SIZE SHOWN IN TABLE B BY PUMP MOTOR HP, # NO/NC FORM "C" AUX CONTACTS, 120 VOLT COIL
- SELECT BASED ON PUMP MOTOR FLA
- GFI RECEPTACLE, 15 AMP, 125 VOLT, FLUSH MOUNT IN 16 BOX W/ COVER ON BACKPLANE
- CB3, THERMAL-MAGNETIC, 15/1, 125 VOLTS, FULL SIZE, 10KAIC, FOR GFI RECEPTACLE, SQUARE D #Q015
- CB4, THERMAL-MAGNETIC, 15/1, 125 VOLTS, FULL SIZE, 10KAIC, FOR CONTROLS, SQUARE D #Q015
- SR2P-06
- PHASE MONITOR BASE - 8 PIN OCTAL BASE, (SINGLE STACK), SNAPON DIN RAIL MOUNT, 300 VOLT, 10 AMP, IDEC #SR2P-06
- ON "PILOT LIGHT", 11 PIN OCTAL BASE, IDEC #RR3PA-UL, OR SQUARE D #8501 KPDR, 13P14 V20 (SQ D DIGEST PAGE 23-14)
- R3 - 3 POLE "ICE CUBE" RELAY, 120 VOLT AC COIL AND 3PDT CONTACTS, 10 AMP, RATED FOR "CONTINUOUS DUTY", 10 AMP, IDEC #SR3P-06Z2, OR SQUARE D #8501NR61
- R2, R3 SOCKET BASE - 11 PIN OCTAL BASE, (SINGLE STACK), FOR 3 POLE RELAY, SNAPON DIN RAIL MOUNT, 300 VOLT, 10 AMP, IDEC #SR3P-06Z2, OR SQUARE D #8501NR61
- HOA1, HOA2, 3 POSITION MAINTAIN, METALLIC BODY, 22MM DIAMETER, 180 DEGREE HANDLE, #ZB4B2105 CONTACT BLOCK (1 NO + 1 NC), 1 ADDITIONAL ZB505 CONTACT BLOCK (1 NO + 1 NC)
- ETM1, ETM2, ELAPSES TIME METER, 1000 HOURS, QUARTZ/DIGITAL WITH 1/8" ANALOG NUMBERS, NON-RESETTING, 120 VOLT AC, NEMA 12X4, RECTANGULAR HOLE PANEL MOUNT, MOUNT IN DEAD FRONT DOOR PANEL, REINFORCED MODEL 722
- ALTERNATOR (ALT) WITH LEAD/LAG OFF TOGGLE SELECTOR SWITCH, 125 VOLT AC 1PDT, RATED 10 AMPS "CONTINUOUS DUTY", REQUIRES 8 PIN OCTAL BASE, TIME-MARK CAT# 261-261-ST-120
- SR2P-06, OR SQUARE D #8501NR61
- RLT RELAY BASE - 8 PIN OCTAL BASE, (SINGLE STACK), SNAPON DIN RAIL MOUNT, 300 V, 10 AMP, IDEC #
- TD1 - TIME DELAY RELAY, FOR START LAG PUMP, ANALOG, TIME DELAY ON, ADJUSTABLE 0.1 SEC TO 600 HOURS FORM "C", DPO CONTACTS, 7 AMPS RESISTIVE, PILOT LIGHTS FOR "ON" AND "TIMING", 120 VOLT COIL, IDEC #RTF-P1720, OR SQUARE D CAT# JCK11 (0-10 SEC, KNOB ON TOP, SQ D DIGEST PAGE 23-42)
- HOA1, HOA2, 3 POSITION MAINTAIN, METALLIC BODY, 22MM DIAMETER, 180 DEGREE HANDLE, #ZB4B2105 CONTACT BLOCK (1 NO + 1 NC), 1 ADDITIONAL ZB505 CONTACT BLOCK (1 NO + 1 NC)
- ETM1, ETM2, ELAPSES TIME METER, 1000 HOURS, QUARTZ/DIGITAL WITH 1/8" ANALOG NUMBERS, NON-RESETTING, 120 VOLT AC, NEMA 12X4, RECTANGULAR HOLE PANEL MOUNT, MOUNT IN DEAD FRONT DOOR PANEL, REINFORCED MODEL 722
- ALTERNATOR (ALT) WITH LEAD/LAG OFF TOGGLE SELECTOR SWITCH, 125 VOLT AC 1PDT, RATED 10 AMPS "CONTINUOUS DUTY", REQUIRES 8 PIN OCTAL BASE, TIME-MARK CAT# 261-261-ST-120
- SR2P-06, OR SQUARE D #8501NR61
- RLT RELAY BASE - 8 PIN OCTAL BASE, (SINGLE STACK), SNAPON DIN RAIL MOUNT, 300 V, 10 AMP, IDEC #SR2P-06
- TD1 SOCKET BASE - 8 PIN OCTAL BASE, (SINGLE STACK), SNAPON DIN RAIL MOUNT, 300 V, 10 AMP, IDEC #SR2P-06, OR SQUARE D #8501NR61
- R2, R3 - 3 POLE "ICE CUBE" RELAY, 120 VOLT AC COIL AND 3PDT CONTACTS, 10 AMP, RATED FOR "CONTINUOUS DUTY", 10 AMP, IDEC #SR3P-06Z2, OR SQUARE D #8501 KPDR, 13P14 V20 (SQ D DIGEST PAGE 23-14)
- R2, R3 SOCKET BASE - 11 PIN OCTAL BASE, (SINGLE STACK), 3 POLE, SNAPON DIN RAIL MOUNT, 300 VOLT, 10 AMP, IDEC #SR3P-06Z2, OR SQUARE D #8501NR61
- SQUARE D #XB4BG4 (HEAD), #ZB4B043 (BODY)
- ON-OFF-TEST SWITCH, METALLIC BODY, 22MM DIAMETER, 180 DEGREE HANDLE, #ZB4B2105 CONTACT BLOCK (1 NO + 1 NC), 1 ADDITIONAL ZB505 CONTACT BLOCK (1 NO + 1 NC)
- RESET (ARM) PUSHBUTTON SWITCH, 22MM, NON-ILLUMINATED, 1 POLE, NC, PUSH TO MOMENTARY OPEN, SPRING RETURN TO CLOSED, 120 VOLTS, 10 AMP RATED, CAP COLOR=BLACK, CAP TEXT=RESET, SQUARE D, HARMONY X44 METAL CAT# ZB4B02, ZB205 CONTACT BLOCK (1 NO + 1 NC, SPRING RETURN TO NC)
- HL, HLA - 3 POLE "ICE CUBE" RELAY, 120 VOLT AC COIL AND 3PDT CONTACTS, 10 AMP, RATED FOR "CONTINUOUS DUTY", "ON" PILOT LIGHT, 11 PIN OCTAL BASE, IDEC #RR3PA-UL, OR SQUARE D #8501 KPDR, 13P14 V20 (SQ D DIGEST PAGE 23-14)
- HL, HLA SOCKET BASE - 11 PIN OCTAL BASE, (SINGLE STACK), 3 POLE, SNAPON DIN RAIL MOUNT, 300 VOLT, 10 AMP, IDEC #SR3P-06Z2, OR SQUARE D #8501NR61
- ALARM SILENCE PUSHBUTTON SWITCH, 22MM, NON-ILLUMINATED, 1 POLE, 120 VOLTS, 10 AMP RATED, CAP COLOR=RED, CAP TEXT=STOP, SQUARE D, HARMONY X44 METAL CAT# ZB4B04, ZB205 CONTACT BLOCK (1 NO + 1 NC, SPRING RETURN TO NC)
- AS - ALARM SILENCE RELAY, 3 POLE "ICE CUBE" RELAY, 120 VOLT AC COIL AND 3PDT CONTACTS, 10 AMP, RATED FOR "CONTINUOUS DUTY", "ON" PILOT LIGHT, 11 PIN OCTAL BASE, IDEC #RR3PA-UL, OR SQUARE D #8501 KPDR, 13P14 V20 (SQ D DIGEST PAGE 23-14)
- 10 AMP, IDEC #SR3P-06Z2, OR SQUARE D #8501NR61
- 32 AS SOCKET BASE - 11 PIN OCTAL BASE, (SINGLE STACK), 3 POLE, SNAPON DIN RAIL MOUNT, 300 VOLT, 10 AMP, IDEC #SR3P-06Z2, OR SQUARE D #8501NR61
- 33 - LED TYPE PILOT LIGHT, 120 VOLT TRANSFORMER INPUT, 22MM BLUE LENS, LABEL "ALARM SILENCED", SQUARE D - #XB4BG6 (HEAD), #ZB4B063 (BODY)
- SQUARE D - #XB4BG6 (HEAD), #ZB4B063 (BODY)
- FLASHER, ADJUSTABLE ON AND OFF INTERVALS, 120 VOLT AC COIL, 10 AMPS, 8 PIN OCTAL BASE, SQUARE D JCK51 (0-10 SEC, 2 KNOBS ON TOP FOR ON, TIME + INTERVAL, SQ D DIGEST PAGE 12-42)
- FLASHER BASE, SQUARE D #8501NR61
- RED ALARM LIGHT, LED EXTERIOR, NEMA 4X, 120 VOLT
- ISBR - INTRINSICALLY SAFE BARRIER RELAY FOR FLOAT SWITCHES AND FOR MOTOR SAFETIES, 8 CHANNEL, 5 AMP, 120 VOLTS, COMMON AND SEPARATE OUTPUT RELAY WIRING, IDEC CAT# EB3C-RO8A
- POWER TERMINAL STRIPS (PTS), 30 AMP, 300 VOLT RATED, 10 TERMINALS (AS NEEDED), BLACK PHENOLIC BODY, MARATHON #67ZR210
- CONTROL TERMINAL STRIPS (CTS), 20 AMP, 300 VOLT RATED, 10 TERMINALS EACH (3X10), BLACK PHENOLIC BODY, MARATHON #601PF10
- DIN RAIL END STOPS, CAT# BNL5
- 40 DIN RAIL, EXTRUDED ALUMINUM, DIN STD. DIMENSIONS, LENGTHS AS REQUIRED, IDEC CAT# BND1000, WITH DIN MARATHON #601PF10
- 41 CB5, THERMAL-MAGNETIC, 15/1, 125 VOLTS, FULL SIZE, 10KAIC, FOR EXTERNAL CELLULAR DEVICE, SQUARE D #Q015
- 42 CB6, CB7 - THERMAL - MAGNETIC, 3 POLE, 250 VOLTS 30 AMP, 22 KAIC, SQUARE D #Q030 VH

WIRING DIAGRAM



GENERAL NOTES:

- ALL PANEL ITEMS SHALL BE MOUNTED ON THE BACKPLANE EXCEPT AS NOTED OTHERWISE. ITEMS SHALL BE MOUNTED ON THE INNER DOOR FRONT ARE ALL PILOT LIGHTS, SELECTOR SWITCHES, PUSHBUTTONS, STARTER RESETS, AND CIRCUIT BREAKER HANDLE OPENINGS. THE ALARM SILENCE HOOKS ON 3 SIDES, RAISED LIP ON ENCLOSURE TO RECEIVE DOOR GASKET, WHITE STEEL BACKPLANE, DEAD FRONT INNER DOOR WITH 1/4 TURN KNUBBLED KNOB FASTENING, BOND BOTH DOORS TO ENCLOSURE GROUND STRIP.
- PANEL ENCLOSURE SHALL BE 36" W X 48" H X 12" D, NEMA 4X TYPE 304 STAINLESS STEEL, WITH HASPS ON 3 SIDES, RAISED LIP ON ENCLOSURE TO RECEIVE DOOR GASKET, WHITE STEEL BACKPLANE, DEAD FRONT INNER DOOR WITH 1/4 TURN KNUBBLED KNOB FASTENING, BOND BOTH DOORS TO ENCLOSURE GROUND STRIP.
- NOMENCLATURE LABELS FOR ALL NEW ITEMS SHALL BE RED FIELD WITH WHITE CHARACTERS, ENGRAVED LAMINATED NAMEPLATES ATTACHED WITH STAINLESS STEEL MACHINE SCREWS AND NUTS. ALL TEXT SHALL BE MINIMUM 1/8" HIGH
- ALL PROPOSED CONTROL PANELS SHALL BE SUBMITTED TO THE PARISH FOR APPROVAL PRIOR TO FABRICATION
- THE NAME OF ANY MANUFACTURER, BRAND OR MAKE LISTED ON THE DRAWING IS FOR THE PURPOSE OF ESTABLISHING A MINIMUM ACCEPTABLE STANDARD OF QUALITY DESIRED BY THE PARISH. ALL PRODUCTS BID MUST HAVE PRIOR APPROVAL AS "PRIOR APPROVED EQUIVALENTS".

TABLE A
 MOTOR CIRCUIT BREAKER TABLE

MOTOR SIZE SQUARE D	HP AMPS	CATALOG NUMBER
0 TO 2	30	BDL363030
>2 TO 5	60	BDL363660
>5 TO 15	100	BDL361000
>15	TBD	TBD

TABLE B
 MOTOR STARTER TABLE

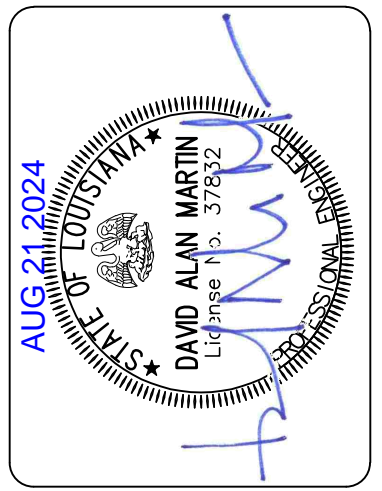
MOTOR SIZE NEMA	HP	SIZE	CATALOG NUMBER
0 TO 2	1	8536SC030V02S	
>2 TO 5	2	8536SD01V02S	
>5 TO 15	3	8536SE01V02S	
>15	TBD	TBD	



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

No.	DESCRIPTION OF REVISION	DATE:

DESIGNED BY:	M. LOKER
DRAWN BY:	J. HITT
CHECKED BY:	J. CATLANOTTO
SUBMITTED BY:	FAIRWAY CE
PROJECT No.:	DU 168,170.
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED [ROMS]



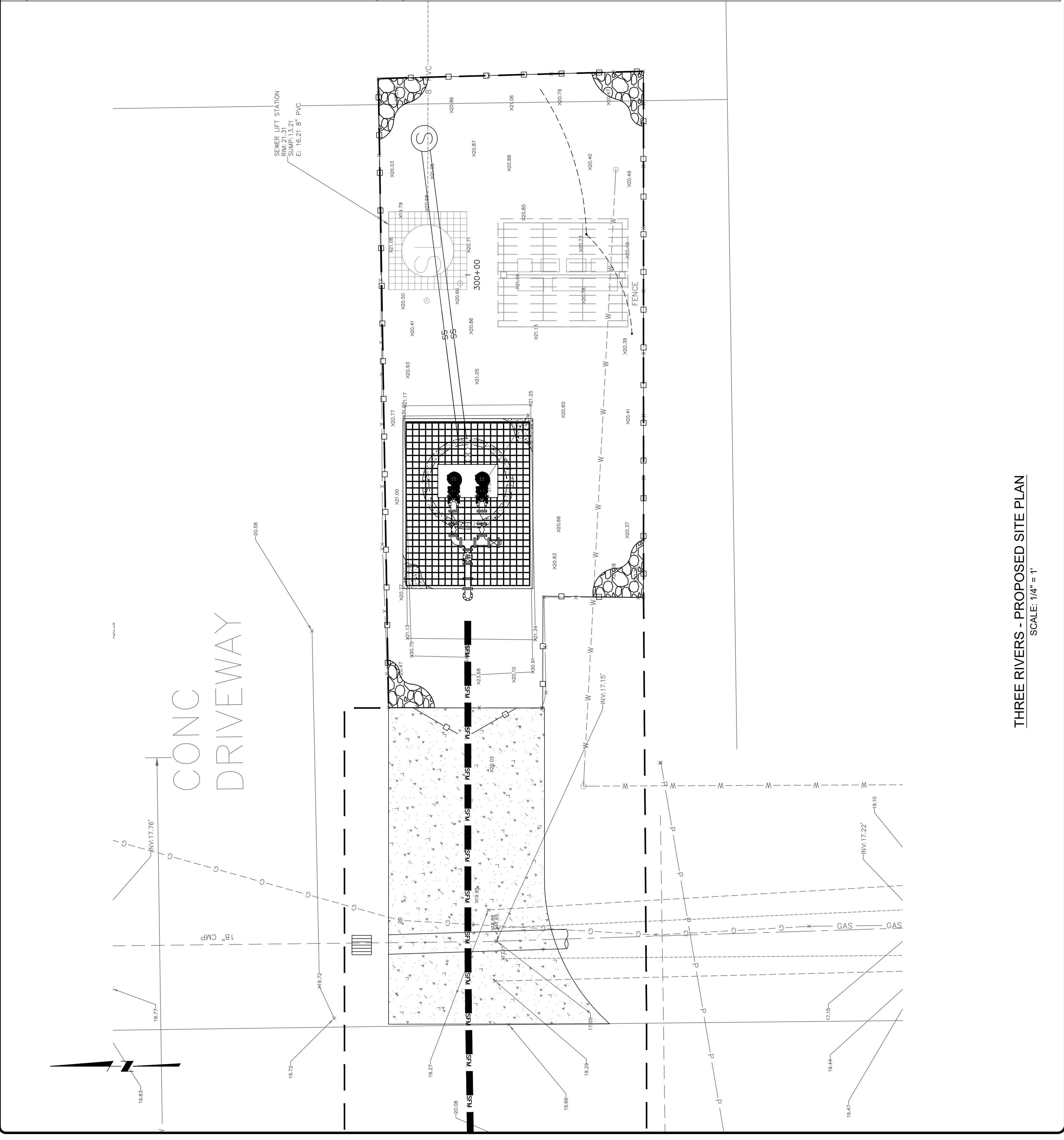
BREWSTER ROAD SEWER
CONSOLIDATION
THREE RIVERS - ELECTRICAL
SITE PLAN

SHEET NO.
30E-01

GENERAL NOTES

1. ELECTRICAL SITE PLAN IS DEVELOPED BASED UPON SURVEY PREPARED BY ALL SOUTH CONSULTING ENGINEERS, L.L.C. TITLED, "FAIRFIELD OAKS, TOCHEUNCTE PARC. & THREE RIVERS WWTP SEWER CONSOLIDATION PROJECT", AND DATED 08/2023.
2. REFER TO RISER DIAGRAMS, PUMP CONTROL PANEL DIAGRAMS, FOR ADDITIONAL REQUIREMENTS AND SPECIFICATIONS.
3. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS & CONDUIT.
4. VERIFY PRIMARY VOLTAGE AND AVAILABLE FAULT CURRENT WITH SERVING UTILITY PRIOR TO EQUIPMENT PROCUREMENT.
5. RUN ALL BELOW - GRADE CONDUIT IN DUCT BANKS PER DETAIL E-103.
6. PROVIDE DUCT BANK SUPPORTS AND JOINTS PER DETAIL E-108.
7. TRANSITION FROM BELOW GRADE TO ABOVE GRADE CONDUIT PER DETAIL E-230. PROVIDE EXPLOSION PROOF SEALS WHERE SHOWN AND/OR OTHERWISE REQUIRED PER NATIONAL ELECTRICAL CODE.
8. TIE IN DUCT BANKS TO EXISTING / REQ'D NEW STRUCTURES PER DETAIL E-109.

SHEET KEY NOTES



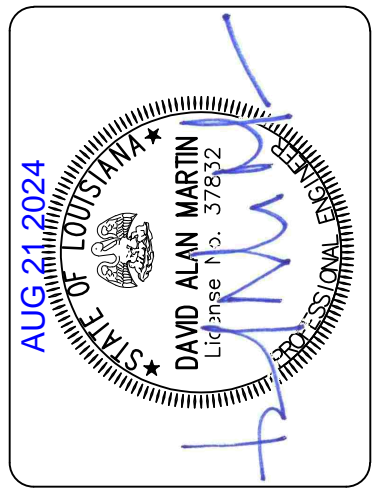
THREE RIVERS - PROPOSED SITE PLAN
SCALE: 1/4" = 1'



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

No.	DESCRIPTION OF REVISION	DATE:
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DESIGNED BY: M. LOKER	DRAWN BY: J. HITT
CHECKED BY: J. CATLANOTTO	FAIRWAY CE
PROJECT No.: DU 168,170.	175, 177
ISSUE DATE: 08/20/2024	APPROVED BY: D. MARTIN
SHEET SIZE: ANSI D 34x22	AS NOTED



BREWSTER ROAD SEWER
CONSOLIDATION
THREE RIVERS - SINGLE LINE
DIAGRAM

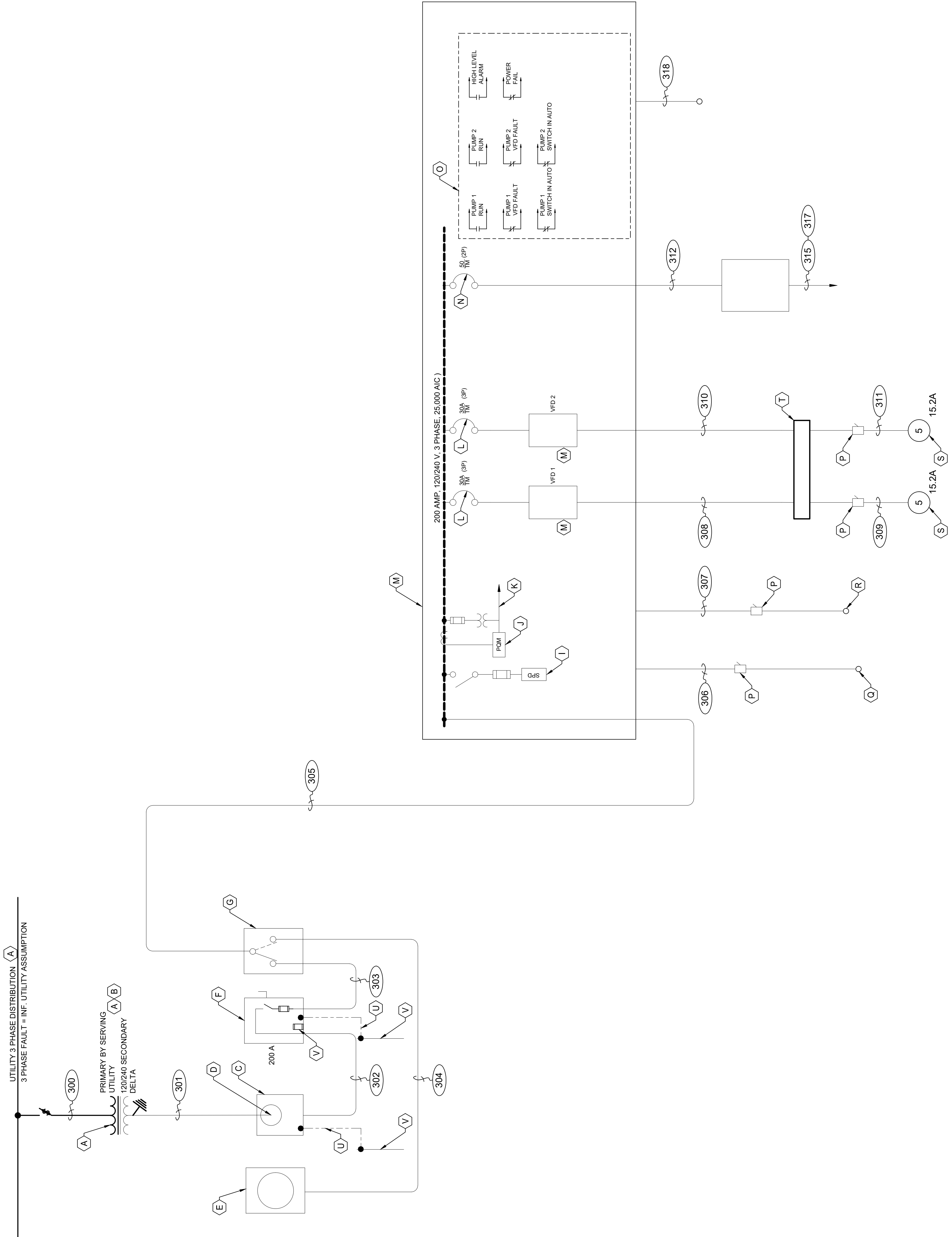
SHEET NO.
30E-02

SHEET GENERAL NOTES

- REFER TO RISER DIAGRAMS, PUMP CONTROL PANEL DIAGRAMS, FOR ADDITIONAL REQUIREMENTS AND SPECIFICATIONS.
- REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS & CONDUIT.
- CURRENT PRIMARY VOLTAGE AND AVAILABLE FAULT CURRENT WITH SERVING UTILITY PRIOR TO EQUIPMENT PROCUREMENT.
- RUN ALL BELOW - GRADE CONDUIT IN DUCT BANKS PER DETAIL E-103.
- PROVIDE DUCT BANK SUPPORTS AND JOINTS PER DETAIL E-108.
- TRANSITION FROM BELOW GRADE TO ABOVE GRADE CONDUIT PER DETAIL E-230. PROVIDE EXPLOSION PROOF SEALS WHERE SHOWN AND/OR OTHERWISE REQUIRED PER NATIONAL ELECTRICAL CODE.
- TIE IN DUCT BANKS TO EXISTING / REQ'D NEW STRUCTURES PER DETAIL E-109.
- VERIFY BREAKER AND CABLE SIZES FOR ALL FURNISHED EQUIPMENT AND INCLUDE ALL COSTS IN THE PRICE OF THE WORK.
- SEE CABLE AND CONDUIT SCHEDULES FOR ADDITIONAL REQUIREMENTS.
- SEE PANEL SCHEDULES FOR ADDITIONAL REQUIREMENTS.

SHEET KEY NOTES

- VERIFY TRANSFORMER SIZE AND AVAILABLE FAULT CURRENT WITH SERVING UTILITY PRIOR TO PROCURING ELECTRICAL EQUIPMENT
- POLE-MOUNT TRANSFORMER BANK BY SERVING UTILITY
- REQ'D METER ENCLOSURE BY CONTRACTOR
- REQ'D METER BY SERVING UTILITY
- PORTABLE GENERATOR BY OTHERS (NOT IN THIS CONTRACT)
- REQ'D FUSED MAIN DISCONNECT SWITCH SINGLE THROW, 200 AMP WITH 200 AMP FUSE (SERVICE EQUIPMENT)
- REQ'D MANUAL TRANSFER SWITCH PER SECTION 26 00 00
- REQ'D PUMP CONTROL PANEL, NEMA 4X ENCLOSURE
- REQ'D SURGE PROTECTIVE DEVICE
- REQ'D PHASE MONITOR
- TO CONTROLS SECTION
- REQ'D THERMAL MAGNETIC BREAKER, VERIFY REQ'D SIZE WITH PUMP SUPPLIER PRIOR TO BID AND INCLUDE ALL COSTS IN THE PRICE OF THE WORK.
- REQ'D PROGRAMMABLE VARIABLE FREQUENCY DRIVE
- REQ'D THERMAL MAGNETIC BREAKER
- REQ'D DRY CONTACTS FOR FUTURE MONITORING
- REQ'D SEAL OFF FITTING
- REQ'D PRESSURE TRANSDUCER
- REQ'D BACKUP FLOAT SWITCH
- REQ'D SUBMERSIBLE PUMP MOTOR
- REQ'D NEMA 4X TERMINAL BOX, MIN 24"x24"x12" (VERIFY PRIOR TO BIDDING)
- REQ'D GROUNDING CONDUCTOR TO GROUND ELECTRODE SYSTEM PER NEC REQUIREMENTS
- REQ'D GROUND ELECTRODE SYSTEM
- REQ'D "PANELBOARD 30"





DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

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DESIGNED BY:	M. LOKER
DRAWN BY:	J. HITT
CHECKED BY:	J. CATLANOTTO
SUBMITTED BY:	FAIRWAY CE
PROJECT No.:	DU 168,170.
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED



BREWSTER ROAD SEWER
CONSOLIDATION
THREE RIVERS - RISER DIAGRAM

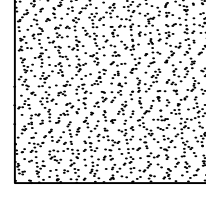
SHEET NO.
30E-03

SHEET GENERAL NOTES

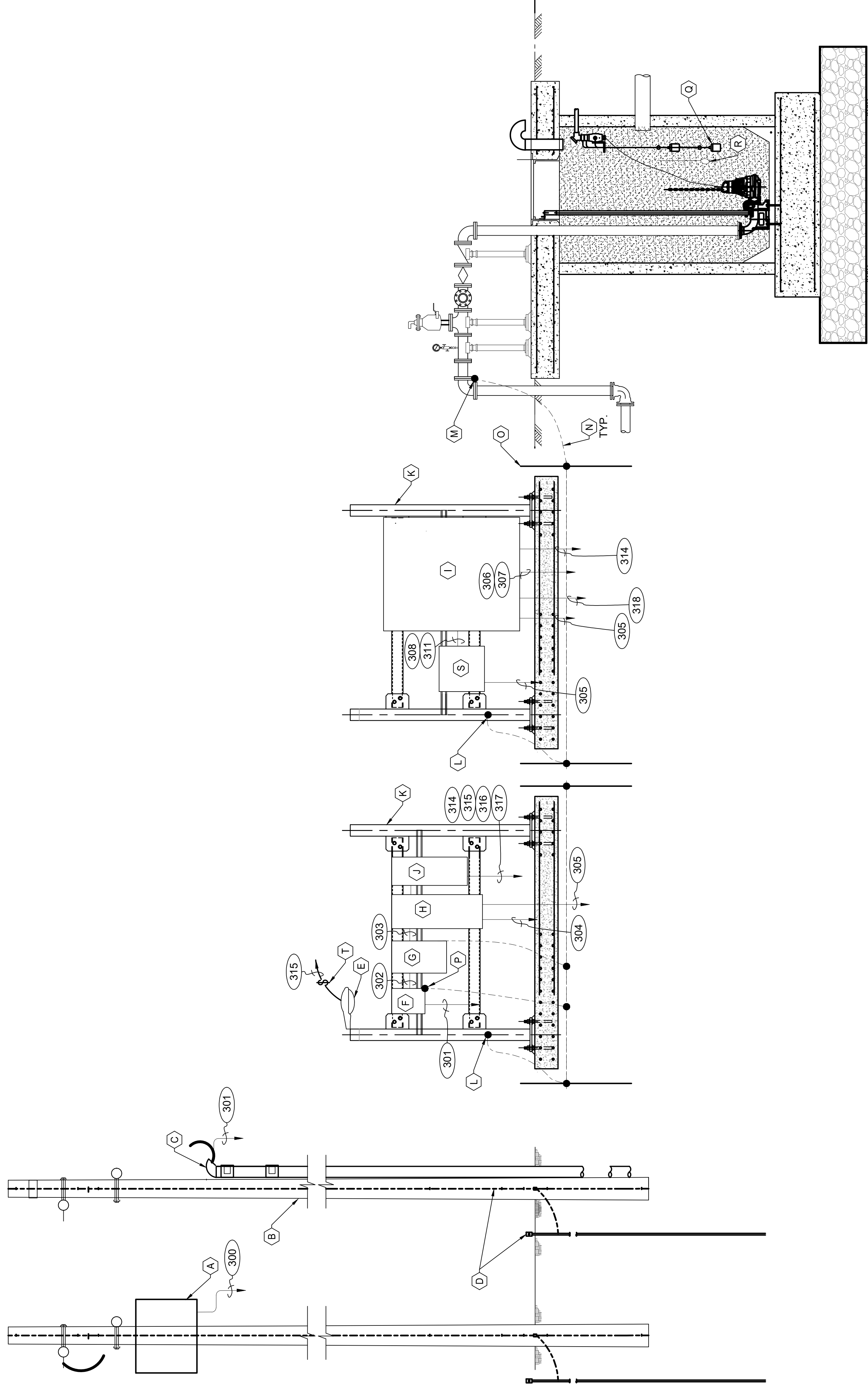
- REFER TO ONE RISER DIAGRAMS, AND PUMP CONTROL PANEL ONE LINE DIAGRAMS FOR ADDITIONAL REQUIREMENTS.
- REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS & CONDUIT.
- VERIFY PRIMARY VOLTAGE AND AVAILABLE FAULT CURRENT WITH SERVING UTILITY PRIOR TO EQUIPMENT PROCUREMENT.
- RUN ALL BELOW - GRADE CONDUIT IN DUCT BANKS PER DETAIL E-103.
- PROVIDE DUCT BANK SUPPORTS AND JOINTS PER DETAIL E-108.
- TRANSITION FROM BELOW GRADE TO ABOVE GRADE CONDUIT PER DETAIL E-230. PROVIDE EXPLOSION PROOF SEALS WHERE SHOWN AND/OR OTHERWISE REQUIRED PER NATIONAL ELECTRICAL CODE.
- TIE IN DUCT BANKS TO EXISTING / REQ'D NEW STRUCTURES PER DETAIL E-109.
- SEE CABLE AND CONDUIT SCHEDULES FOR ADDITIONAL REQUIREMENTS.
- SEE PANEL SCHEDULES FOR ADDITIONAL REQUIREMENTS.

SHEET KEY NOTES ◻

- SERVING UTILITY TRANSFORMER BANK
- REQ'D TREATED TIMBER SERVICE POLE PER SERVING UTILITY STANDARDS
- REQ'D WEATHERHEAD
- GROUND SERVICE POLE PER SERVING UTILITY REQUIREMENTS
- REQ'D SITE LIGHT FIXTURE & PHOTO CELL
- REQ'D METER ENCLOSURE PER SERVING UTILITY STANDARDS, METER BY SERVING UTILITY
- REQ'D FUSED DISCONNECT SWITCH, SINGLE THROW WITH 200 AMP F USE (SERVICE EQUIPMENT)
- REQ'D MANUAL TRANSFER SWITCH PER SECTION 26 00 00
- REQ'D PUMP CONTROL PANEL
- REQ'D PANELBOARD "P-30" (SEE PANEL SCHEDULE)
- REQ'D EQUIPMENT CANOPY PER STRUCTURE
- BOND EQUIPMENT RACK TO GROUND
- BOND FLOW METER GROUND RING TO GROUND ELECTRODE SYSTEM PER NEC REQUIREMENTS.
- REQ'D GROUND JUMPER PER NEC REQUIREMENTS
- REQ'D GROUND ELECTRODE SYSTEM (MIN. 2 RODS)
- BOND METER ENCLOSURE TO GROUND ELECTRODE SYSTEM PER NEC REQUIREMENTS
- REQ'D UL-TRASONIC TRANSDUCER
- REQ'D BACKUP FLOAT SWITCH
- REQ'D JUNCTION BOX
- REQ'D SWITCH FOR LIGHT CIRCUIT



CLASSIFIED AREA,
CLASS I, DIVISION 1



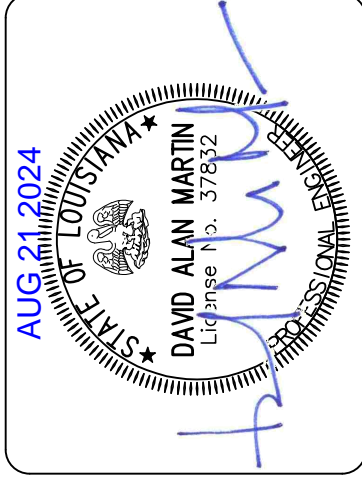
THREE RIVERS - RISER DIAGRAM
SCALE: 3/8" = 1'-0"



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DESIGNED BY:	M. LOKER
DRAWN BY:	J. HITT
CHECKED BY:	J. CATALANOTTO
PROJECT No.:	DU 168,170, 175, 177
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED



BREWSTER ROAD SEWER
CONSOLIDATION
THREE RIVERS - CONTROL -
DIAGRAM 1

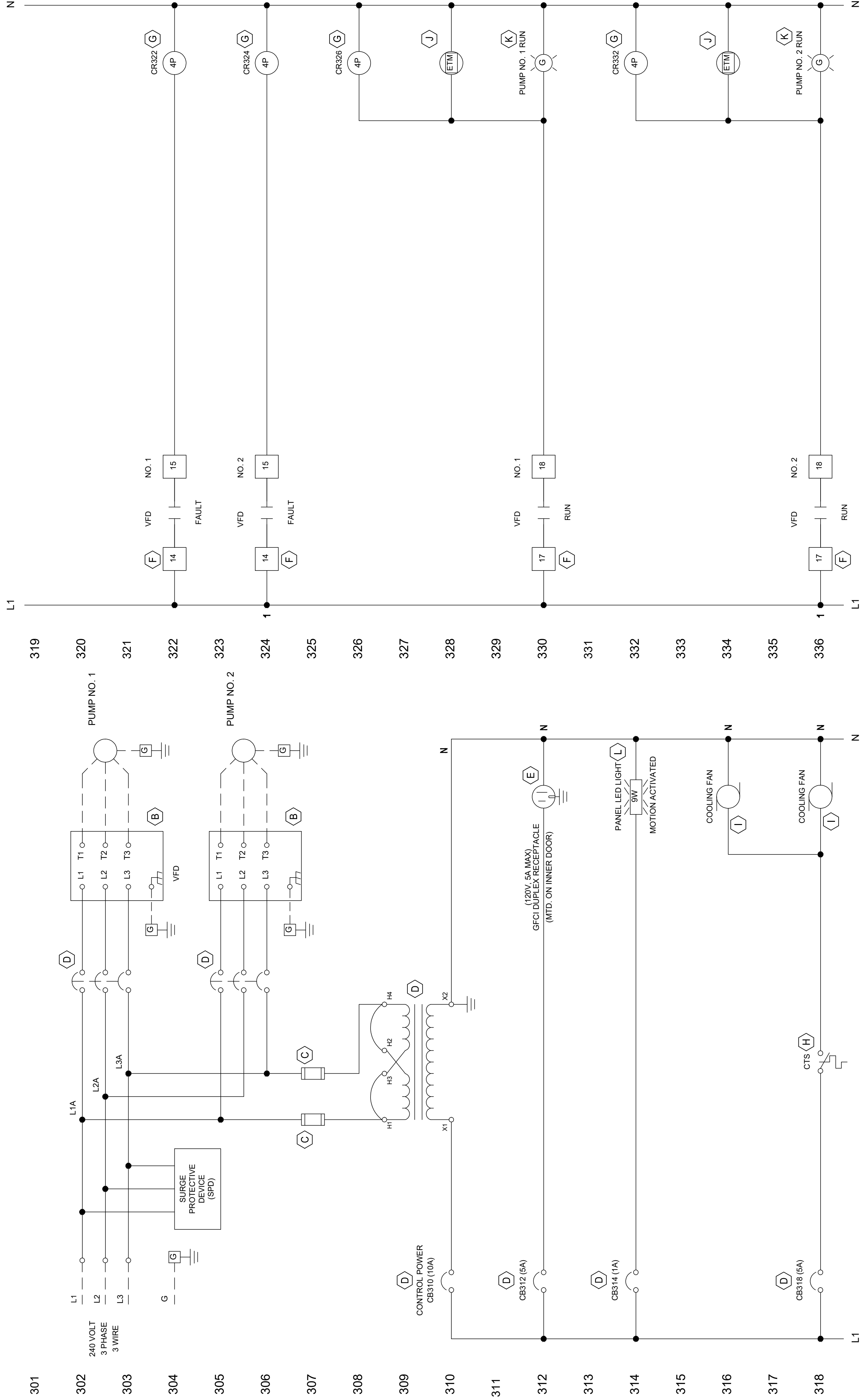
SHEET NO.
30-E04

SHEET GENERAL NOTES

1. REFER TO ONE LINE DIAGRAMS AND RISER DIAGRAMS FOR ADDITIONAL REQUIREMENTS.

SHEET KEY NOTES

- A. REQ'D SPD PER SECTION 40 91 00
- B. FURNISH EACH PUMP WITH SHIELDED VFD CABLE TO TERMINATION IN PANEL
- C. REQ'D CONTROL POWER FUSING, SIZE BY PANEL SUPPLIER
- D. REQ'D THERMAL MAGNETIC BREAKER
- E. REQ'D CONTROL POWER CONVENIENCE OUTLET
- F. REQ'D VFD CONTACT
- G. REQ'D CONTROL RELAY
- H. REQ'D TEMPERATURE SWITCH
- I. REQ'D COOLING FAN, SIZED BY CONTROL PANEL MANUFACTURER, SIZED SUCH THAT APPROPRIATE COOLING IS PROVIDED WITH ONE FAN OUT OF SERVICE
- J. REQ'D ELAPSED TIME METER, DISPLAY MOUNTED ON BACK PAN
- K. REQ'D PILOT LIGHT, MOUNTED ON BACK PAN
- L. REQ'D PANEL LIGHT, TO ILLUMINATE UPON DOOR OPENING



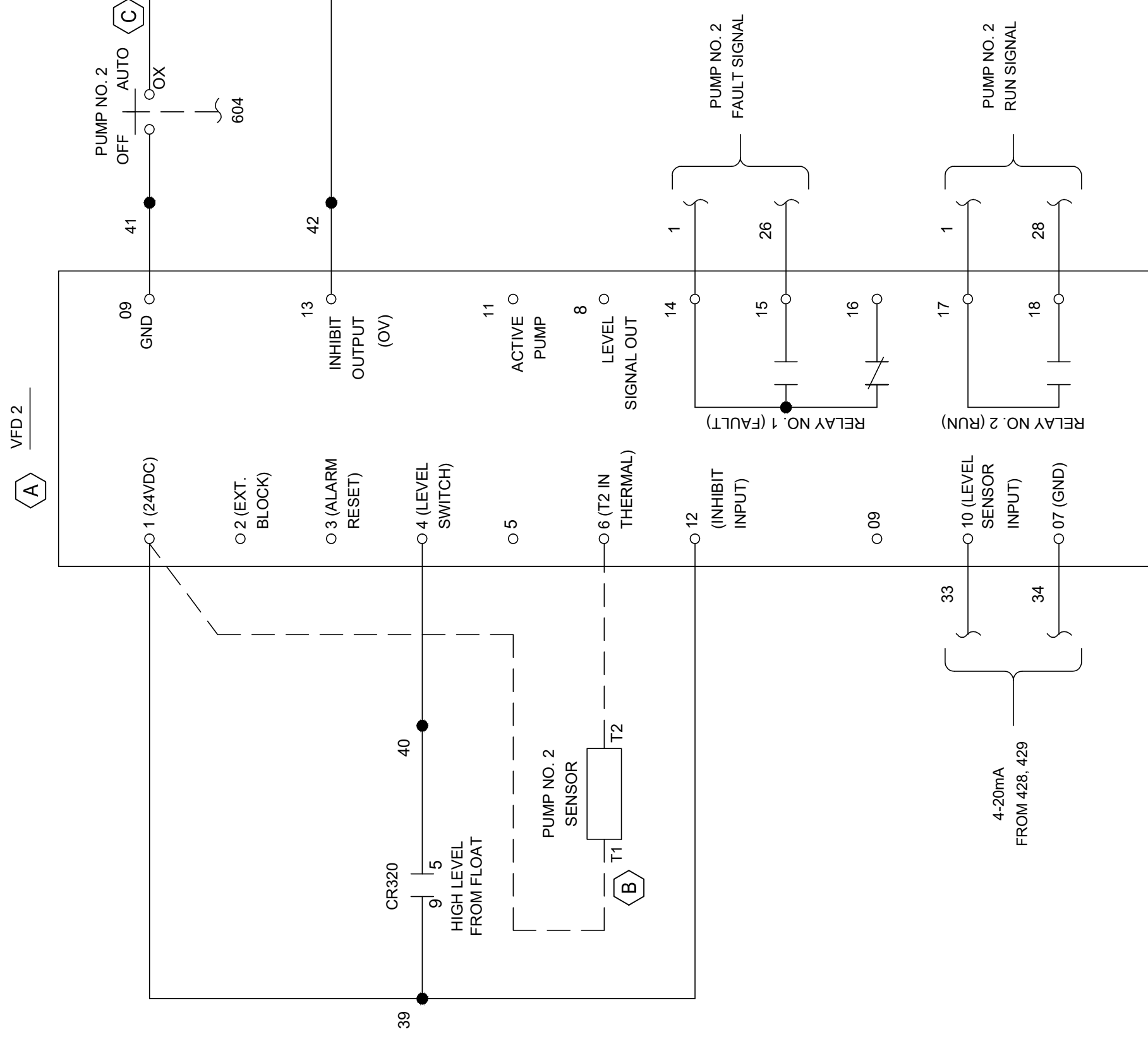
SHEET GENERAL NOTES

- REFER TO ONE LINE DIAGRAMS AND RISER DIAGRAMS FOR ADDITIONAL REQUIREMENTS.

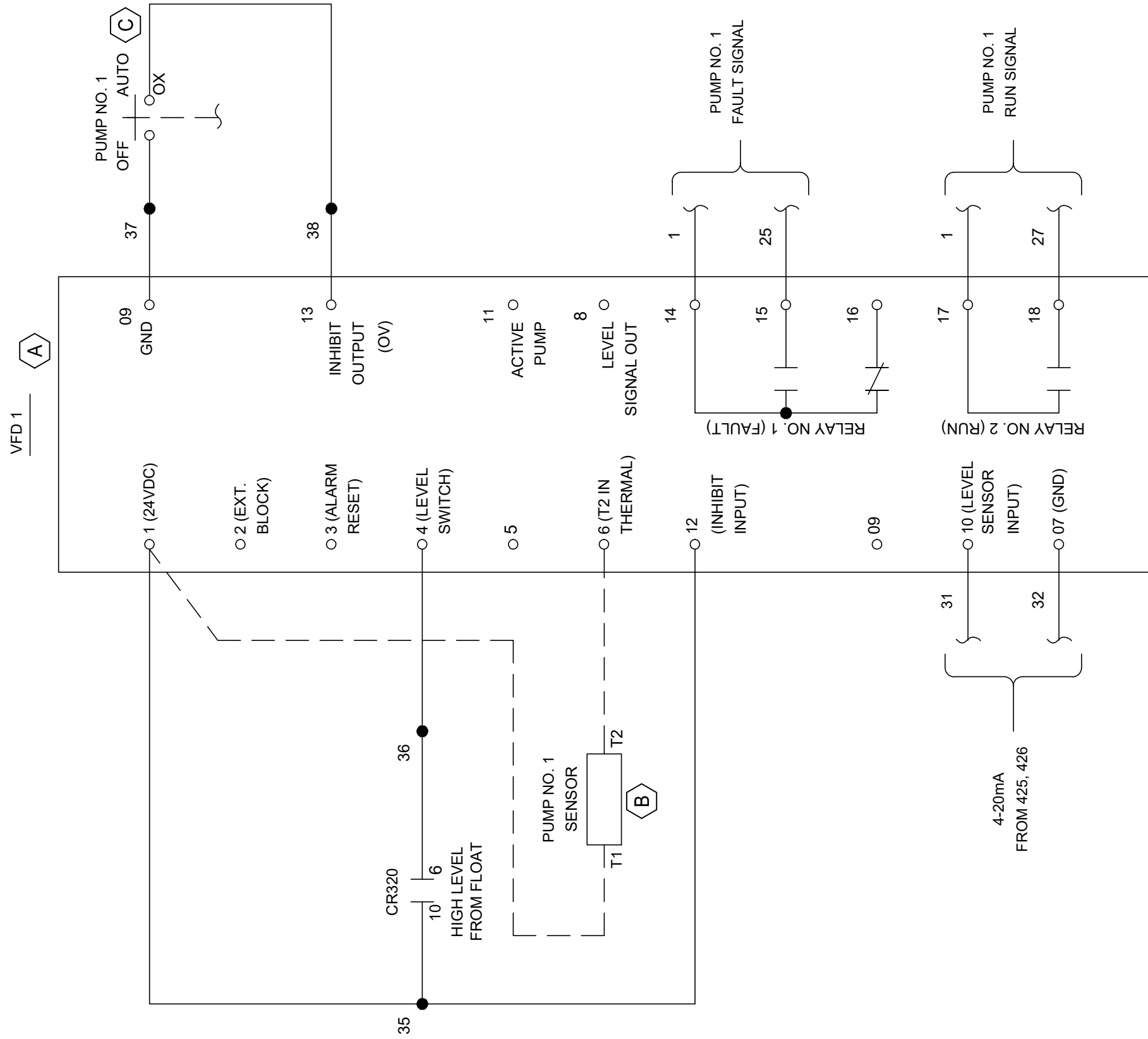
SHEET KEY NOTES

- REQ'D VARIABLE SPEED DRIVE
- REQ'D PUMP THERMAL CUT OUT SWITCH (IN PUMP)
- REQ'D HAND SWITCH, MOUNTED ON PANEL BACK PAN

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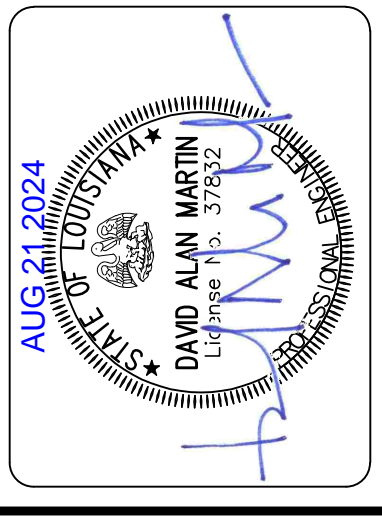
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DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

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DESIGNED BY:	M. LOKER
DRAWN BY:	J. HITT
CHECKED BY:	J. CATALANOTTO
PROJECT No.:	DU 168,170, 175, 177
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED



BREWSTER ROAD SEWER
CONSOLIDATION
THREE RIVERS - CONTROL -
DIAGRAM III

SHEET NO.
30E-06

SHEET GENERAL NOTES

- REFER TO ONE LINE DIAGRAMS AND RISER DIAGRAMS FOR ADDITIONAL REQUIREMENTS.

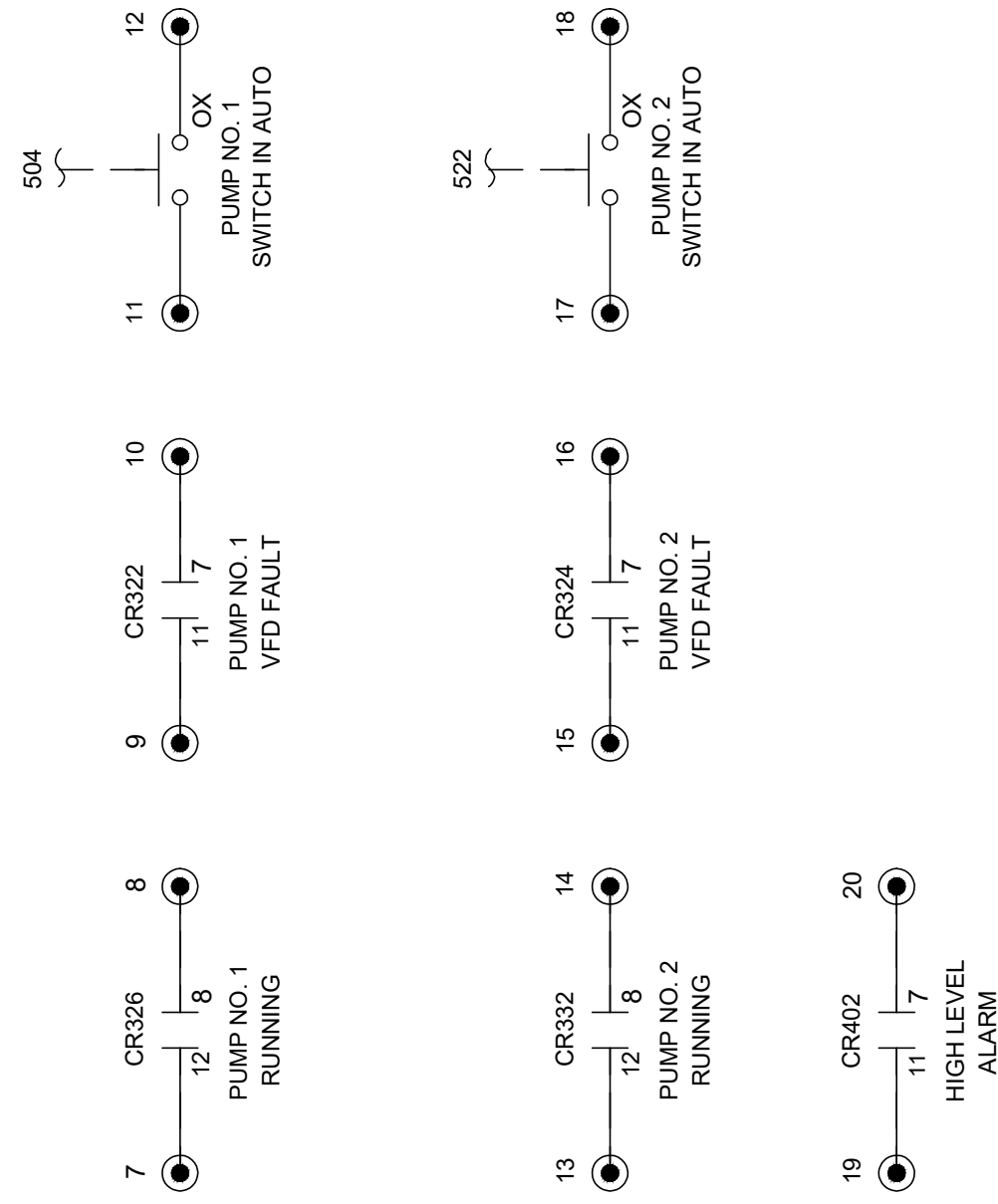
SHEET KEY NOTES

- REQ'D DRY CONTACTS TO BE INCLUDED FOR FUTURE SCADA MONITORING

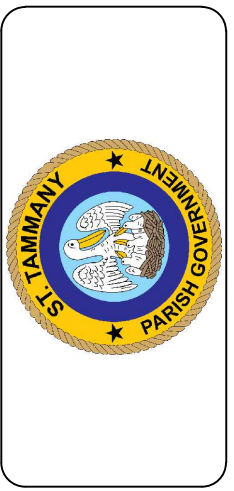
VFD PARAMETER SETTINGS				
PARAM	DESCRIPTION	DEFAULT	FACTORY SETTINGS	CUSTOMER SETTINGS
P1-01	MAXIMUM SPEED LIMIT	VARIES	60HZ	
P1-02	MINIMUM SPEED LIMIT	30HZ		
P1-03	ACCELERATION RAMP TIME	1.0 SEC	10.0 SEC	
P1-04	DECELERATION RAMP TIME	10.0 SEC		
P1-06	MOTOR ENERGY OPTIMIZER	0 (DISABLE)		
P1-07	MOTOR RATED VOLTAGE	VAIRES	240V	
P1-08	MOTOR RATED CURRENT	VAIRES	27A	
P1-09	MOTOR RATED FREQUENCY	VAIRES	60HZ	
P1-014	EXTENDED MENU ACCESS	0	505	
P1-015	START LEVEL		5.56	
P1-016	STOP LEVEL		2.30	
P1-017	PUMP CLEANING SETTINGS	1 (ON)		
P1-021	SENSOR MAX LEVEL	16.4		
P2-013	ANALOG OUTPUT NO. 2 FUNCTION	(0) DRIVE RUNNING	(3) MOTOR SPEED > 0	
P4-014	MAX FREQUENCY START RUN TIME	5.0 SEC	15.0 SEC	
P4-015	HIGH LEVEL RUNTIME	10.0 SEC		
P5-01	DRIVE FIELD BUS ADDRESS	50	PUMP 1 - 1, PUMP 2 - 2	
P6-019	RELAY OUTPUT NO. 1	7 (A-ALARM)		
P6-020	RELAY OUTPUT NO. 2	9 (PUMP RUNNING)		
P6-021	RELAY OUTPUT NO. 3 & 4		31 (RELAY 3 SEAL FAILURE)	

RUNNING IN AUTO MODE

- PUT DRIVE IN AUTO MODE (PRESS AUTO ON DRIVE KEYPAD)
- PUT DRIVE IN AUTO-STANDBY MODE (PRESS START ON DRIVE KEYPAD)
- RESET AN ALARM BY PRESSING STOP ON DRIVE KEYPAD (START MUST THEN BE PRESSED TO RETURN DRIVE TO AUTO-STANDBY MODE.)



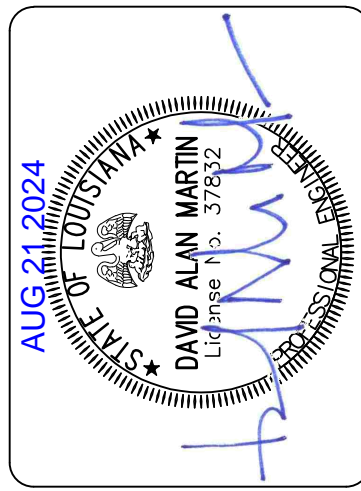
DRY CONTACTS



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

No.	DESCRIPTION OF REVISION	DATE:
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DESIGNED BY: M LOKER	CHECKED BY: J. CATALANOTTO	PROJECT No.: DU 168,170, 175, 177	ISSUE DATE: 08/20/2024	APPROVED BY: D. MARTIN	SHEET SIZE: ANSI D 34x22	SCALE: AS NOTED
DRAWN BY: J. HITT						



BREWSTER ROAD SEWER
CONSOLIDATION
THREE RIVERS - CONTROL -
DIAGRAM IV

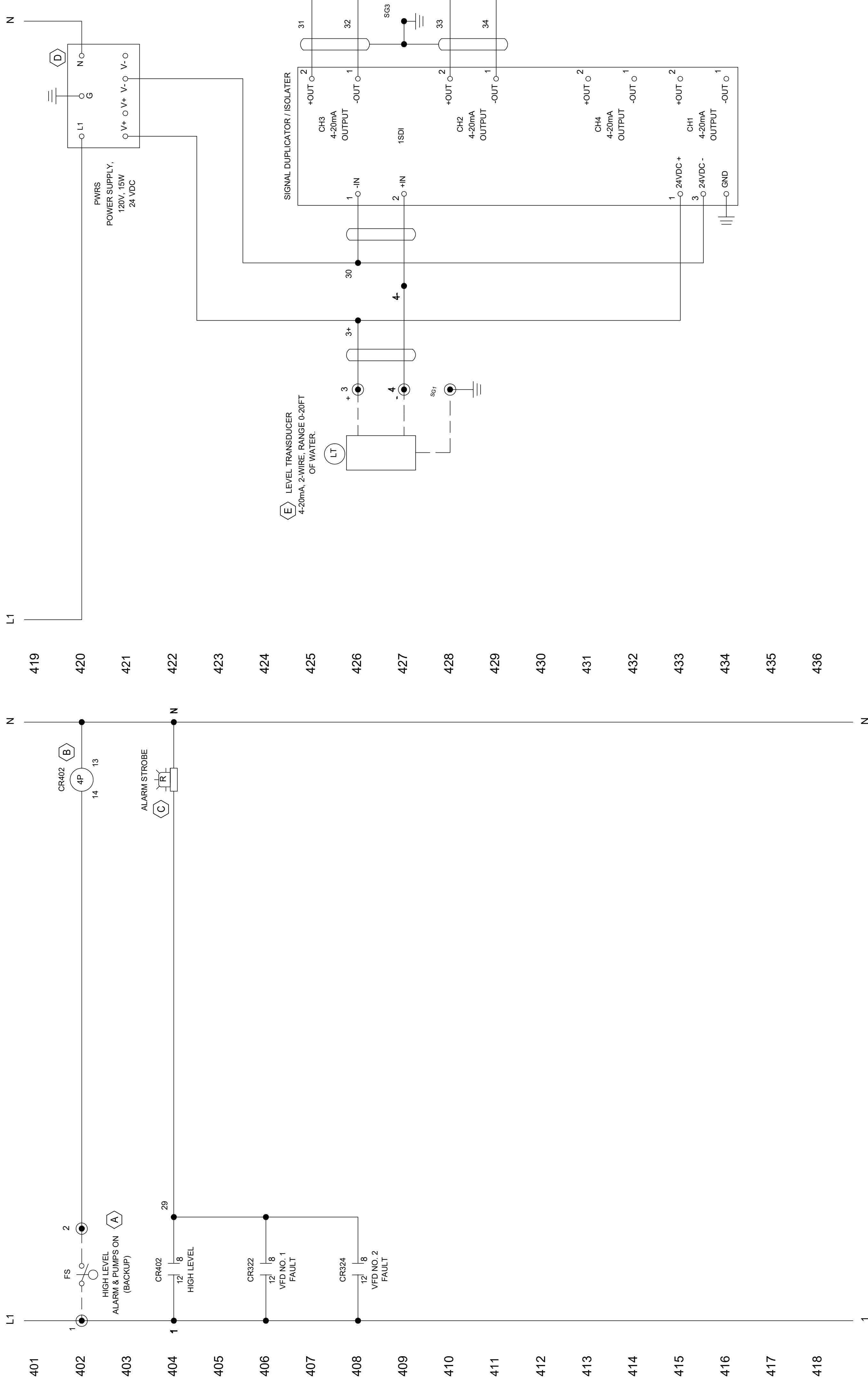
SHEET NO.
30E-07

SHEET GENERAL NOTES

- REFER TO ONE LINE DIAGRAMS AND RISER DIAGRAMS FOR ADDITIONAL REQUIREMENTS.

SHEET KEY NOTES

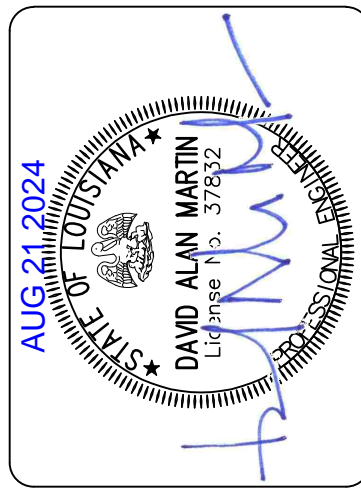
- REQ'D BACKUP FLOAT SWITCH, INSTALLED IN WET WELL AND SEALED OFF
- REQ'D CONTROL RELAY
- REQ'D ALARM LIGHT MOUNTED ON PANEL EXTERIOR
- REQ'D DC POWER SUPPLY, 120V, 24V DC, SIZED BY PANEL SUPPLIER
- REQ'D LEVEL TRANSDUCER
- REQ'D SIGNAL DUPLICATOR/ISOLATOR
- PROVIDE OUTPUTS FOR FUTURE SCADA, 4-0 mA



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
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COVINGTON, LA 70433

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DESIGNED BY:	M. LOKER
DRAWN BY:	J. HITT
CHECKED BY:	J. CATALANOTTO
PROJECT No.:	DU 168,170,
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED



BREWSTER ROAD SEWER
CONSOLIDATION
THREE RIVERS - CONTROL -
DIAGRAM II

SHEET NO.
30-E05

GENERAL NOTES

1. ELECTRICAL SITE PLAN IS DEVELOPED BASED UPON SURVEY PREPARED BY ALL SOUTH CONSULTING ENGINEERS, L.L.C. TITLED, "FAIRFIELD OAKS, TCHEFUNCTE PARC, & THREE RIVERS WWTP SEWER CONSOLIDATION PROJECT," AND DATED 08/2023.
2. REFER TO RISER DIAGRAMS, PUMP CONTROL PANEL DIAGRAMS, FOR ADDITIONAL REQUIREMENTS AND SPECIFICATIONS.
3. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS & CONDUIT.
4. VERIFY PRIMARY VOLTAGE AND AVAILABLE FAULT CURRENT WITH SERVING UTILITY PRIOR TO EQUIPMENT PROCUREMENT.
5. RUN ALL BELOW - GRADE CONDUIT IN DUCT BANKS PER DETAIL E-103.
6. PROVIDE DUCT BANK SUPPORTS AND JOINTS PER DETAIL E-108.
7. TRANSITION FROM BELOW GRADE TO ABOVE GRADE CONDUIT PER DETAIL E-230. PROVIDE EXPLOSION PROOF SEALS WHERE SHOWN AND/OR OTHERWISE REQUIRED PER NATIONAL ELECTRICAL CODE.
8. TIE IN DUCT BANKS TO EXISTING / REQ'D NEW STRUCTURES PER DETAIL E-109.

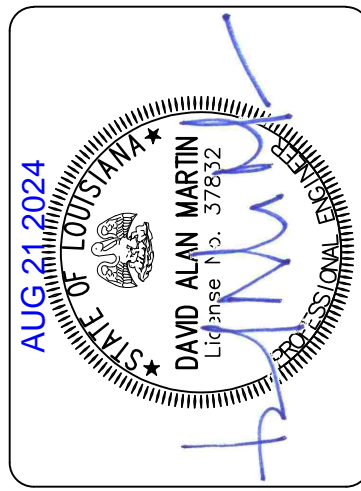
SHEET KEY NOTES



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

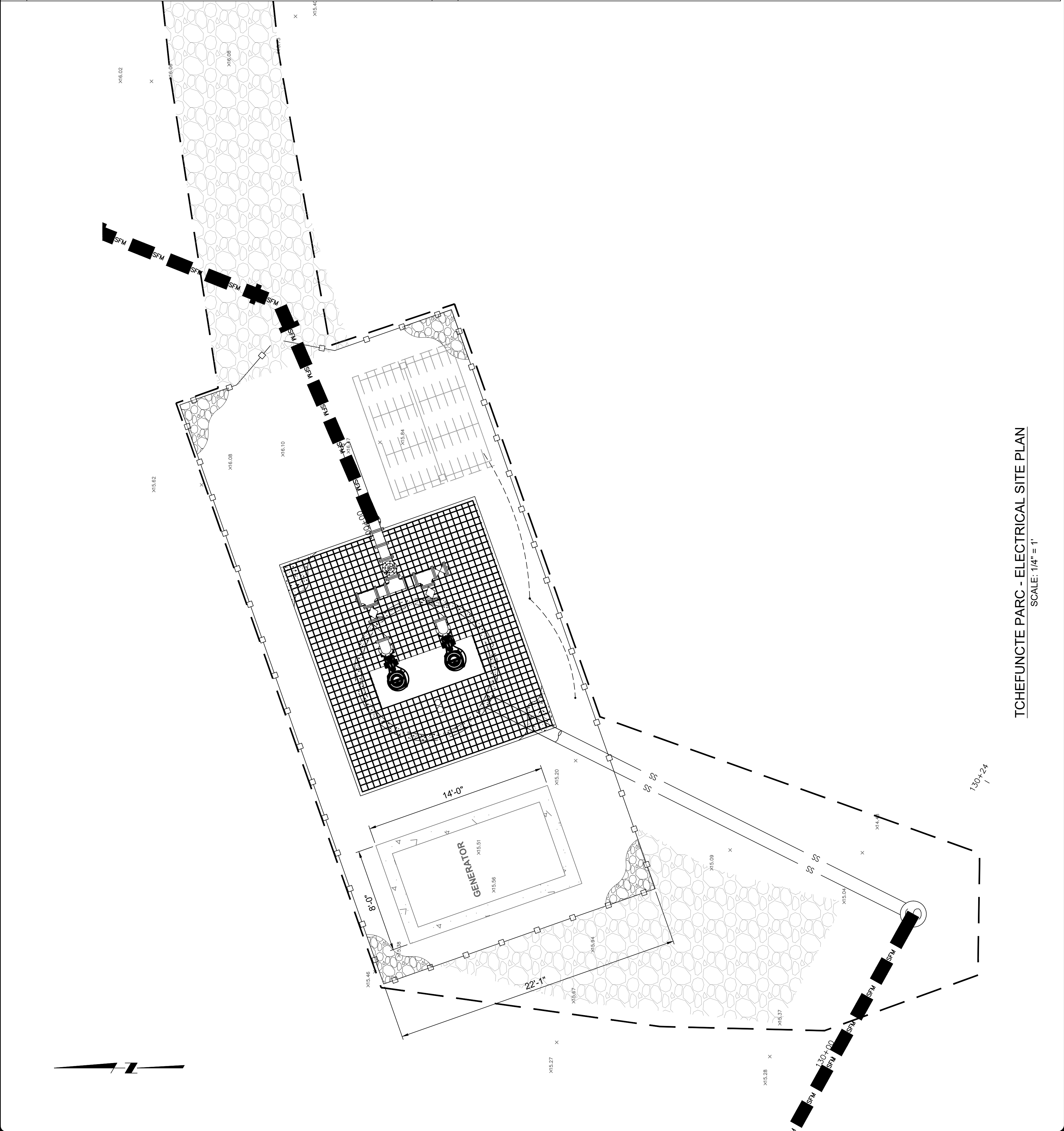
No.	DESCRIPTION OF REVISION	DATE:
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DESIGNED BY:	M. LOKER
DRAWN BY:	J. HITT
CHECKED BY:	J. CATALANOTTO
SUBMITTED BY:	FAIRWAY CE
PROJECT No.:	DU 168,170, 175, 177
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED



BREWSTER ROAD SEWER
CONSOLIDATION
ELECTRICAL SITE PLAN -
TCHEFUNCTE PARC

SHEET NO.
40E-01



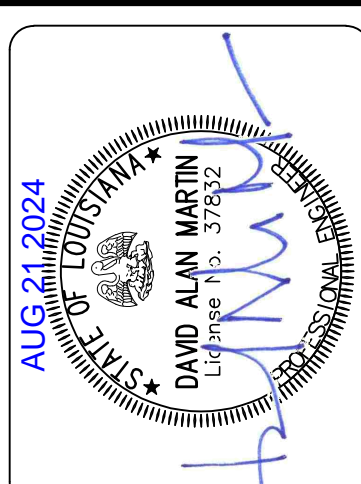
TCHEFUNCTE PARC - ELECTRICAL SITE PLAN
SCALE: 1/4" = 1'



DEPT. OF UTILITIES
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GOVERNMENT
620 N. TYLER STREET
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DESIGNED BY:	M. LOKER
DRAWN BY:	J. HITT
CHECKED BY:	J. CATLANOTTO
SUBMITTED BY:	FAIRWAY CE
PROJECT No.:	DU 168,170.
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED



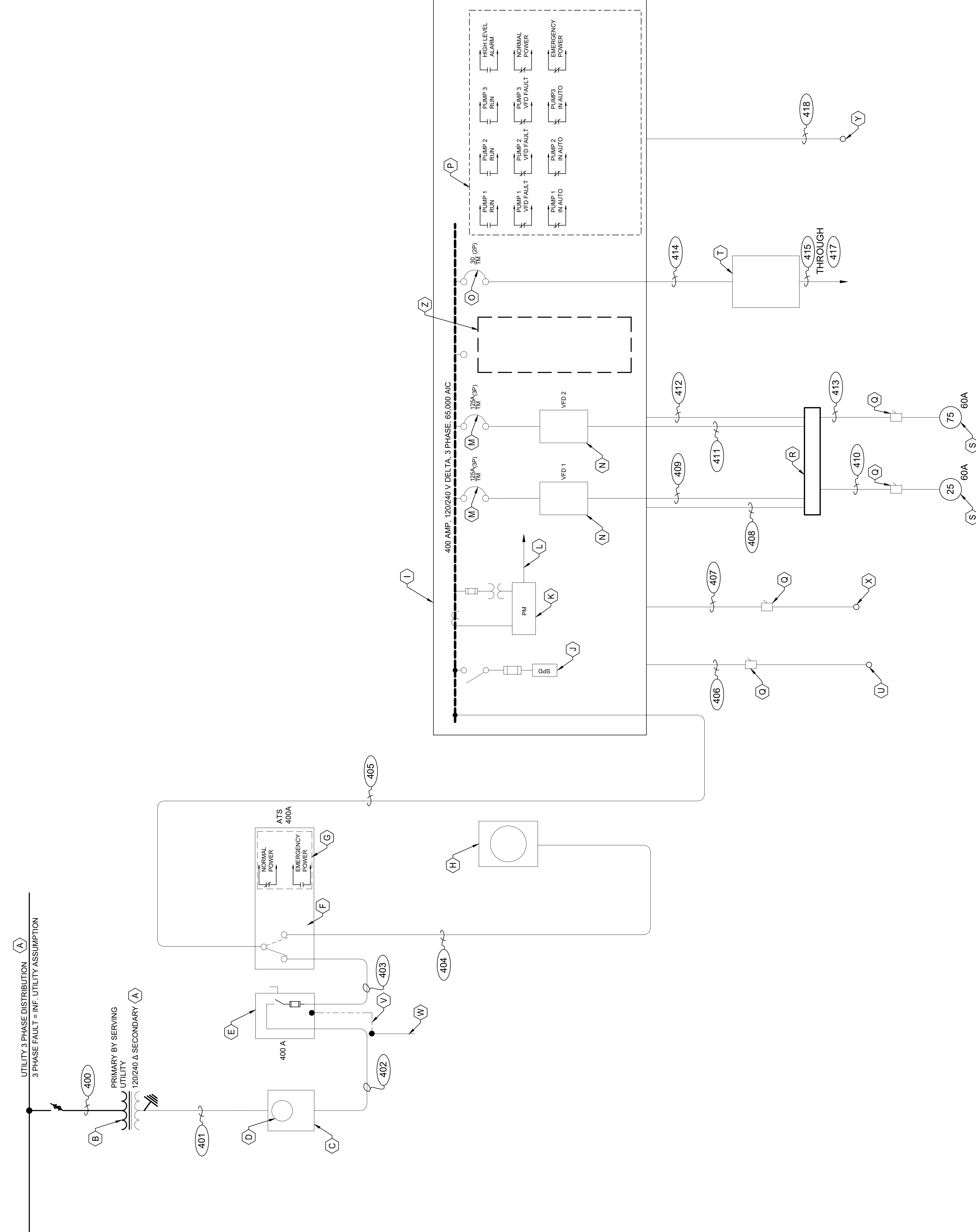
BREWSTER ROAD SEWER
CONSOLIDATION
THEFUNCTIONE PARC - SINGLE
LINE DIAGRAM

SHEET GENERAL NOTES

- REFER TO RISER DIAGRAMS, PUMP CONTROL PANEL DIAGRAMS, FOR ADDITIONAL REQUIREMENTS AND SPECIFICATIONS.
- REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS & CONDUIT.
- VERIFY PRIMARY VOLTAGE AND AVAILABLE FAULT CURRENT WITH SERVING UTILITY PRIOR TO EQUIPMENT PROCUREMENT.
- RUN ALL BELOW - GRADE CONDUIT IN DUCT BANKS PER DETAIL E-103.
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- TIE IN DUCT BANKS TO EXISTING / REQ'D NEW STRUCTURES PER DETAIL E-109.
- VERIFY BREAKER AND CABLE SIZES FOR ALL FURNISHED EQUIPMENT AND INCLUDE ALL COSTS IN THE PRICE OF THE WORK.
- SEE CABLE AND CONDUIT SCHEDULES FOR ADDITIONAL REQUIREMENTS.
- SEE PANEL SCHEDULES FOR ADDITIONAL REQUIREMENTS.

SHEET KEY NOTES

- VERIFY TRANSFORMER SIZE AND AVAILABLE FAULT CURRENT WITH SERVING UTILITY PRIOR TO PROCURING ELECTRICAL EQUIPMENT
- PAD MOUNTED UTILITY TRANSFORMER BY SERVING UTILITY. TRANSFORMER PAD BY CONTRACTOR
- REQ'D METER ENCLOSURE PER SERVING UTILITY REQUIREMENT
- METER BY SERVING UTILITY
- REQ'D MAIN DISCONNECT, 400 AMP W/ 300 AMP FUSE (SERVICE EQUIPMENT)
- REQ'D AUTOMATIC TRANSFER SWITCH
- REQ'D DRY CONTACTS FOR FUTURE MONITORING
- REQ'D GENERATOR SET
- REQ'D PUMP CONTROL PANEL, NEMA 4X ENCLOSURE
- REQ'D SURGE PROTECTIVE DEVICE
- REQ'D PHASE MONITOR
- TO CONTROLS SECTION
- REQ'D THERMAL MAGNETIC BREAKER. VERIFY REQ'D SIZE WITH PUMP SUPPLIER PRIOR TO BID AND INCLUDE ALL COSTS IN THE PRICE OF THE WORK
- REQ'D PROGRAMMABLE VARIABLE FREQUENCY DRIVE
- REQ'D THERMAL MAGNETIC BREAKER
- REQ'D DRY CONTACTS FOR FUTURE MONITORING
- REQ'D SEAL OFF FITTING
- REQ'D NEMA 4X TERMINAL BOX, MIN 24" X 24" X 12"
- REQ'D SUBMERSIBLE PUMP MOTOR. VERIFY FLA WITH SUPPLIER
- REQ'D PANELBOARD "P-40"
- REQ'D BACKUP FLOAT SWITCH
- REQ'D GROUND CONDUCTOR PER N.E.C.
- REQ'D GROUND ELECTRODE SYSTEM
- REQ'D PRESSURE TRANSDUCER
- REQ'D FLOW METER SENSOR
- REQ'D SPACE FOR FUTURE VFD AND BREAKER



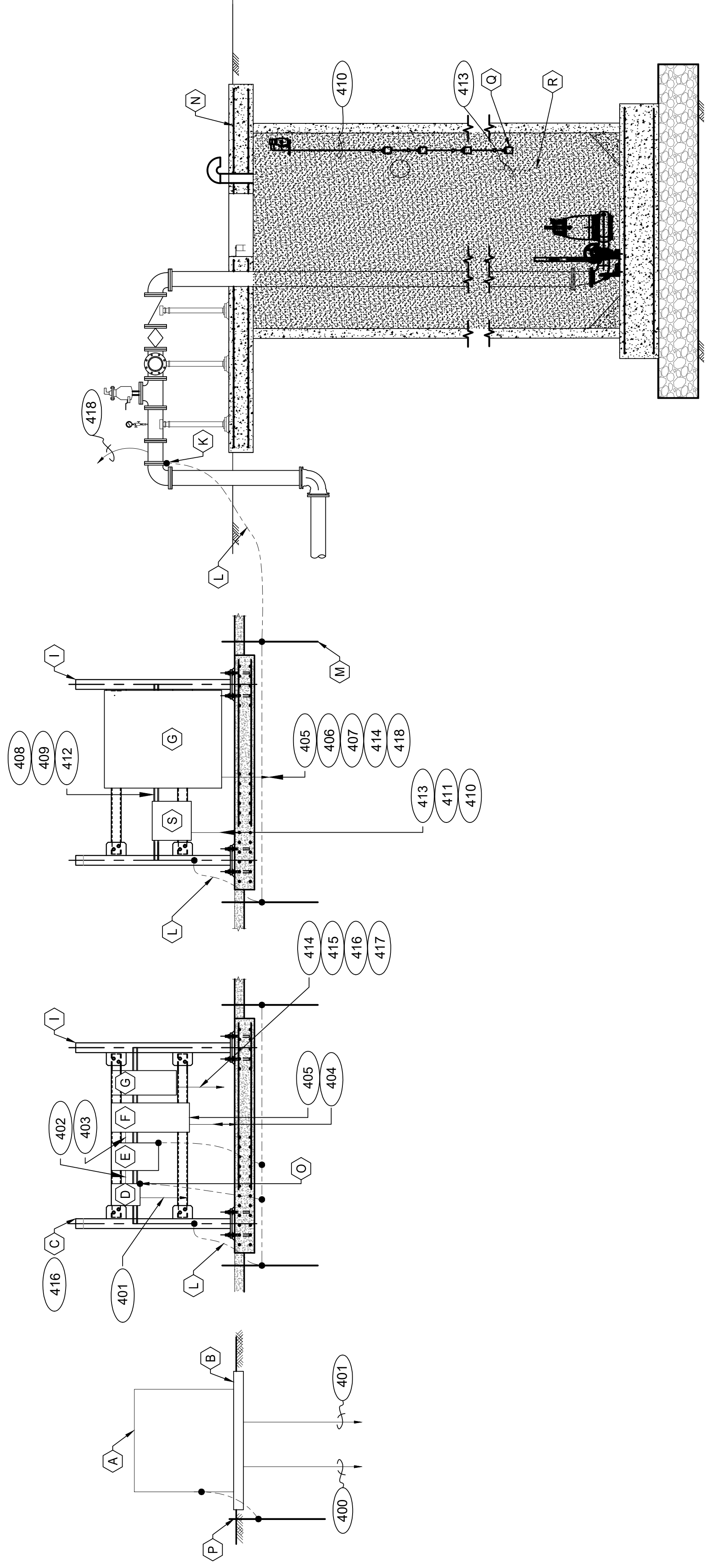
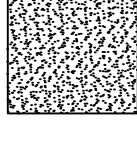
SHEET GENERAL NOTES

1. REFER TO ONE RISER DIAGRAMS, AND PUMP CONTROL PANEL ONE LINE DIAGRAMS FOR ADDITIONAL REQUIREMENTS.
2. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS & CONDUIT.
3. VERIFY PRIMARY VOLTAGE AND AVAILABLE FAULT CURRENT WITH SERVING UTILITY PRIOR TO EQUIPMENT PROCUREMENT.
4. RUN ALL BELOW - GRADE CONDUIT IN DUCT BANKS PER DETAIL E-103.
5. PROVIDE DUCT BANK SUPPORTS AND JOINTS PER DETAIL E-108.
6. TRANSITION FROM BELOW GRADE TO ABOVE GRADE CONDUIT PER DETAIL E-230. PROVIDE EXPLOSION PROOF SEALS WHERE SHOWN AND/OR OTHERWISE REQUIRED PER NATIONAL ELECTRICAL CODE.
7. TIE IN DUCT BANKS TO EXISTING / REQ'D NEW STRUCTURES PER DETAIL E-109.

SHEET KEY NOTES

- A. REQ'D PAD MOUNT TRANSFORMER BY SERVING UTILITY. VERIFY RATING WITH SERVING UTILITY.
- B. REQ'D PORTLAND CEMENT CONCRETE TRANSFORMER PAD PER SERVING UTILITY STANDARDS.
- C. REQ'D SITE LIGHT FIXTURE & PHOTOCELL
- D. REQ'D METER ENCLOSURE PER SERVING UTILITY STANDARDS, METER BY SERVING UTILITY.
- E. REQ'D FUSED DISCONNECT SWITCH, SINGLE THROW, 400 AMP WITH 300 AMP FUSE (SERVICE EQUIPMENT)
- F. REQ'D AUTOMATIC TRANSFER SWITCH PER SECTION 26 00 00
- G. REQ'D PUMP CONTROL PANEL
- H. REQ'D PANELBOARD "P-40" (SEE PANEL SCHEDULE)
- I. REQ'D EQUIPMENT CANOPY PER STRUCTURAL
- J. BOND EQUIPMENT RACK TO GROUND ELECTRODE SYSTEM PER NEC REQUIREMENTS.
- K. BOND FLOW METER GROUND RING TO GROUND ELECTRODE SYSTEM PER NEC REQUIREMENTS.
- L. REQ'D GROUND JUMPER PER NEC REQUIREMENTS.
- M. REQ'D GROUND ELECTRODE SYSTEM (MIN. 2 RODS)
- N. BOND REINFORCING STEEL TO GROUND ELECTRODE SYSTEM PER NEC REQUIREMENTS.
- O. BOND METER ENCLOSURE TO GROUND ELECTRODE SYSTEM PER NEC REQUIREMENTS.
- P. GROUND TRANSFORMER PER SERVING UTILITY REQUIREMENTS
- Q. REQ'D ULTRASONIC TRANSDUCER
- R. REQ'D BACKUP FLOAT SWITCH
- S. REQ'D JUNCTION BOX

CLASSIFIED AREA,
CLASS 1, DIVISION 1



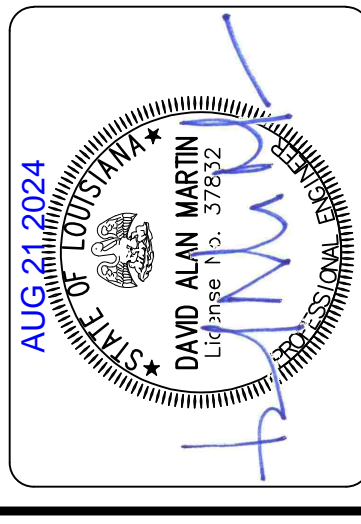
TCHEFUNCTE PARC - RISER DIAGRAM
SCALE: N.T.S.

BREWSTER ROAD SEWER
CONSOLIDATION

TCHEFUNCTE PARC - RISER
DIAGRAM

SHEET NO.
40E-03

DESIGNED BY:	M. LOKER
DRAWN BY:	J. HITT
CHECKED BY:	J. CATLANOTTO
PROJECT No.:	DU 168,170, 175, 177
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED



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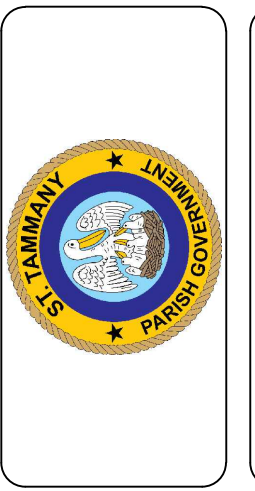
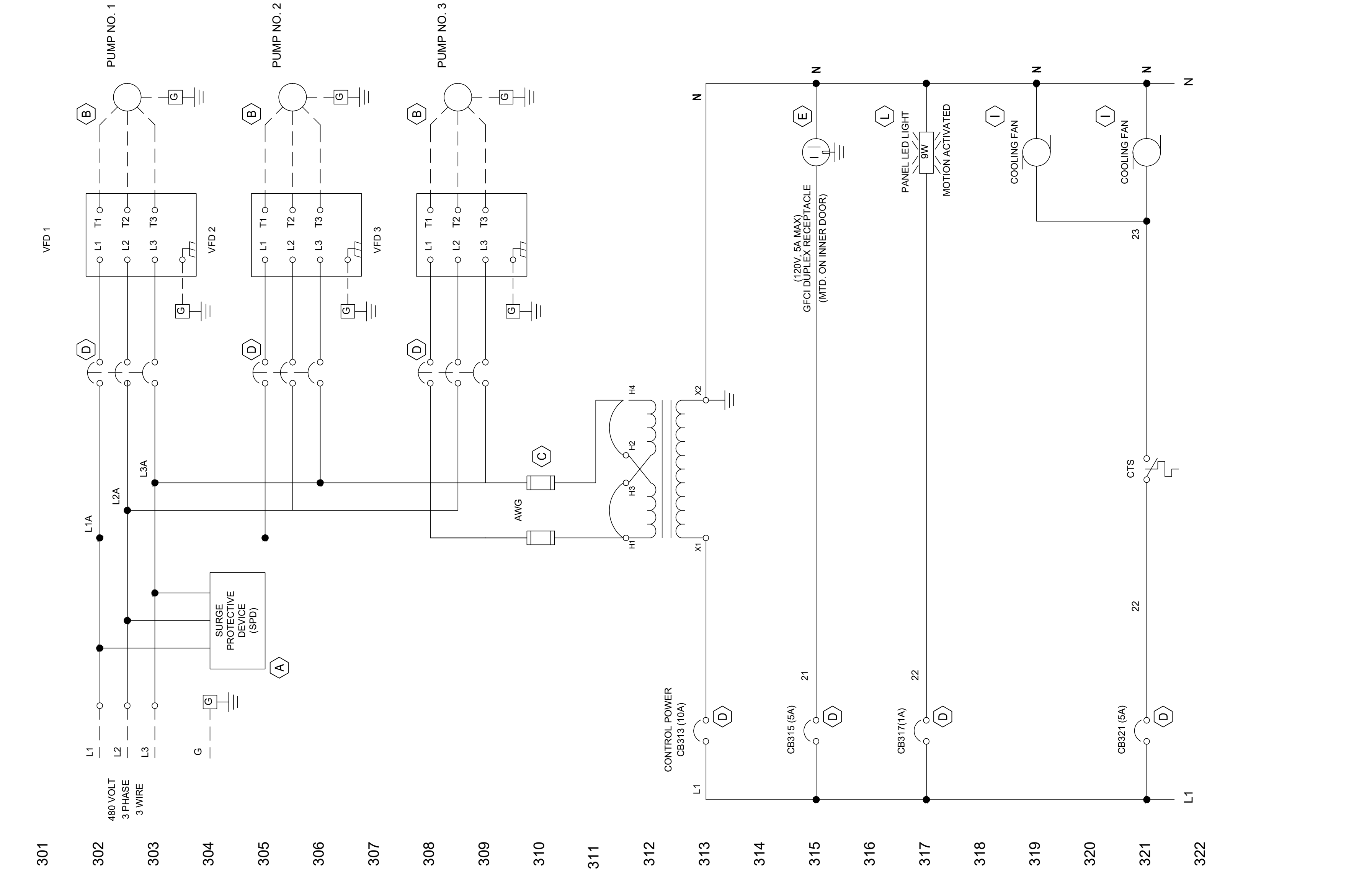
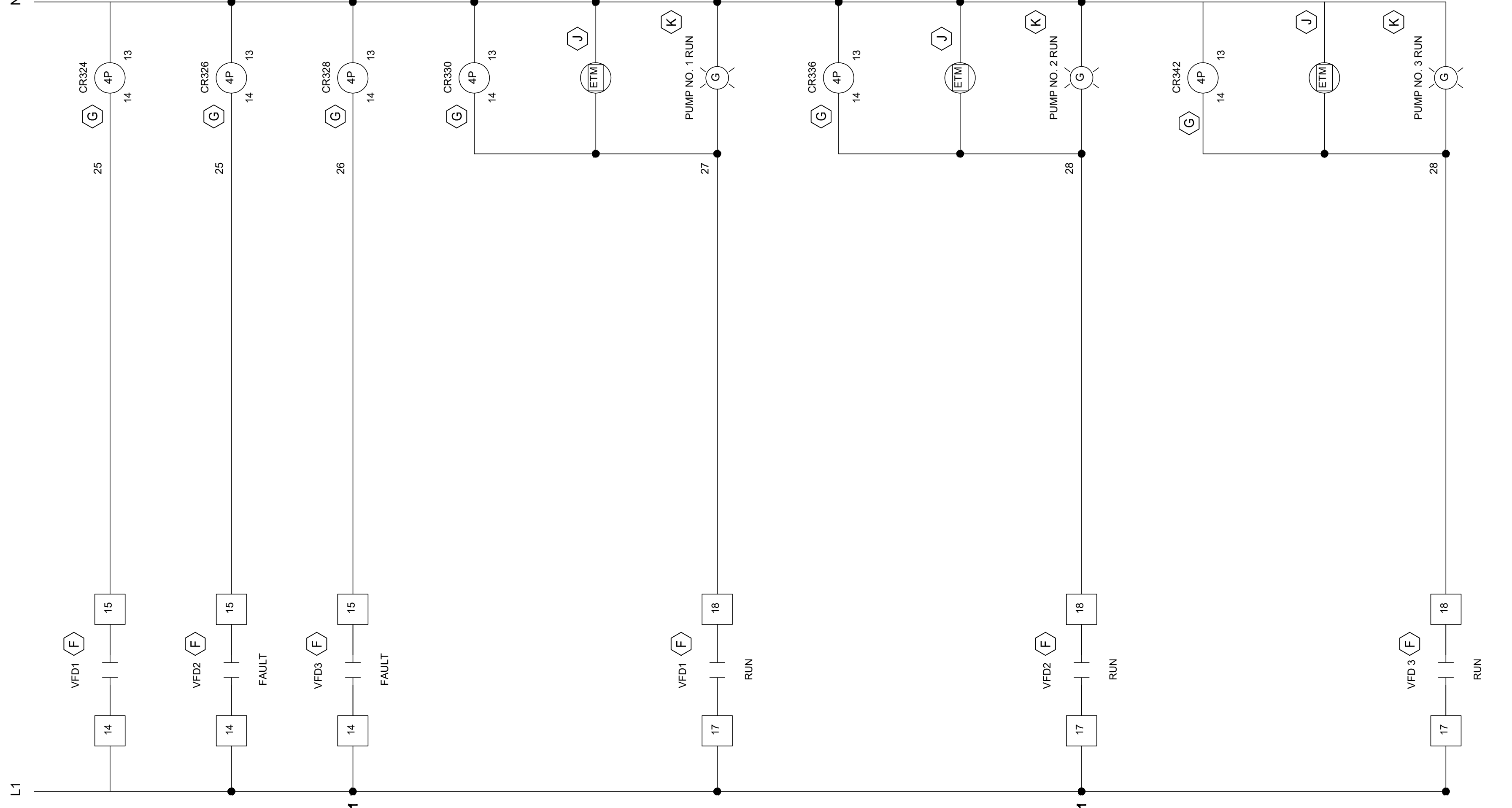


SHEET GENERAL NOTES

- REFER TO ONE LINE DIAGRAMS AND RISER DIAGRAMS FOR ADDITIONAL REQUIREMENTS.

SHEET KEY NOTES

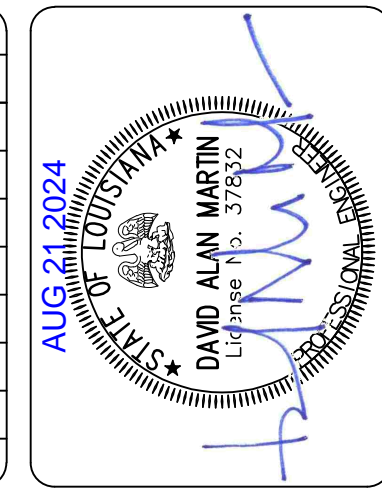
- REQ'D SPD PER SECTION 40 91 00
- FURNISH EACH PUMP WITH SHIELDED VFD CABLE TO TERMINATION IN PANEL
- REQ'D CONTROL POWER FUSING, SIZE BY PANEL SUPPLIER
- REQ'D THERMAL MAGNETIC BREAKER
- REQ'D CONTROL POWER CONVENIENCE OUTLET
- REQ'D VFD CONTACT
- REQ'D CONTROL RELAY
- REQ'D TEMPERATURE SWITCH
- REQ'D COOLING FAN, SIZED BY CONTROL PANEL MANUFACTURER, SIZED SUCH THAT APPROPRIATE COOLING IS PROVIDED WITH ONE FAN OUT OF SERVICE
- REQ'D ELAPSED TIME METER, DISPLAY MOUNTED ON BACK PAN
- REQ'D PILOT LIGHT, MOUNTED ON BACK PAN
- REQ'D PANEL LIGHT, TO ILLUMINATE UPON DOOR OPENING



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DESIGNED BY:	M. LOKER
DRAWN BY:	J. HITT
CHECKED BY:	J. CATALANOTTO
SUBMITTED BY:	FAIRWAY CE
PROJECT No.:	DU 168,170, 175, 177
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED



BREWSTER ROAD SEWER
CONSOLIDATION
TCHFF PARC-CONTROL -
DIAGRAM 1

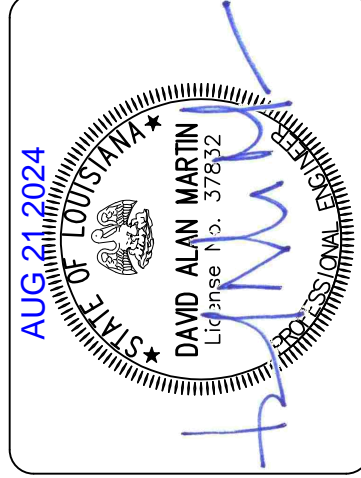
SHEET NO.
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DESIGNED BY:	M. LOKER
DRAWN BY:	J. HITT
CHECKED BY:	J. CATALANOTTO
PROJECT No.:	DU 168,170,
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED



BREWSTER ROAD SEWER
CONSOLIDATION
TCHFF PARC-CONTROL -
DIAGRAM II

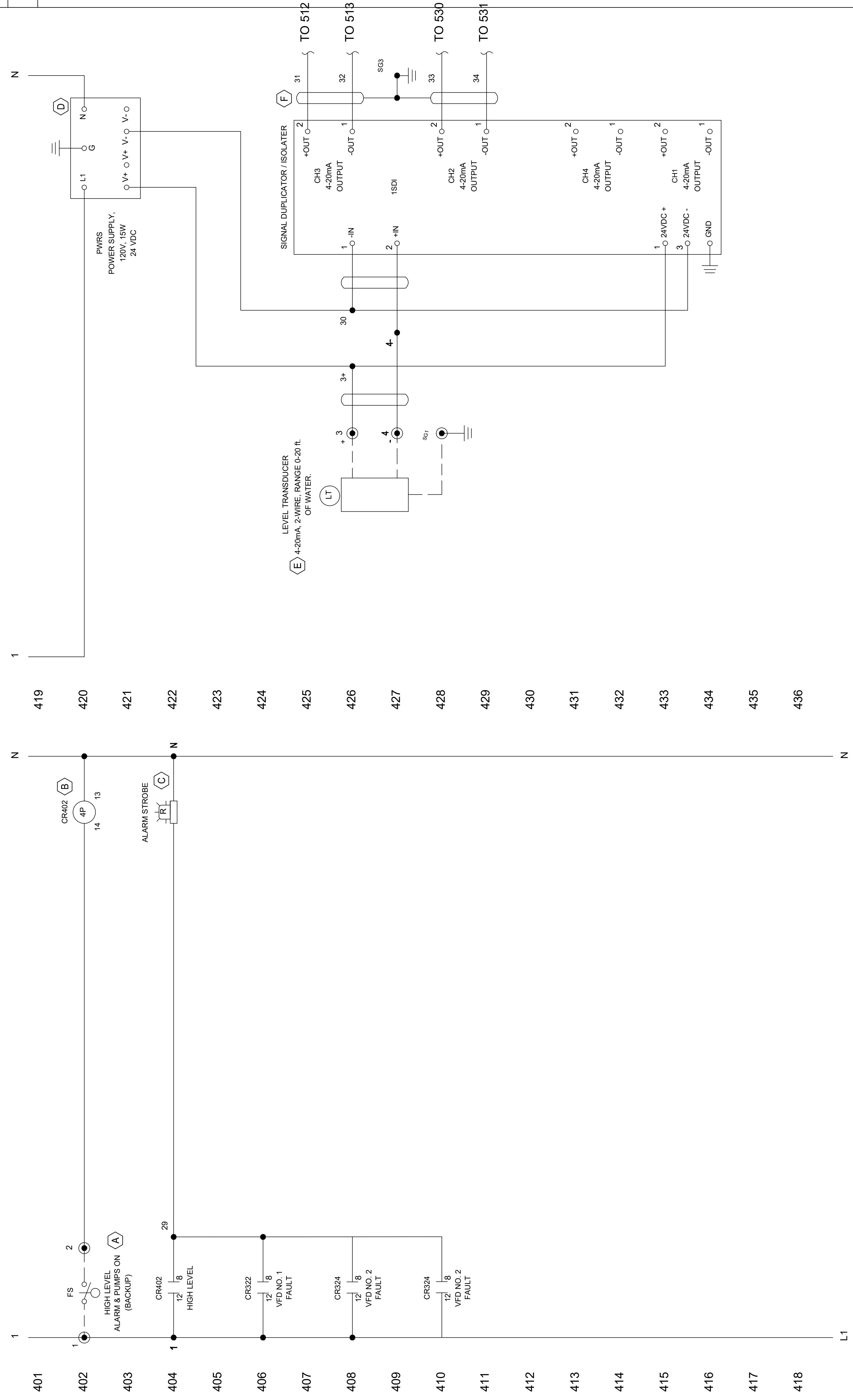
SHEET NO.
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SHEET GENERAL NOTES

1. REFER TO ONE LINE DIAGRAMS AND RISER DIAGRAMS FOR ADDITIONAL REQUIREMENTS.

SHEET KEY NOTES

- A. REQ'D BACKUP FLOAT SWITCH, INSTALLED IN WET WELL AND SEALED OFF
- B. REQ'D CONTROL RELAY
- C. REQ'D ALARM LIGHT MOUNTED ON PANEL EXTERIOR
- D. REQ'D DC POWER SUPPLY, 120V, 24V DC, SIZED BY PANEL SUPPLIER
- E. REQ'D LEVEL TRANSDUCER
- F. REQ'D SIGNAL DUPLICATOR/ISOLATOR
- G. PROVIDE OUTPUTS FOR FUTURE SCADA, 4-0 mA



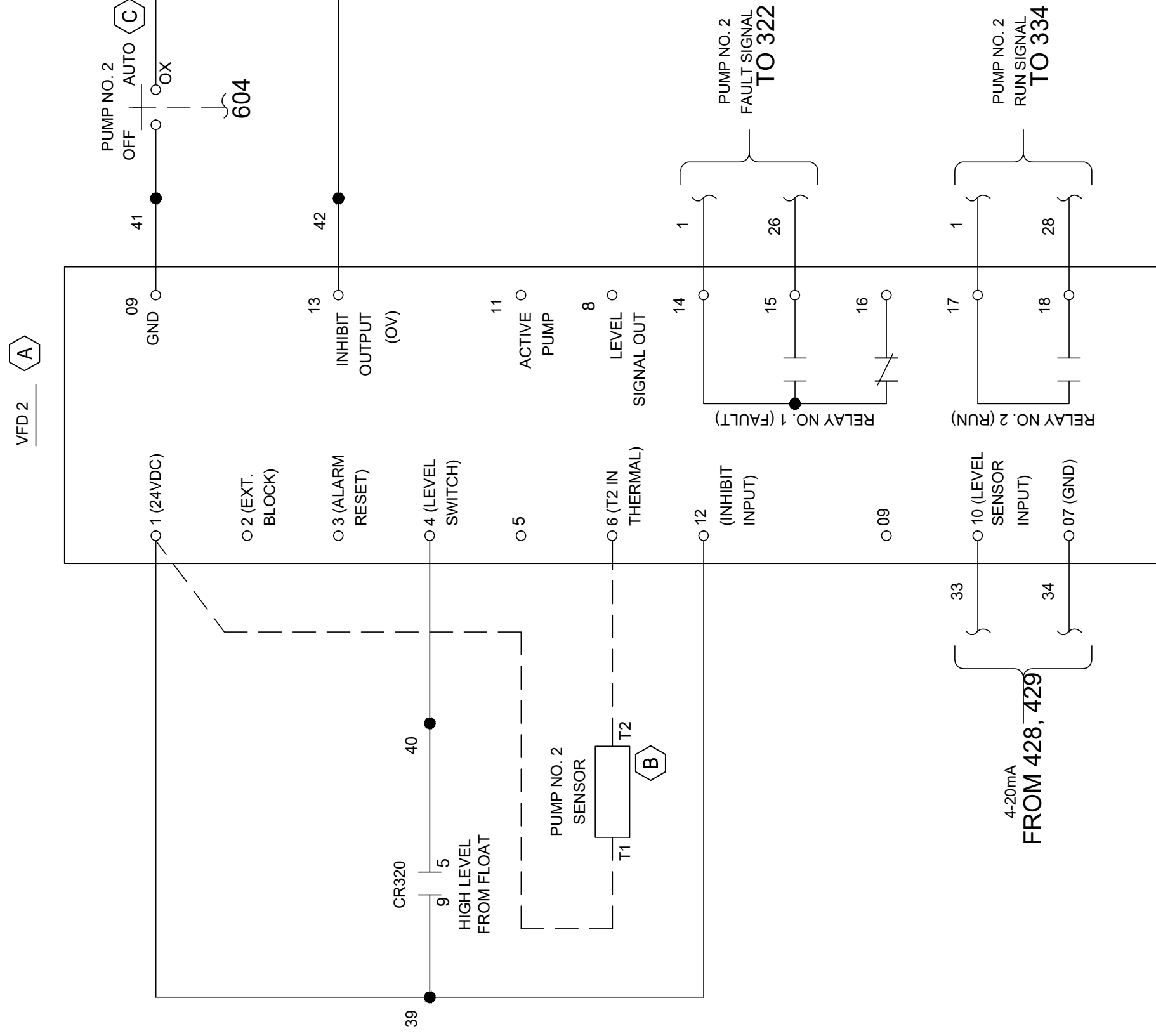
SHEET GENERAL NOTES

- REFER TO ONE LINE DIAGRAMS AND RISER DIAGRAMS FOR ADDITIONAL REQUIREMENTS.

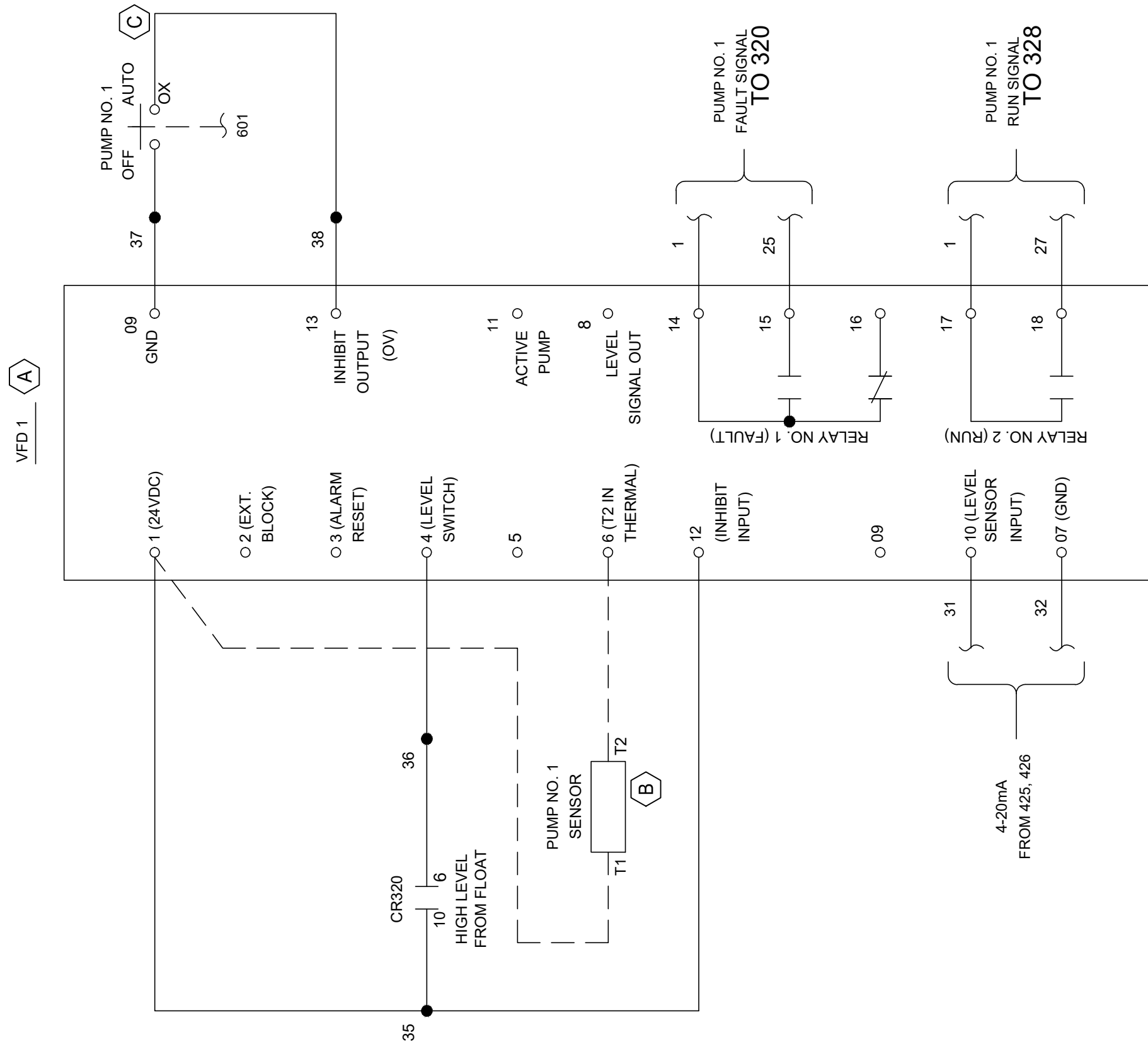
SHEET KEY NOTES

- REQ'D VARIABLE SPEED DRIVE
- REQ'D PUMP THERMAL CUT OUT SWITCH (IN PUMP)
- REQ'D HAND SWITCH, MOUNTED ON PANEL BACK PAN

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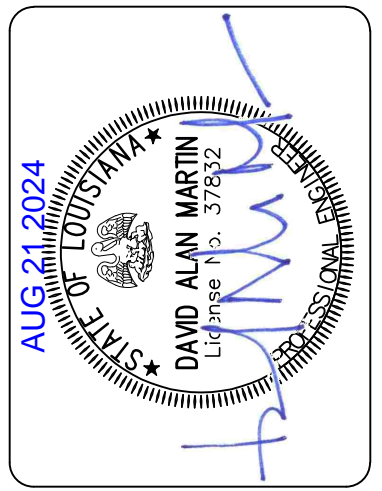
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DESIGNED BY:	M. LOKER
DRAWN BY:	J. HITT
CHECKED BY:	J. CATALANOTTO
PROJECT No.:	DU 168,170, 175, 177
ISSUE DATE:	08/20/2024
APPROVED BY:	D. MARTIN
SHEET SIZE:	ANSI D 34x22
SCALE:	AS NOTED



BREWSTER ROAD SEWER
CONSOLIDATION
TCHFF PARC-CONTROL -
DIAGRAM III

SHEET NO.
40E-06

SHEET GENERAL NOTES

- REFER TO ONE LINE DIAGRAMS AND RISER DIAGRAMS FOR ADDITIONAL REQUIREMENTS.

SHEET KEY NOTES

- REQ'D VARIABLE SPEED DRIVE
- REQ'D PUMP THERMAL CUT OUT SWITCH (IN PUMP)
- REQ'D HAND SWITCH, MOUNTED ON PANEL BACK PAN

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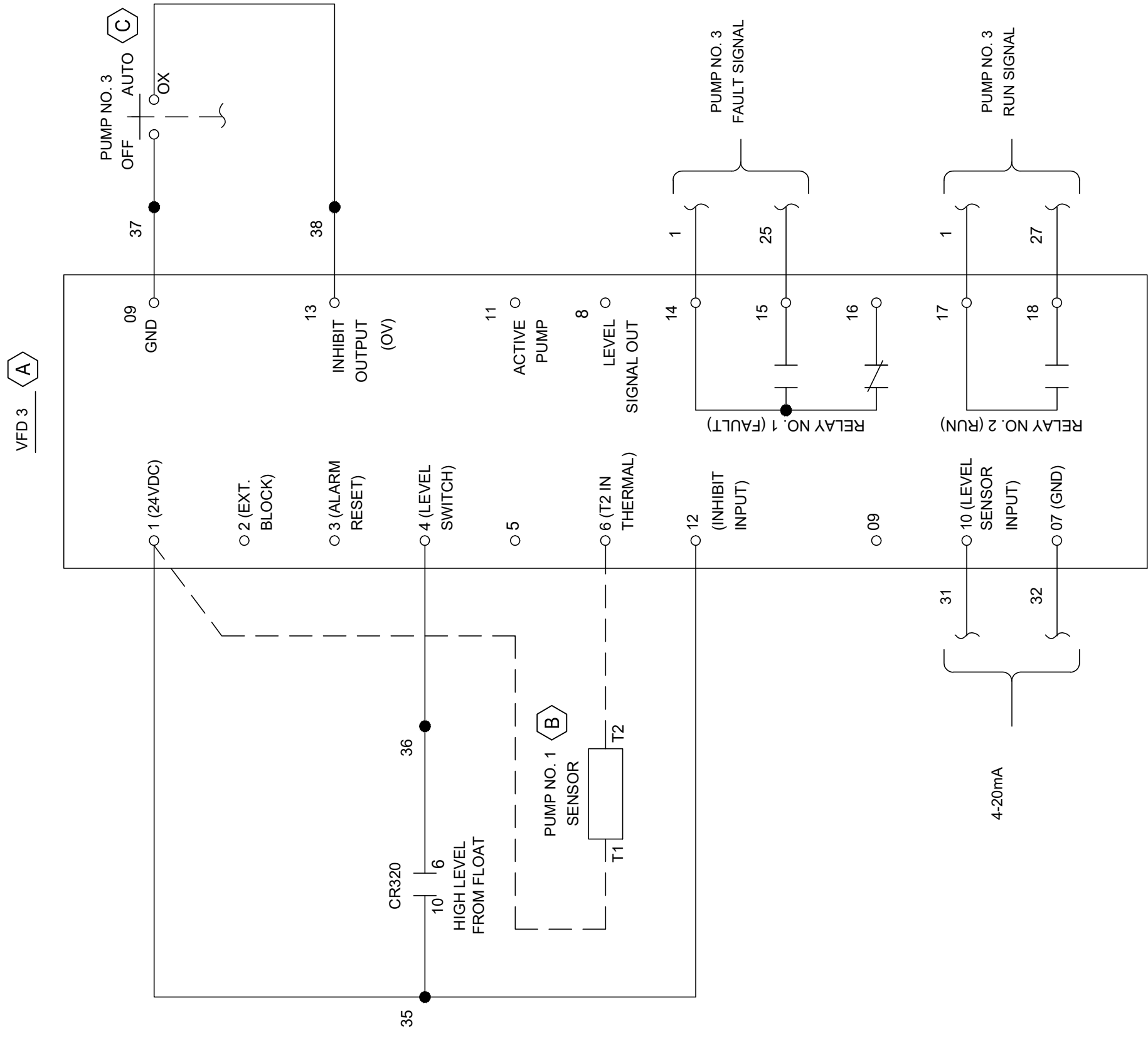
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DESIGNED BY: M. LOKER	DRAWN BY: J. HITT
CHECKED BY: J. CATALANOTTO	PROJECT No.: DU 168,170, 175, 177
ISSUE DATE: 08/20/2024	APPROVED BY: D. MARTIN
SHEET SIZE: ANSI D 34x22	AS NOTED



BREWSTER ROAD SEWER
CONSOLIDATION

TCHF PARC-CONTROL -
DIAGRAM IV

SHEET NO.
40E-07



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COVINGTON, LA 70433

SHEET GENERAL NOTES

- REFER TO ONE LINE DIAGRAMS AND RISER DIAGRAMS FOR ADDITIONAL REQUIREMENTS.

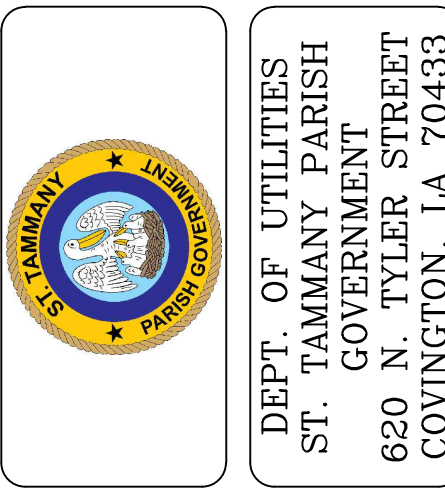
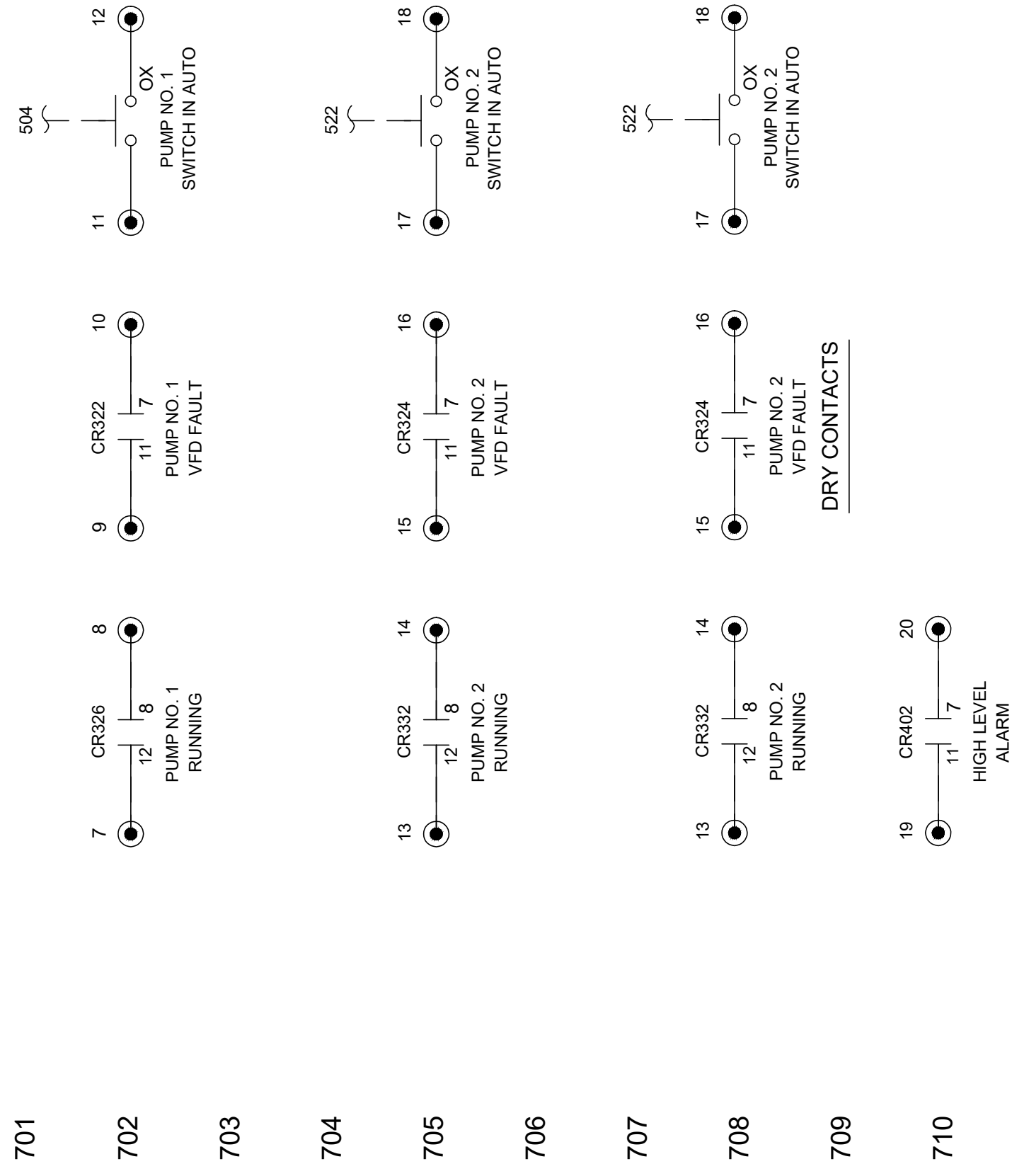
SHEET KEY NOTES

- REQ'D DRY CONTACT TO BE INCLUDED FOR FUTURE SCADA MONITORING

VFD PARAMETER SETTINGS				
PARAM	DESCRIPTION	DEFAULT	FACTORY SETTINGS	CUSTOMER SETTINGS
P1-01	MAXIMUM SPEED LIMIT	VARIES	60HZ	
P1-02	MINIMUM SPEED LIMIT	30HZ		
P1-03	ACCELERATION RAMP TIME	1.0 SEC	10.0 SEC	
P1-04	DECELERATION RAMP TIME	10.0 SEC		
P1-06	MOTOR ENERGY OPTIMIZER	0 (DISABLE)		
P1-07	MOTOR RATED VOLTAGE	VAIRES	240V	
P1-08	MOTOR RATED CURRENT	VAIRES	27A	
P1-09	MOTOR RATED FREQUENCY	VAIRES	60HZ	
P1-014	EXTENDED MENU ACCESS	0	505	
P1-015	START LEVEL		5.56	
P1-016	STOP LEVEL		2.30	
P1-017	PUMP CLEANING SETTINGS	1 (ON)		
P1-021	SENSOR MAX LEVEL	16.4		
P2-013	ANALOG OUTPUT NO. 2 FUNCTION	(0) DRIVE RUNNING	(3) MOTOR SPEED > 0	
P4-014	MAX FREQUENCY START RUN TIME	5.0 SEC	15.0 SEC	
P4-015	HIGH LEVEL RUNTIME	10.0 SEC		
P5-01	DRIVE FIELD BUS ADDRESS	50	PUMP 1 - 1, PUMP 2 - 2	
P6-019	RELAY OUTPUT NO. 1	7 (A-ALARM)		
P6-020	RELAY OUTPUT NO. 2	9 (PUMP RUNNING)		
P6-021	RELAY OUTPUT NO. 3 & 4		31 (RELAY 3 SEAL FAILURE)	

RUNNING IN AUTO MODE

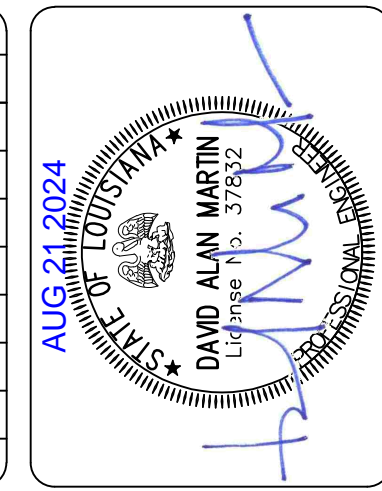
- PUT DRIVE IN AUTO MODE (PRESS AUTO ON DRIVE KEYPAD)
- PUT DRIVE IN AUTO-STANDBY MODE (PRESS START ON DRIVE KEYPAD)
- RESET AN ALARM BY PRESSING STOP ON DRIVE KEYPAD (START MUST THEN BE PRESSED TO RETURN DRIVE TO AUTO-STANDBY MODE.)



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DRAWN BY:	J. HITT
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PROJECT No.:	DU 168,170, 175, 177
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BREWSTER ROAD SEWER
CONSOLIDATION
TCHFF PARC-CONTROL -
DIAGRAM V

SHEET NO.
40E-08

Section 14

Technical Specifications

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Section 01 10 00	Summary of Work
Section 01 14 00	Construction Constraints
Section 01 29 00	Measurement and Payment
Section 01 29 73	Schedule of Values
Section 01 32 14	Barchart Construction Schedule
Section 01 33 00	Contractor Submittals
Section 01 35 53	Site Security
Section 01 42 13	Abbreviations of Institutions
Section 01 42 19	Reference Standards
Section 01 45 00	Quality Control
Section 01 50 00	Mobilization
Section 01 50 10	Protection of Existing Facilities
Section 01 53 00	Temporary Works
Section 01 55 00	Site Access and Storage
Section 01 55 26	Temporary Traffic Control
Section 01 57 19	Temporary Environmental Controls
Section 01 60 00	Products, Materials, Equipment and Substitutions
Section 01 71 33	Construction Layout and Staking
Section 01 74 30	Pressure Piping Testing and Disinfection
Section 01 75 00	Equipment Testing and Startup
Section 01 77 00	Project Closeout
Section 02 22 00	Site Conditions Surveys
Section 02 41 19	Demolition and Removal of Structures and Obstructions
Section 03 20 10	Reinforcing for Portland Cement Concrete
Section 03 31 00	Structural Concrete
Section 03 31 10	Portland Cement Concrete
Section 03 60 00	Grouting

Section 05 50 00	Miscellaneous Metalwork
Section 09 96 00	Protective Coatings
Section 26 00 00	General Specifications for Electrical Work
Section 26 32 13	Standby Power Generation
Section 31 05 16	Aggregates
Section 31 10 00	Site Preparation
Section 31 13 00	Selective Tree and Shrub Removal and Trimming
Section 31 30 00	Earthwork
Section 32 13 16	Walks, Drives and Incidental Paving
Section 32 15 00	Aggregate Surface Course
Section 32 31 13	Fences and Gates
Section 33 05 23	Horizontal Directional Drilling
Section 33 31 00	Sanitary Sewer Systems
Section 40 05 00	Piping, General
Section 40 91 00	Control Panels
Section 43 20 00	Pumps, General
Section 43 25 06	Submersible Solids Handling Pumps
Section 43 25 08	Self-Priming Solid Handling Pumps
Section 43 30 00	Valves, General
Section 43 30 12	Valve and Gate Actuators
Section 46 01 00	Equipment, General Provisions

SECTION 01 10 00 - SUMMARY OF WORK

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 CONTRACT DOCUMENTS

- A.** The WORK of this Contract consists of constructing new sewer force main, new lift stations, and demolishing existing wastewater treatment plants. Major items of WORK consist of, but are not necessarily limited to the following
1. Demolition and disposal of the top slabs;
 2. Removal and disposal of existing mechanical and electrical equipment, inclusive of pumps, controls, valves, and piping;
 3. Rehabilitation of wet wells and valve pits;
 4. Installation and commissioning of mechanical equipment, inclusive of new pumps, valves, and piping;
 5. Installation and commissioning of new electrical and controls equipment, inclusive of control panels and level sensing systems;
 6. Construction of new top slabs;
 7. Appurtenant civil, structural, mechanical, and electrical construction.
- B.** The WORK is located within the St. Tammany Parish rights of way along Brewster Rd., Rex Ave. and Tchefuncte Parc Dr. and at the existing lift station and waste



water treatment plant sites. A project vicinity map is provided within the design drawings.

1.3 CONTRACT METHOD

- A.** The WORK hereunder will be constructed under a single unit-price contract.

1.4 EXPLANATION OF ALTERNATES

- A.** No Bid Alternates will be considered.

1.5 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.

1.6 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.

1.7 CONTRACTOR USE OF SITE

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

1.8 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.

1.9 UTILITY OUTAGE PLAN AND REQUESTS

- A. Unless the Contract Documents indicate otherwise, then do not remove from service, de-energize, or modify settings for any existing operating pipeline, valve, fire hydrant, equipment, structures, roads, or any other facility without permission from the ENGINEER. Night work or work outside of normal operating hours may be required to perform tie ins to the existing system.
 - 1. The maximum duration of any outage is 4 hours.
- B. Where the WORK requires modifications to existing facilities or construction of new facilities and connection of new facilities to existing facilities, submit a detailed outage plan and schedule for the ENGINEER'S approval a minimum of 2 weeks in advance of the time that such outage is planned.
- C. Coordinated the outage plan with the construction schedule and meet the restrictions and conditions of the Contract Documents. Describe the CONTRACTOR's method for connection to the existing system the length of time required to complete said operation; any necessary temporary utilities; manpower, and equipment which the CONTRACTOR will furnish for proper switchover. Include all costs for preparing and implementing the outage plans in the Bid Price.



- D. 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.
- E. Provide written confirmation of the shutdown date and time 2 working days prior to the actual shutdown.

1.10 OWNER USE OF THE SITE

- A. The OWNER will utilize all or part of the existing facilities during the entire period of construction for the conduct of the OWNER's normal operations and service to customers. 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 period of construction.

1.11 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.

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION (NOT USED)

END OF SECTION



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SECTION 01 14 00 – CONSTRUCTION CONSTRAINTS

PART 1 -- GENERAL

1.1 THE REQUIREMENT

- A. Schedule, sequence, and perform the WORK in a manner which minimizes disruption to the public and to 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

1.2 EXISTING FACILITIES

- A. Execute while the existing sewerage collection system is in operation. Do not jeopardize the operation of the existing sewerage collection system or reduce the capacity of the system as a result of the execution of the WORK.
- B. Execute the WORK without impacting the delivery of other utility systems except as provided for by the Contract Documents.

1.3 OPERATION OF EXISTING SEWERAGE SYSTEM

- A. With the exception of temporary bypass pumping, operational functions or shutdown of the existing sanitary sewerage collection system required to facilitate CONTRACTOR's operation will be done by the OWNER's personnel only.
- B. OWNER personnel will cooperate in every way that is practical in order to facilitate CONTRACTOR's operation. However, certain shutdown and connections may only be permissible at times other than normal working hours such as nights or weekends. No additional payment will be made to the CONTRACTOR for any night, weekend, or holiday premium or overtime payments.
- C. If it becomes necessary for the proper operation or maintenance of portions of the sanitary sewerage collection system, the OWNER may require the CONTRACTOR to reschedule an approved shutdown. Reschedule operations so there will be no conflict with necessary operations or maintenance of the water distribution system. Within 2 Days, furnish the ENGINEER a revised outage request and a plan for rescheduling the shutdown in accordance with the requirements of the construction schedule.

1.4 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 water distribution system. 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.

1.5 CONSTRUCTION SEQUENCING

- A. Schedule and sequence construction activities to ensure continuous operation of the existing sanitary sewerage distribution system. Develop construction sequencing so that the WORK will not adversely impact the existing system. Assume the full and sole responsibility for 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. Do not begin any construction until site conditions surveys have been completed and accepted by the ENGINEER and OWNER.
 - 2. Do not begin any construction until temporary traffic control devices are in place.
 - 3. Do not begin demolition of existing lift station components until temporary bypass pumping is in place and operational.
 - 4. Do not place rehabilitated pumping stations into service until pressure testing has been completed and pump station start up and commissioning has been completed.
 - 5. Do not take temporary bypass pumping out of operation until pump station start up and commissioning has been completed.



1.6 PERMITS

- A.** Abide by the conditions of permits and obtain proof of satisfaction of conditions from issuers of permits prior to acceptance of the WORK by the OWNER.
- B.** Conditions affecting the CONTRACTOR are found in the following permits. Copies of permit conditions are attached at the end of this Section.
 - 1.** Louisiana Department of Health Permit No. TBD
 - 2.** Louisiana Department of Transportation and Development Utility Permit No. TBD
 - 3.** St Tammany Parish Building Permit (obtained and paid for by the Contractor).

1.7 SCHEDULE CONSTRAINTS

- A.** General: It is the CONTRACTOR's responsibility to coordinate and plan the construction activities to integrate each schedule constraint into performance of the overall WORK.
- B.** The listing of schedule constraints below does not mean that every constraint or special condition has been identified. The list does not substitute for the CONTRACTOR's coordination and planning for completion of the WORK within the Contract Times.
- C.** The following constraints affect the construction schedule.
 - 1.** Do not perform work on holidays observed by the OWNER.

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION (NOT USED)

END OF SECTION



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SECTION 01 29 00 - 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 include all compensation to be received by the CONTRACTOR for furnishing all tools, equipment, supplies, and manufactured articles, and for all labor, operations, and incidentals appurtenant to the items of work being described, as necessary to complete the various items of the WORK all in accordance with the requirements of the Contract Documents, including all appurtenances thereto, and including all costs of permits and cost of compliance with the regulations of public agencies having jurisdiction, including Safety and Health Requirements of the Occupational Safety and Health Administration of the U.S. Department of Labor (OSHA). No separate payment will be made for any item that is not specifically set forth in the Bid Schedule. therefore, include all costs of the WORK in the prices named in the Bid Schedule for the various appurtenant items of WORK.

1.2 ACCURACY

- A. The ENGINEER will be the judge of the accuracy of measurements, or approximations made in lieu of accurate determinations and these decisions will be binding upon both the CONTRACTOR and the OWNER.
- B. The ENGINEER will utilize the accepted Schedule of Values for the purpose of estimating the value of WORK completed for the evaluation of requests for payment.
- C. In computing volumes of excavation, the average end area method or other acceptable methods will be used.
- D. When United States standard units are used, the pound or the ton will be the standard units of weight. The term "ton," in the United States standard, will mean the short ton of 2,000 pounds avoirdupois. Weigh materials measured or proportioned by weight on approved scales by qualified personnel at designated locations. If material is shipped by rail, the car weight may be accepted provided the weight of material only will be paid for; however, car weights will not be acceptable for material to be passed through mixing plants. Weigh trucks used to haul material being paid by measured weight empty at such times as directed; and provide each truck a plainly legible identification mark.
- E. Haul materials specified to be measured by volume in hauling vehicles in approved vehicles that will be measured at the point of delivery on the project. Vehicles may be of any acceptable size or type, provided the body is of such shape that the volume can be readily and accurately determined. Load vehicles to at least a predetermined permanently fixed mark, which defines a known volume, upon arrival at the point of delivery. Vehicles will be measured in increments of 0.5 cubic yard, except that when tailgate spreader-boxes are used to place aggregate materials for asphaltic surface



treatment, the volume of the spreader-ox will be added to the volume of the vehicle. When materials are measured by weight and converted to volume for payment, conversion will be made to the nearest 0.1 cubic yard.

- F. Where decimal places are included in the estimated quantities shown in the Bid Form, the ENGINEER will round quantities to the same number of decimal places shown in the estimated quantities on the Bid Form.
- G. 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. Portions of lump sum items may be paid where deemed acceptable by the ENGINEER and OWNER based upon an estimate of the proportion of the WORK of the lump sum item acceptably completed in accordance with the Contract Documents. The ENGINEER may utilize an accepted Schedule of Values to make such determinations. Provide all supporting documentation requested by the ENGINEER in this regard.

1.3 BREWSTER ROAD FORCE MAIN - MOBILIZATION (REF. NO. 23000168-001)

- A. **Measurement:** No measurement will be made for this item.
- B. **Payment:** Payment for this item will be made at the lump sum price on the Bid Form, or in portions thereof in accordance with the table below. Payment of said price listed on the Bid Form constitutes full compensation to be paid to the CONTRACTOR for this item, inclusive of all labor, products and materials, equipment, and services necessary for the successful mobilization and de – mobilization to and from the site, all in accordance with the requirements of the Contract Documents.

Percent of Total Contract Amount Earned	Allowable Percent of Lump Sum Price for Mobilization
<i>1st Application for Payment</i>	25
10	50
25	75
50	100

1.4 BREWSTER ROAD SEWER FORCE MAIN – 12” SEWER FORCE MAIN BY HORIZONTAL DIRECTIONAL DRILL (REF. NO. 23000168-002)

- A. **Measurement:** Measurement for payment for this item will be based upon the number of linear feet of such pipe placed as determined by the approved drilling logs, not inclusive of the length of fittings and valves.
- B. **Payment:** Payment for this item will be made at the unit price named on the bid form. Payment of said price listed on the Bid Form constitutes full compensation to be paid to the CONTRACTOR for this item, inclusive of all



labor, products and materials, equipment, and services necessary for the installation of water main pipeline installed by horizontal directional drilling, inclusive but not limited to launching and receiving pits, excavation, shoring for excavation safety, provision and placement of bedding material, provision, placement and joining of pipe, pressure testing and disinfection of pipe, joining of pipe to structures, valves, and fittings, and backfilling and all other work all in accordance with the requirements of the Contract Documents.

1.5 BREWSTER ROAD SEWER FORCE MAIN – 12” DUCTILE IRON FITTINGS, ALL TYPES (REF. NO. 23000168-003)

- A. Measurement:** Measurement for payment for this item will be based upon the number of such fittings furnished and installed in place.
- B. Payment:** Payment for this item will be made at the unit price named on the bid form. Payment of said price listed on the Bid Form constitutes full compensation to be paid to the CONTRACTOR for this item, inclusive of all labor, products and materials, equipment, and services necessary for the installation of fittings within the pipeline, inclusive but not limited to excavation, shoring for excavation safety, provision and placement of bedding material, provision, placement and joining of fittings, retainer glands, and backfilling and all other work all in accordance with the requirements of the Contract Documents

1.6 BREWSTER ROAD SEWER FORCE MAIN – 14” DUCTILE IRON FITTINGS, ALL TYPES (REF. NO. 23000168-004)

- A. Measurement:** Measurement for payment for this item will be based upon the number of such fittings furnished and installed in place.
- B. Payment:** Payment for this item will be made at the unit price named on the bid form. Payment of said price listed on the Bid Form constitutes full compensation to be paid to the CONTRACTOR for this item, inclusive of all labor, products and materials, equipment, and services necessary for the installation of fittings within the pipeline, inclusive but not limited to excavation, shoring for excavation safety, provision and placement of bedding material, provision, placement and joining of fittings, retainer glands, and backfilling and all other work all in accordance with the requirements of the Contract Documents

1.7 BREWSTER ROAD SEWER FORCE MAIN – 14” SEWER FORCE MAIN BY HORIZONTAL DIRECTIONAL DRILL (REF. NO. 23000168-005)

- A. Measurement:** Measurement for payment for this item will be based upon the number of linear feet of such pipe placed as determined by the approved drilling logs, not inclusive of the length of fittings and valves.
- B. Payment:** Payment for this item will be made at the unit price named on the bid form. Payment of said price listed on the Bid Form constitutes full compensation to be paid to the CONTRACTOR for this item, inclusive of all labor, products and materials, equipment, and services necessary for the installation of water main pipeline installed by horizontal directional drilling,



inclusive but not limited to launching and receiving pits, excavation, shoring for excavation safety, provision and placement of bedding material, provision, placement and joining of pipe, pressure testing and disinfection of pipe, joining of pipe to structures, valves, and fittings, and backfilling and all other work all in accordance with the requirements of the Contract Documents.

1.8 BREWSTER ROAD SEWER FORCE MAIN – 12” SEWER FORCE MAIN BY OPEN CUT (REF. NO. 23000168-006)

- A. Measurement:** Measurement for payment for this item will be based upon the number of linear feet of such pipe actually placed as determined by measurement along the centerline of such pipe as measured between outside of structures, not inclusive of the length of fittings and valves.
- B. Payment:** Payment for this item will be made at the unit price named on the bid form. Payment of said price listed on the Bid Form constitutes full compensation to be paid to the CONTRACTOR for this item, inclusive of all labor, products and materials, equipment, and services necessary for the installation of restrained water main pipeline, inclusive but not limited to excavation, shoring for excavation safety, provision and placement of bedding material, provision, placement and joining of pipe, provision and installation of pipe restraints, pressure testing and disinfection of pipe, joining of pipe to structures, valves, and fittings, and backfilling and all other work all in accordance with the requirements of the Contract Documents.

1.9 BREWSTER ROAD SEWER FORCE MAIN – 14” SEWER FORCE MAIN BY OPEN CUT (REF. NO. 23000168-007)

- A. Measurement:** Measurement for payment for this item will be based upon the number of linear feet of such pipe actually placed as determined by measurement along the centerline of such pipe as measured between outside of structures, not inclusive of the length of fittings and valves.
- B. Payment:** Payment for this item will be made at the unit price named on the bid form. Payment of said price listed on the Bid Form constitutes full compensation to be paid to the CONTRACTOR for this item, inclusive of all labor, products and materials, equipment, and services necessary for the installation of restrained water main pipeline, inclusive but not limited to excavation, shoring for excavation safety, provision and placement of bedding material, provision, placement and joining of pipe, provision and installation of pipe restraints, pressure testing and disinfection of pipe, joining of pipe to structures, valves, and fittings, and backfilling and all other work all in accordance with the requirements of the Contract Documents.

1.10 BREWSTER ROAD SEWER FORCE MAIN – 12” BURIED GATE VALVE (REF. NO. 23000168-008)

- A. Measurement:** Measurement for payment for this item will be based upon the number of such valves furnished and installed in place.
- B. Payment:** Payment for this item will be made at the unit price named on the bid form. Payment of said price listed on the Bid Form constitutes full



compensation to be paid to the CONTRACTOR for this item, inclusive of all labor, products and materials, equipment, and services necessary for the installation of the valve, inclusive but not limited to excavation, shoring for excavation safety, provision and placement of bedding material, provision and installation of the valve including retainer glands for full restraint of the valve, valve actuator, extension stem, soil pipe, valve casting, and concrete pad (or manhole cover for buried valves in pavement), and backfilling all in accordance with the requirements of the Contract Documents.

1.11 BREWSTER ROAD SEWER FORCE MAIN – ARV AND VAULT (REF. NO. 23000168-009)

- A. Measurement:** Measurement for payment for this item will be based upon the number of such valves furnished and installed in place.
- B. Payment:** Payment for this item will be made at the unit price named on the bid form. Payment of said price listed on the Bid Form constitutes full compensation to be paid to the CONTRACTOR for this item, inclusive of all labor, products and materials, equipment, and services necessary for the installation of the valve inclusive but not limited to excavation, shoring for excavation safety, provision and placement of bedding material, provision and installation of the valve, outlet piping, concrete box and lid, air release piping, concrete pad, snorkel tubing within the manhole, snorkel vent, mesh screen, and backfilling all in accordance with the requirements of the Contract Documents.

1.12 FAIRFIELD OAKS SEWER CONSOLIDATION – MOBILIZATION (REF. NO. 23000170-001)

- A. Measurement:** No measurement will be made for this item.
- B. Payment:** Payment for this item will be made at the lump sum price on the Bid Form, or in portions thereof in accordance with the table below. Payment of said price listed on the Bid Form constitutes full compensation to be paid to the CONTRACTOR for this item, inclusive of all labor, products and materials, equipment, and services necessary for the successful mobilization and de – mobilization to and from the site, all in accordance with the requirements of the Contract Documents.

Percent of Total Contract Amount Earned	Allowable Percent of Lump Sum Price for Mobilization
<i>1st Application for Payment</i>	25
10	50
25	75
50	100



1.13 FAIRFIELD OAKS SEWER CONSOLIDATION – DEMOLITION AND DISPOSAL OF FAIRFIELD OAKS WWTP (REF. NO. 23000170-002)

- A. Measurement: No Measurement will be made for this item. Payment will be made based upon the estimated amount of the WORK completed in accordance with the accepted Schedule of Values.
- B. Payment: Payment for this item will be made at, or in portions thereof based upon the estimated amount of the WORK completed, of the lump sum bid price named on the bid form. Payment of said price listed on the Bid Form constitutes full compensation to be paid to the CONTRACTOR for this item, inclusive of all labor, products and materials, equipment, and services necessary for the complete removal of the existing facility as indicated on the drawings and as specified.

1.14 FAIRFIELD OAKS SEWER CONSOLIDATION – 4” SEWER FORCE MAIN BY OPEN CUT (REF. NO. 23000170-003)

- A. **Measurement:** Measurement for payment for this item will be based upon the number of linear feet of such pipe actually placed as determined by measurement along the centerline of such pipe as measured between outside of structures, not inclusive of the length of fittings and valves.
- B. **Payment:** Payment for this item will be made at the unit price named on the bid form. Payment of said price listed on the Bid Form constitutes full compensation to be paid to the CONTRACTOR for this item, inclusive of all labor, products and materials, equipment, and services necessary for the installation of restrained water main pipeline, inclusive but not limited to excavation, shoring for excavation safety, provision and placement of bedding material, provision, placement and joining of pipe, provision and installation of pipe restraints, pressure testing and disinfection of pipe, joining of pipe to structures, valves, and fittings, and backfilling and all other work all in accordance with the requirements of the Contract Documents.

1.15 FAIRFIELD OAKS SEWER CONSOLIDATION – 4” DUCTILE IRON FITTINGS, ALL TYPES (REF. NO. 23000170-004)

- A. Measurement: Measurement for payment for this item will be based upon the number of such fittings furnished and installed in place.
- B. Payment: Payment for this item will be made at the unit price named on the bid form. Payment of said price listed on the Bid Form constitutes full compensation to be paid to the CONTRACTOR for this item, inclusive of all labor, products and materials, equipment, and services necessary for the installation of fittings within the pipeline, inclusive but not limited to excavation, shoring for excavation safety, provision and placement of bedding material, provision, placement and joining of fittings, retainer glands, and backfilling and all other work all in accordance with the requirements of the Contract Documents



1.16 FAIRFIELD OAKS SEWER CONSOLIDATION – 4” SEWER FORCE MAIN BY HORIZONTAL DIRECTIONAL DRILL (REF. NO. 23000170-005)

- A. Measurement:** Measurement for payment for this item will be based upon the number of linear feet of such pipe placed as determined by the approved drilling logs, not inclusive of the length of fittings and valves.
- B. Payment:** Payment for this item will be made at the unit price named on the bid form. Payment of said price listed on the Bid Form constitutes full compensation to be paid to the CONTRACTOR for this item, inclusive of all labor, products and materials, equipment, and services necessary for the installation of water main pipeline installed by horizontal directional drilling, inclusive but not limited to launching and receiving pits, excavation, shoring for excavation safety, provision and placement of bedding material, provision, placement and joining of pipe, pressure testing and disinfection of pipe, joining of pipe to structures, valves, and fittings, and backfilling and all other work all in accordance with the requirements of the Contract Documents.

1.17 FAIRFIELD OAKS SEWER CONSOLIDATION – CONSTRUCT FAIRFIELD OAKS SEWER PUMP STATION (REF. NO. 23000170-006)

- A. Measurement:** No measurement will be made for this lump sum item.
- B. Payment:** Payment for this item will be made at, or in portions of based upon the portion of total work completed, the lump sum price named in the Bid Form, which price shall constitute full compensation for materials, labor and equipment required for the complete mechanical, structural, and electrical work necessary for the construction of the lift station as detailed within the Contract Documents, including temporary traffic control, temporary environmental controls, mobilization, project closeout, demolition, piping, valves, temporary flow controls, electrical and controls work, structural work, site work, mechanical work, and all other items required under the Contract Documents. Payments will be based upon the accepted Schedule of Values specified under Section 01 29 73 – Schedule of Values.

1.18 FAIRFIELD OAKS SEWER CONSOLIDATION – 4” BURIED GATE VALVE (REF. NO. 23000170-007)

- A. Measurement:** Measurement for payment for this item will be based upon the number of such valves furnished and installed in place.
- B. Payment:** Payment for this item will be made at the unit price named on the bid form. Payment of said price listed on the Bid Form constitutes full compensation to be paid to the CONTRACTOR for this item, inclusive of all labor, products and materials, equipment, and services necessary for the installation of the valve, inclusive but not limited to excavation, shoring for excavation safety, provision and placement of bedding material, provision and installation of the valve including retainer glands for full restraint of the valve, valve actuator, extension stem, soil pipe, valve casting, and concrete pad (or manhole cover for buried valves in pavement), and backfilling all in accordance with the requirements of the Contract Documents.



1.19 FAIRFIELD OAKS SEWER CONSOLIDATION – ARV AND VAULT (REF. NO. 23000170-008)

- A. Measurement: Measurement for payment for this item will be based upon the number of such valves furnished and installed in place.
- B. Payment: Payment for this item will be made at the unit price named on the bid form. Payment of said price listed on the Bid Form constitutes full compensation to be paid to the CONTRACTOR for this item, inclusive of all labor, products and materials, equipment, and services necessary for the installation of the valve inclusive but not limited to excavation, shoring for excavation safety, provision and placement of bedding material, provision and installation of the valve, outlet piping, concrete box and lid, air release piping, concrete pad, snorkel tubing within the manhole, snorkel vent, mesh screen, and backfilling all in accordance with the requirements of the Contract Documents.

1.20 THREE RIVERS SEWER CONSOLIDATION – MOBILIZATION (REF. NO. 23000177-001)

- A. **Measurement:** No measurement will be made for this item.
- B. **Payment:** Payment for this item will be made at the lump sum price on the Bid Form, or in portions thereof in accordance with the table below. Payment of said price listed on the Bid Form constitutes full compensation to be paid to the CONTRACTOR for this item, inclusive of all labor, products and materials, equipment, and services necessary for the successful mobilization and de – mobilization to and from the site, all in accordance with the requirements of the Contract Documents.

Percent of Total Contract Amount Earned	Allowable Percent of Lump Sum Price for Mobilization
<i>1st Application for Payment</i>	25
10	50
25	75
50	100

1.21 THREE RIVERS SEWER CONSOLIDATION – REMOVAL AND DISPOSAL OF EXISTING THREE RIVERS TREATMENT PLANT (REF. NO. 23000177-002)

- A. Measurement: No Measurement will be made for this item. Payment will be made based upon the estimated amount of the WORK completed in accordance with the accepted Schedule of Values.
- B. Payment: Payment for this item will be made at, or in portions thereof based upon the estimated amount of the WORK completed, of the lump sum bid price named on the bid form. Payment of said price listed on the Bid Form constitutes full compensation to be paid to the CONTRACTOR for this item, inclusive of all labor, products and materials, equipment, and services



necessary for the complete removal of the existing facility as indicated on the drawings and as specified.

1.22 THREE RIVERS SEWER CONSOLIDATION – 4” SEWER FORCE MAIN BY HORIZONTAL DIRECTIONAL DRILL (REF. NO. 23000177-003)

- A. **Measurement:** Measurement for payment for this item will be based upon the number of linear feet of such pipe placed as determined by the approved drilling logs, not inclusive of the length of fittings and valves.
- B. **Payment:** Payment for this item will be made at the unit price named on the bid form. Payment of said price listed on the Bid Form constitutes full compensation to be paid to the CONTRACTOR for this item, inclusive of all labor, products and materials, equipment, and services necessary for the installation of water main pipeline installed by horizontal directional drilling, inclusive but not limited to launching and receiving pits, excavation, shoring for excavation safety, provision and placement of bedding material, provision, placement and joining of pipe, pressure testing and disinfection of pipe, joining of pipe to structures, valves, and fittings, and backfilling and all other work all in accordance with the requirements of the Contract Documents.

1.23 THREE RIVERS SEWER CONSOLIDATION – 4” DUCTILE IRON FITTINGS, ALL TYPES (REF. NO. 23000177-004)

- A. **Measurement:** Measurement for payment for this item will be based upon the number of such fittings furnished and installed in place.
- B. **Payment:** Payment for this item will be made at the unit price named on the bid form. Payment of said price listed on the Bid Form constitutes full compensation to be paid to the CONTRACTOR for this item, inclusive of all labor, products and materials, equipment, and services necessary for the installation of fittings within the pipeline, inclusive but not limited to excavation, shoring for excavation safety, provision and placement of bedding material, provision, placement and joining of fittings, retainer glands, and backfilling and all other work all in accordance with the requirements of the Contract Documents

1.24 THREE RIVERS SEWER CONSOLIDATION – 4” SEWER FORCE MAIN BY OPEN CUT (REF. NO. 23000177-005)

- A. **Measurement:** Measurement for payment for this item will be based upon the number of linear feet of such pipe actually placed as determined by measurement along the centerline of such pipe as measured between outside of structures, not inclusive of the length of fittings and valves.
- B. **Payment:** Payment for this item will be made at the unit price named on the bid form. Payment of said price listed on the Bid Form constitutes full compensation to be paid to the CONTRACTOR for this item, inclusive of all labor, products and materials, equipment, and services necessary for the installation of restrained water main pipeline, inclusive but not limited to excavation, shoring for excavation safety, provision and placement of bedding material, provision, placement and joining of pipe, provision and



installation of pipe restraints, pressure testing and disinfection of pipe, joining of pipe to structures, valves, and fittings, and backfilling and all other work all in accordance with the requirements of the Contract Documents.

1.25 THREE RIVERS SEWER CONSOLIDATION – CONSTRUCT THREE RIVERS SEWER PUMP STATION (REF. NO. 23000177-006)

- A. Measurement:** No measurement will be made for this lump sum item.
- B. Payment:** Payment for this item will be made at, or in portions of based upon the portion of total work completed, the lump sum price named in the Bid Form, which price shall constitute full compensation for materials, labor and equipment required for the complete mechanical, structural, and electrical work necessary for the construction of the lift station as detailed within the Contract Documents, including temporary traffic control, temporary environmental controls, mobilization, project closeout, demolition, piping, valves, temporary flow controls, electrical and controls work, structural work, site work, mechanical work, and all other items required under the Contract Documents. Payments will be based upon the accepted Schedule of Values specified under Section 01 29 73 – Schedule of Values.

1.26 THREE RIVERS SEWER CONSOLIDATION – 4” BURIED GATE VALVE (REF. NO. 23000177-007)

- A. Measurement:** Measurement for payment for this item will be based upon the number of such valves furnished and installed in place.
- B. Payment:** Payment for this item will be made at the unit price named on the bid form. Payment of said price listed on the Bid Form constitutes full compensation to be paid to the CONTRACTOR for this item, inclusive of all labor, products and materials, equipment, and services necessary for the installation of the valve, inclusive but not limited to excavation, shoring for excavation safety, provision and placement of bedding material, provision and installation of the valve including retainer glands for full restraint of the valve, valve actuator, extension stem, soil pipe, valve casting, and concrete pad (or manhole cover for buried valves in pavement), and backfilling all in accordance with the requirements of the Contract Documents.

1.27 THREE RIVERS SEWER CONSOLIDATION – ARV AND VAULT (REF. NO. 23000177-008)

- A. Measurement:** Measurement for payment for this item will be based upon the number of such valves furnished and installed in place.
- B. Payment:** Payment for this item will be made at the unit price named on the bid form. Payment of said price listed on the Bid Form constitutes full compensation to be paid to the CONTRACTOR for this item, inclusive of all labor, products and materials, equipment, and services necessary for the installation of the valve inclusive but not limited to excavation, shoring for excavation safety, provision and placement of bedding material, provision and installation of the valve, outlet piping, concrete box and lid, air release piping, concrete pad, snorkel tubing within the manhole, snorkel vent, mesh screen, and backfilling all in accordance with the requirements of the



1.28 TCHEFUNCTE PARC SEWER CONSOLIDATION – MOBILIZATION (REF. NO. 23000176-001)

- A. Measurement:** No measurement will be made for this item.
- B. Payment:** Payment for this item will be made at the lump sum price on the Bid Form, or in portions thereof in accordance with the table below. Payment of said price listed on the Bid Form constitutes full compensation to be paid to the CONTRACTOR for this item, inclusive of all labor, products and materials, equipment, and services necessary for the successful mobilization and de – mobilization to and from the site, all in accordance with the requirements of the Contract Documents.

Percent of Total Contract Amount Earned	Allowable Percent of Lump Sum Price for Mobilization
<i>1st Application for Payment</i>	25
10	50
25	75
50	100

1.29 TCHEFUNCTE PARC SEWER CONSOLIDATION – DEMOLITION OF TCHEFUNCTE PARC SEWER PUMPING STATION (REF. NO. 23000176-002)

- A.** Measurement: No Measurement will be made for this item. Payment will be made based upon the estimated amount of the WORK completed in accordance with the accepted Schedule of Values.
- B.** Payment: Payment for this item will be made at, or in portions thereof based upon the estimated amount of the WORK completed, of the lump sum bid price named on the bid form. Payment of said price listed on the Bid Form constitutes full compensation to be paid to the CONTRACTOR for this item, inclusive of all labor, products and materials, equipment, and services necessary for the complete removal of the existing facility as indicated on the drawings and as specified.

1.30 TCHEFUNCTE PARC SEWER CONSOLIDATION – 12” DUCTILE IRON FITTINGS, ALL TYPES (REF. NO. 23000176-003)

- A. Measurement:** Measurement for payment for this item will be based upon the number of such fittings furnished and installed in place.
- B. Payment:** Payment for this item will be made at the unit price named on the bid form. Payment of said price listed on the Bid Form constitutes full compensation to be paid to the CONTRACTOR for this item, inclusive of all



labor, products and materials, equipment, and services necessary for the installation of fittings within the pipeline, inclusive but not limited to excavation, shoring for excavation safety, provision and placement of bedding material, provision, placement and joining of fittings, retainer glands, and backfilling and all other work all in accordance with the requirements of the Contract Documents

1.31 TCHEFUNCTE PARC SEWER CONSOLIDATION – 12” SEWER FORCE MAIN BY OPEN CUT (REF. NO. 23000176-004)

- A. Measurement:** Measurement for payment for this item will be based upon the number of linear feet of such pipe actually placed as determined by measurement along the centerline of such pipe as measured between outside of structures, not inclusive of the length of fittings and valves.
- B. Payment:** Payment for this item will be made at the unit price named on the bid form. Payment of said price listed on the Bid Form constitutes full compensation to be paid to the CONTRACTOR for this item, inclusive of all labor, products and materials, equipment, and services necessary for the installation of restrained water main pipeline, inclusive but not limited to excavation, shoring for excavation safety, provision and placement of bedding material, provision, placement and joining of pipe, provision and installation of pipe restraints, pressure testing and disinfection of pipe, joining of pipe to structures, valves, and fittings, and backfilling and all other work all in accordance with the requirements of the Contract Documents.

1.32 TCHEFUNCTE PARC SEWER CONSOLIDATION – 12” SEWER FORCE MAIN BY HORIZONTAL DIRECTIONAL DRILL (REF. NO. 23000176-005)

- A. Measurement:** Measurement for payment for this item will be based upon the number of linear feet of such pipe placed as determined by the approved drilling logs, not inclusive of the length of fittings and valves.
- B. Payment:** Payment for this item will be made at the unit price named on the bid form. Payment of said price listed on the Bid Form constitutes full compensation to be paid to the CONTRACTOR for this item, inclusive of all labor, products and materials, equipment, and services necessary for the installation of water main pipeline installed by horizontal directional drilling, inclusive but not limited to launching and receiving pits, excavation, shoring for excavation safety, provision and placement of bedding material, provision, placement and joining of pipe, pressure testing and disinfection of pipe, joining of pipe to structures, valves, and fittings, and backfilling and all other work all in accordance with the requirements of the Contract Documents.

1.33 TCHEFUNCTE PARC SEWER CONSOLIDATION – CONSTRUCT TCHEFUNCTE PARC SEWER PUMPING STATION (REF. NO. 23000176-006)

- A. Measurement:** No measurement will be made for this lump sum item.
- B. Payment:** Payment for this item will be made at, or in portions of based upon the portion of total work completed, the lump sum price named in the Bid Form, which price shall constitute full compensation for materials, labor and



equipment required for the complete mechanical, structural, and electrical work necessary for the construction of the lift station as detailed within the Contract Documents, including temporary traffic control, temporary environmental controls, mobilization, project closeout, demolition, piping, valves, temporary flow controls, electrical and controls work, structural work, site work, mechanical work, and all other items required under the Contract Documents. Payments will be based upon the accepted Schedule of Values specified under Section 01 29 73 – Schedule of Values.

1.34 TCHEFUNCTE PARC SEWER CONSOLIDATION – 12” BURIED GATE VALVE (REF. NO. 23000176-007)

- A. Measurement:** Measurement for payment for this item will be based upon the number of such valves furnished and installed in place.
- B. Payment:** Payment for this item will be made at the unit price named on the bid form. Payment of said price listed on the Bid Form constitutes full compensation to be paid to the CONTRACTOR for this item, inclusive of all labor, products and materials, equipment, and services necessary for the installation of the valve, inclusive but not limited to excavation, shoring for excavation safety, provision and placement of bedding material, provision and installation of the valve including retainer glands for full restraint of the valve, valve actuator, extension stem, soil pipe, valve casting, and concrete pad (or manhole cover for buried valves in pavement), and backfilling all in accordance with the requirements of the Contract Documents.

1.35 TCHEFUNCTE PARC SEWER CONSOLIDATION – ARV AND VAULT (REF. NO. 23000176-008)

- A. Measurement:** Measurement for payment for this item will be based upon the number of such valves furnished and installed in place.
- B. Payment:** Payment for this item will be made at the unit price named on the bid form. Payment of said price listed on the Bid Form constitutes full compensation to be paid to the CONTRACTOR for this item, inclusive of all labor, products and materials, equipment, and services necessary for the installation of the valve inclusive but not limited to excavation, shoring for excavation safety, provision and placement of bedding material, provision and installation of the valve, outlet piping, concrete box and lid, air release piping, concrete pad, snorkel tubing within the manhole, snorkel vent, mesh screen, and backfilling all in accordance with the requirements of the Contract Documents.

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION (NOT USED)

- END OF SECTION -



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SECTION 01 29 73 – SCHEDULE OF VALUES

PART 1 -- GENERAL

1.1 THE REQUIREMENT

- 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, 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.

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION (NOT USED)

3.1 SCHEDULE OF VALUES

- A.** The minimum detail of breakdown of Bid Items 23000170-006, 230000177-006, and 230000176-006 is indicated below. Provide greater detail where so directed by the ENGINEER.
- 1.** At a minimum, break these lump sum items down into amounts for bypass pumping/temporary flow controls, demolition, site work, mechanical work, electrical and controls work, and protective coatings work as indicated below:
 - a.** Bypass Pumping/Temporary Flow Controls: Further break this item into amounts for setup, operation, and take down/removal of temporary flow controls.
 - b.** Demolition: Further break this item down into amounts for structural demolition, mechanical demolition, and electrical and controls demolition.
 - c.** Site Work: Further break this item down into grading and surface restoration and fencing.
 - d.** Mechanical Work: Further break this item down into amounts for pumping equipment, pumping installation, valve equipment, and valve installation, piping materials and equipment, piping installation, station testing and start-up.
 - e.** Electrical and Controls Work: Further break this item down into amounts for raceways, power cabling, instrumentation, control panel equipment and materials, control panel installation, and station testing and start-up.

- 2. Rehabilitation of Lift Station (Bid Form Ref. No. 2):** At a minimum, this lump sum



item down into amounts for bypass pumping/temporary flow controls, demolition, site work, mechanical work, electrical and controls work, and protective coatings work as indicated below:

- a. Bypass Pumping/Temporary Flow Controls: Further break this item into amounts for setup, operation, and take down/removal of temporary flow controls.
- b. Demolition: Further break this item down into amounts for structural demolition, mechanical demolition, demolition of pavement, and electrical and controls demolition.
- c. Site Work: Further break this item down into grading, Portland cement concrete walks and drives, and surface restoration.
- d. Mechanical Work: Further break this item down into amounts for pumping equipment, pumping installation, valve equipment, and valve installation, piping materials and equipment, piping installation, station testing and start-up.
- e. Electrical and Controls Work: Further break this item down into amounts for raceways, power cabling, instrumentation, control panel equipment and materials, control panel installation, and station testing and start-up.
- f. Any other items as directed by the ENGINEER.

3. Other Bid Items not listed above: No breakdown is required.

- B. 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 for the evaluation of the CONTRACTOR's periodic applications for payment. 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.
- C. In the event that the CONTRACTOR and ENGINEER agree to make adjustments to the original Schedule of Values because of inequities discovered in the original accepted detailed Schedule of Values, increases and equal decreases to values for activities may be made.

- END OF SECTION -



SECTION 01 32 14 - BARCHART CONSTRUCTION SCHEDULE

PART 1 -- GENERAL

1.1 THE REQUIREMENT

- 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 Section 01 14 00 – Construction and Schedule Constraints.

1.2 SCHEDULING

- A. 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.
- B. 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.
- C. 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.
- D. 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.
- E. 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.
- F. 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.

- G.** 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.
- H.** Include lost days on the construction schedule due to inclement weather. Inclement weather delays will be determined in accordance with the requirements of the Supplementary Conditions.

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION (Not Used)

END OF SECTION



SECTION 01 33 00 - CONTRACTOR SUBMITTALS

PART 1 -- GENERAL

1.1 THE REQUIREMENT

- A. Wherever submittals are required by the Contract Documents, submit them to the ENGINEER.
- B. Within 7 Days after the date of commencement as stated in the Notice to Proceed, submit the following items for review:
 - 1. Submittal Schedule
 - a. Submit a preliminary schedule of Shop Drawings, Samples, and proposed Substitutes ("or equal") submittals listed in the Bid.
 - b. Base the schedule of submittals on CONTRACTOR's priority, planned construction sequence and schedule, long-lead items, and size of submittal package.
 - c. Allow time for resubmittals.
 - 2. Submit a list of permits and licenses the CONTRACTOR expects to obtain, indicating the agency required to grant the permit and the expected date of submittal for the permit and required date for receipt of the permit.

1.2 PRECONSTRUCTION CONFERENCE SUBMITTALS

- A. At the preconstruction conference of Section 01 10 00 – Summary of Work, submit the following items to the ENGINEER for review:
 - 1. a revised schedule of Shop Drawings, Samples, and proposed Substitution ("or-equal") items;
 - 2. a list of permits and licenses the CONTRACTOR expects obtain, indicating the agency required to grant the permit, the expected date of submittal for the permit, and required date for receipt of the permit;
 - 3. a 60-Day plan of operation in accordance with Section 01 32 14 – Barchart Construction Schedule;

1.3 SHOP DRAWINGS

- 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 15 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 15 Days. Thus, for a submittal that requires 2 resubmittals before it is complete, the maximum review period could be 45 Days.
6. If a submittal is returned to the CONTRACTOR marked "NO EXCEPTIONS TAKEN", formal revision and resubmission will not be required. If a submittal is returned marked "MAKE CORRECTIONS NOTED," make the corrections on the submittal, but formal revision and resubmission will not be required. If a submittal is returned marked "REVISE - 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 - RESUBMIT," the submittal as a whole is deemed "REVISE - 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 " NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED." 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.

1.4 CERTIFICATES

- A. 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.



1.5 TECHNICAL MANUALS

A. 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 following 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.

1.6 RECORD DRAWINGS

A. 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.

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION (NOT USED)

END OF SECTION



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SECTION 01 35 53 – SITE SECURITY

PART 1 -- GENERAL

1.1 THE REQUIREMENT

- 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 or OWNER may immediately effect necessary repairs and deduct the cost of such repairs from payments for the work.

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION (NOT USED)

END OF SECTION



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SECTION 01 42 13 - ABBREVIATIONS OF INSTITUTIONS

PART 1 -- GENERAL

1.1 THE REQUIREMENT

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

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION (NOT USED)

END OF SECTION



SECTION 01 42 19 - REFERENCE STANDARDS

PART 1 - GENERAL

1.1 THE REQUIREMENT

- 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.

1.2 CODE REFERENCES

- A. 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.
- B. 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.
- C. 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.
- D. 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

1.3 REGULATIONS RELATED TO HAZARDOUS MATERIALS

- A. Assume responsibility that all work included in the Contract Documents, regardless if shown or not. Comply with all EPA, OSHA, RCRA, NFPA, and any



other Federal, State, and Local Regulations governing the storage and conveyance of hazardous materials, including petroleum products. Where no specific regulations exist, 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.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION



SECTION 01 45 00 - QUALITY CONTROL

PART 1 -- GENERAL

1.1 THE REQUIREMENT

- A. Specific quality control requirements for the WORK are indicated throughout the Contract Documents. The requirements of this Section are primarily related to performance of the WORK beyond furnishing of manufactured products. The term "Quality Control" includes inspection, sampling and testing, and associated requirements.

1.2 INSPECTION AT PLACE OF MANUFACTURE

- A. Unless otherwise indicated, all products, materials, and equipment are subject to inspection by the ENGINEER at the place of manufacture.
- B. The presence of the ENGINEER at the place of manufacturer, however, will not relieve the CONTRACTOR of the responsibility for providing products, materials, and equipment which comply with all requirements of the Contract Documents. Compliance is a duty of the CONTRACTOR, and said duty is not avoided by any act or omission on the part of the ENGINEER.

1.3 SAMPLING AND TESTING

- A. Unless otherwise indicated, all sampling and testing will be in accordance with the methods prescribed in the current standards of the ASTM, as applicable to the class and nature of the article or materials considered; however, the OWNER reserves the right to use any generally-accepted system of sampling and testing which, in the opinion of the ENGINEER will assure the OWNER that the quality of the workmanship is in full accord with the Contract Documents.
- B. Any waiver by the OWNER of any specific testing or other quality assurance measures, whether or not such waiver is accompanied by a guarantee of substantial performance as a relief from the testing or other quality assurance requirements originally indicated, and whether or not such guarantee is accompanied by a performance bond to assure execution of any necessary corrective or remedial WORK, will not be construed as a waiver of any requirements of the Contract Documents.
- C. Notwithstanding the existence of such waiver, the ENGINEER reserves the right to make independent investigations and tests, and failure of any portion of the WORK to meet any of the requirements of the Contract Documents, will be reasonable cause for the ENGINEER to require the removal or correction and reconstruction of any such WORK in accordance with the General Conditions.

1.4 INSPECTION AND TESTING SERVICE

- A. Inspection and testing laboratory service will comply with the following:
 - 1. The CONTRACTOR will appoint, employ, and pay for services of an independent firm to perform inspection and testing or will perform inspection and testing itself.



2. Additionally, the OWNER or independent firm might perform inspections, testing, and other services as required by the ENGINEER under Paragraph 1.3C above.
3. Reports of testing, regardless of whether the testing was the OWNER'S or the CONTRACTOR'S responsibility, will be submitted to the ENGINEER in electronic format, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.
4. Cooperate with the OWNER or independent firm and furnish samples of materials, design mix, equipment, tools, storage, and assistance as requested.
5. Notify ENGINEER 24 hours prior to the expected time for operations requiring inspection and laboratory testing services.
6. Coordinate directly with the testing laboratory 24 hours prior to the date testing will be needed.
7. Retesting required because of non-conformance to requirements will be performed by the same independent firm on instructions by the ENGINEER. Pay all costs from such retesting.
8. For samples and tests required for CONTRACTOR'S use, make arrangements with an independent firm for payment and scheduling of testing. The cost of sampling and testing for the CONTRACTOR'S use is the CONTRACTOR'S responsibility.

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION

3.1 INSTALLATION

- A. Inspection: Inspect materials or equipment upon the arrival on the job site and immediately prior to installation and reject damaged and defective items.
- B. Measurements: Verify measurements and dimensions of the WORK, as an integral step of starting each installation.
- C. Manufacturer's Instructions: Where installations include manufactured products, comply with manufacturer's applicable instructions and recommendations for installation, to whatever extent these are more explicit or more stringent than applicable requirements indicated in Contract Documents.

3.2 REQUIRED TESTING, GENERAL

- A. Conduct tests as prescribed below and as required by individual specifications sections. Failure to conduct testing as specified will be cause for rejection of installed materials.
- B. Where specifications require evidence of a product or material's listing on the LDOTD AML, provide certificates to the ENGINEER and OWNER. Products so



specified must be listed on the AML at the time of their incorporation into the WORK.

- C. Submit reports to the ENGINEER.
- D. Conduct tests necessary for quality control and include such costs in the cost of the WORK.

E. Definitions:

1. **Lot, Pavement Concrete:** A lot is an identifiable placement of pavement concrete not exceeding two hundred cubic yards in volume.
2. **Lot, Structural Concrete:** A lot is an identifiable placement not exceeding 50 cubic yards in volume.

3.3 REQUIRED TESTING, SECTION 31 05 16 – AGGREGATES

- A. **Testing:** Refer to requirements for Section 31 30 00 - Earthwork.

3.4 REQUIRED TESTING, SECTION 31 30 00 – EARTHWORK

- A. **Testing:** The following tests are required under this Section:

1. River Sand for Backfill, Source Approval: Test material for deleterious materials and gradation prior to the first placement of backfill, and then not less than once monthly thereafter. Test and report moisture – density relationships of acceptable material in accordance with DOTD TR 418. Determine In – Place Density and Determination of In – Place Moisture Content by DOTD TR 401 and DOTD TR 403, respectively.
2. River Sand for Backfill, In Place Testing: Conduct a minimum one In – Place Moisture Density test per each per lift per 100 linear feet of pipe for pipe backfill. Conduct a minimum of one in – place moisture – density test for every lift of fill for the parking area.
3. Bedding Material: Test material for deleterious materials and gradation prior to the first placement of backfill, and then not less than once monthly thereafter. Test and report moisture – density relationships of acceptable material in accordance with DOTD TR 418. Determine In – Place Density and Determination of In – Place Moisture Content by DOTD TR 401 and DOTD TR 403, respectively.
4. Bedding and Haunching Material, In Place Testing: Conduct one In – Place Moisture Density test per 100 linear feet of pipe per lift of bedding material.

3.5 REQUIRED TESTING, SECTION 03 31 00 – STRUCTURAL CONCRETE

- A. Refer to the requirements for Section 03 31 00 – Portland Cement Concrete.

3.6 REQUIRED TESTING, SECTION 03 20 10 – CONCRETE REINFORCEMENT

- A. Reinforcement will not be tested unless questionable.



3.7 REQUIRED TESTING, SECTION 03 31 10 – PORTLAND CEMENT CONCRETE PAVEMENT.

A. Pavement: Conduct the following tests for pavement:

1. **Surface Tolerance (Cured Concrete):** Test the parking area with an approved 10 – foot rolling or static straight edge. Correct deficient areas in accordance with the pavement specifications.
2. **Compressive Strength (Plastic Concrete/Cured Concrete):** Take six (6) 4x8 cylinders for compressive strength testing for each lot. Test one for compressive strength at three (3) days, one at seven (7) days, and three at twenty-eight days. Reserve the final cylinder for testing at fifty-six (56) days curing.
3. **Aggregates:** Test aggregates for gradation and deleterious material at least once per 200 cubic yards of concrete production.
4. **Cement:** Testing of cement is not required.
5. **Mix Temperature (Plastic Concrete):** Take a minimum of one per each one half day of concrete placement.
6. **Entrained Air (Plastic Concrete):** Take a minimum of one entrained air test per half day.
7. **Slump (Plastic Concrete):** Take a minimum of one slump test per half day.

B. Structural Concrete: Conduct the following tests for structural concrete:

1. **Compressive Strength (Plastic Concrete/Cured Concrete):** Take six (6) 4x8 cylinders for compressive strength testing for each lot. Test one for compressive strength at three (3) days, one at seven (7) days, and three at twenty-eight days. Reserve the final cylinder for testing at fifty-six (56) days curing.
2. **Aggregates:** Test aggregates for gradation and deleterious material at least once per 50 cubic yards of concrete production.
3. **Cement:** Testing of cement is not required.
4. **Mix Temperature (Plastic Concrete):** Take a minimum of one per each one half day of concrete placement.
5. **Entrained Air (Plastic Concrete):** Take a minimum of one entrained air test per half day.
6. **Slump (Plastic Concrete):** Take a minimum of one slump test per half day.

- C. **Precast Structural Concrete:** 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.

END OF SECTION



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SECTION 01 50 00 – MOBILIZATION

PART 1 - GENERAL

1.1 THE REQUIREMENT

- 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.
 - 12. Submitting traffic control plan and form of proposed traffic control diary.

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 01 50 10 - PROTECTION OF EXISTING FACILITIES

PART 1 -- GENERAL

1.1 THE REQUIREMENT

- 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.

1.2 RIGHTS-OF-WAY AND UTILITIES

- A. 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.
- B. After authority has been obtained, give said party due notice of its intention to begin work, if required by said party.
- C. Remove, shore, support, or otherwise protect such pipeline, transmission line, ditch, fence, or structure, or replace the same.

1.3 PROTECTION OF STREET OR ROADWAY MARKERS

- A. 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.

1.4 RESTORATION OF PAVEMENT

- A. **General:** Provide temporary surfacing per Section 32 15 10 – Traffic Maintenance Surfacing. Make permanent restoration in accordance with the requirements of the applicable earthwork and pavement specifications sections.
- B. **Portland Cement Concrete Pavement:** Where the CONTRACTOR's operations cause damage to Portland cement concrete pavement, remove and repair the damaged Portland cement concrete pavement by patching at no cost to the OWNER. The ENGINEER will determine the required limits of patching. The ENGINEER will determine the required limits of removal and patching. Patch concrete in accordance with the requirements of Section 03 31 10 - Rehabilitation of Portland Cement Concrete Pavement.
- C. **Asphalt Concrete Pavement:** Where the CONTRACTOR's operations damage asphalt concrete pavement, repair by patching, milling, and overlaying at no cost to the OWNER. The ENGINEER will determine the required limits of patching, milling, and overlaying. Patch asphalt in accordance with the requirements of Section 32 12 10 - Patching, Joint Repair, and Pavement Widening. Overlay



asphalt pavement in accordance with the requirements of Section 32 21 02 - Asphalt Concrete Pavement. Mill asphalt pavement in accordance with the requirements of Section 32 12 10 - Milling Asphalt Pavement.

- D. Incidental Walks, Drives, and Pavement: Where the CONTRACTOR's operations cause damage to walks, drives, and/or incidental pavement, remove and replace the pavement by full depth patching at no cost to the OWNER. Patch pavement in accordance with the requirements of Section 03 31 10 - Rehabilitation of Portland Cement Concrete Pavement.

1.5 UNDERGROUND UTILITIES

- A. **General:** 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.
- B. 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.
- C. Perform the number of exploratory excavations which is sufficient to determine the alignment and grade of the Utility.
- D. **Utilities to be Moved:** In case it becomes 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.
- E. **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.
- F. **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.



- G. 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.
- H. 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.
- I.** 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.
- J. 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.
- K. 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.

1.6 TREES, SHRUBS, AND LAWN AREAS WITHIN STREET RIGHTS-OF-WAY AND PROJECT LIMITS

- A. 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.

- B. 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 kerosene, coal tar, creosote, or other material injurious to the life of the tree.
- C. 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.
- D.** Repair or replace lawn and/or landscaped areas damaged during construction to match the pre-construction condition to the satisfaction of the land owner and the OWNER.

1.7 NOTIFICATION BY THE CONTRACTOR

- A.** 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.
- B.** Comply with the Louisiana Underground Utilities and Facilities Damage Prevention Law.
- C.** Provide notice to Louisiana One Call (811) in accordance with the Louisiana Underground Utilities and Facilities Damage Prevention Law

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION (NOT USED)

END OF SECTION



SECTION 01 53 00 – TEMPORARY WORKS

PART 1 -- GENERAL

1.1 THE REQUIREMENT

- A. Furnish, construct, and remove temporary facilities employed in the execution of the work. Such facilities include but are not limited to temporary bridges, temporary sheeting, falsework, shoring, formwork, scaffolding, form travelers, cofferdams, systems for the exclusion of water, temporary utilities, and containment systems.
- B. Temporary works are considered to be the contractor's means and methods. Unless otherwise specified, submittals will be for record.
- C. Submit information on materials, drawings and construction details, and procedures for installation, operation, maintenance and removal.
- D. Submit supporting documentation such as engineering analysis and design and manufacturer's information for prefabricated elements. Retain a licensed professional engineer registered in Louisiana to perform, seal, sign, and date all submitted analysis, related drawings, and design unless otherwise specified.

1.2 TEMPORARY ENVIRONMENTAL CONTROLS

- A. Furnish, install, maintain, and remove temporary environmental controls as specified in Section 01 57 19 – Temporary Environmental Controls.

1.3 TEMPORARY TRAFFIC CONTROLS

- A. Furnish, place into service, maintain, and remove temporary traffic controls as specified in Section 01 55 26 – Temporary Traffic Control.

1.4 CONSTRUCTION REQUIREMENTS

- A. Design temporary works in accordance with the latest version of AASHTO LRFD Bridge Construction Specifications. Consider appropriately distributed construction loads such as stockpiled materials and construction equipment. Determine member capacities based on field conditions accounting for section loss, deterioration of capacity, alterations of the structure, and support conditions during all construction phases.

1.5 CONTRACTOR SUBMITTALS, SAMPLING, AND TESTING

- A. Provide submittals, samples for testing, and testing of materials in accordance with Section 01 33 00 – Contractor Submittals and Section 01 45 00 – Quality Control.
- B. Submittals: Submit the following:
 - 1. Estimate of peak flow to be controlled
 - 2. Detailed procedures for handling peak estimated flow



3. Schedule for controlling flow
4. Listing of equipment needed for flow control
5. Operation plan
6. Emergency procedures
7. Permits to close roads or lanes if necessary
8. Drawing of plug, bypass pump and pipeline locations (if bypass pumping is required)
9. Bypass pump sizes, capacities, number of each size to be onsite (including standby equipment) and power requirements
10. Bypass pipeline sizes and material types
11. Sheeting, Shoring and Bracing Plan

PART 2 -- PRODUCTS (NOT USED)

2.1 MATERIALS FOR TEMPORARY UTILITIES

- A. 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.

2.2 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 in good condition and of a watertight 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 good, sound condition which comply with all applicable OSHA requirements. Install, use, and remove 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.

2.3 SHEET PILES

- A. **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.
- B. **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 (NOT USED)

3.1 TEMPORARY UTILITIES

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

- D. 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.
- E. 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.
- F. 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.

3.2 CONSTRUCTION ACCESS BRIDGE

- A.** Provide a bridge for construction access within the limits of the specified right-of-way which meets the environmental commitments and hydraulic requirements at the site.
- B.** Perform all necessary additional clearing and grubbing as required to complete this item. Remove construction access bridge. Fill holes resulting from removal of bridge elements with a granular material. Retain all materials used in the construction access bridge and/or dispose of in a permitted disposal facility.

3.3 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.

3.4 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.

3.5 WELL POINTING

- A. When required by plans or the engineer, design, detail, install, maintain, operate, and remove a well point system. Install the well point system around the perimeter of the excavated area in a location such that other operations will not be impeded. Continuously maintain the piezometric level in the soil at least 5 feet below the bottom of the excavated area.
- B. When well points are no longer required for water control, plug abandoned well in accordance with *Water Well Rules, Regulations and Standards, State of Louisiana*.
- C. Install piezometers or other suitable means of monitoring within the excavated area as required by field conditions. Make daily readings or measurements of the piezometers to verify that the well point system is operational. Excavation may begin when the level is 5 feet below the proposed excavation bottom surface for at least four hours.
- D. Provide the well point system with a back-up system of pumps and power units. If failure of the well point system occurs, add water to the excavation as rapidly as possible at no additional cost or time to the Department.
- E. Notify the engineer after completing each excavation. Do not place concrete until the engineer has accepted the excavation.

3.6 FALSEWORK AND FORMWORK

- A. Support falsework on a satisfactory foundation and remove upon completion of work. Set falsework and formwork to give the finished structure the specified final position under all loads.

3.7 COFFERDAMS

- A. General cofferdam requirements for bidding purposes may be included in the plans.
- B. Design, fabricate, install, maintain, and remove the cofferdam system. The cofferdam system consists of temporary elements such as walls, supporting structural elements, and water control system. The cofferdam seal is part of the permanent structure designed by the EOR. The seal is designed to prevent water



ingress and to provide vertical stability to the cofferdam system and foundation during all construction stages. Place the upper one foot of seal concrete in the dry to provide a level surface for forming and constructing the foundation footing.

- C. The plan seal and foundation have been designed for vertical stability under the plan specified maximum allowable water surface elevation for dry foundation construction. Flood the cofferdam when the water elevation exceeds the specified maximum allowable water surface elevation. Flooding under this condition will be considered an excusable compensable delay in accordance with 108.07.4. Cofferdam flooding occurring at water elevations below the specified maximum allowable value will be considered a non- excusable delay in accordance with 108.07.5.
- D. Alterations to the plan seal and foundation will require a Contractor or VE Proposal. Submit the proposal for review. The specified maximum water surface elevation will not be altered. Department cost to review, redesign and detail the seal and foundation will be reimbursed to the Department through Change Order regardless of whether or not the proposal is constructed.
- E. Submit a Cofferdam Installation Plan to the ENGINEER for record. Include design assumptions, computations, details of cofferdam system elements, and sequences and methods of construction including excavation, installation of cofferdam system, and construction of seal and foundation, and cofferdam system removal. Include cofferdam system components to remain in the permanent work, repair methods and repair materials. The Cofferdam Installation Furnish a plan that has been designed, sealed, signed and dated by a professional engineer registered in Louisiana.
- F. Design and construct cofferdam so that system and components safely perform under all aspects of global, external and structural stability during each stage of construction, including anchorage, embedment, and loads from balanced and unbalanced soil, water, and construction activities. Provide sufficient interior clearances for form construction, inspection of form exteriors, and to permit control of water.
- G. Right, reset, and enlarge cofferdams that tilt or move laterally as needed to provide necessary interior clearances.
- H. Control ingress of water so that construction can be performed in the dry. Dewater after seal concrete has cured. When weighted cofferdams are employed and the weight is utilized to participate in vertical stability of the system, provide anchorage to transfer cofferdam system weight to the seal. During placing and curing of seal, control the water elevation inside the cofferdam to prevent water flow through the seal.
- I. If the cofferdam is permitted by the engineer or required by the plans to remain in place, vent or port cofferdam at or below low-water level.
- J. Re-establish pre-construction ground elevations inside and outside of the cofferdam in accordance with Section 802.



- K. Remove cofferdam system after completion of the work without damaging the finished work or existing adjacent structures. Remove portions of the cofferdam system which remain within concrete permanent work in accordance with the Cofferdam Installation Plan to at least 6 inches from the surface of the permanent work. Use block outs to facilitate removal and patch permanent work with compatible materials conforming to the plans and the Cofferdam Installation Plan.

3.8 CLEANING AND PAINT CONTAINMENT SYSTEMS

- A. General containment system requirements for bidding purposes may or may not be included in the plans. Design, fabricate, install, operate, maintain, and remove containment systems as required by local, State, and Federal requirements.
- B. Design and construct the containment system in accordance with the Contract and SSPC Guide 6, Guide for Containing Debris Generated During Paint Removal Activities. Unless specified otherwise, provide a Class 1A containment system.
- C. Determine member capacities based on field conditions accounting for section loss, deterioration of capacity, alterations of the structure, and support conditions during all construction phases. In addition, design and furnish suspended scaffolding in accordance with the requirements of 29 CFR § 1926 Subpart (L).
- D. Containment System Plan Submittal: Prepare and submit for review Containment System Plan in accordance with the requirements of this Section and the requirements of Section 01 33 00 – Contractor Submittals. Furnish containment System Plan and calculations which were prepared, sealed, signed and dated by a professional engineer registered in Louisiana.
- E. Submit reviewed and accepted Containment System Plan as part of the Pollution Control and Monitoring Plan in accordance with 811.05.9. Include in the Containment System Plan as a minimum the following:
 - F. Describe the proposed containment system, including methods for collecting debris, and containment enclosure components.
 - G. A description of the ventilation system components and information including the fan curve and design point on the proposed dust collector.
 - H. A description and details of materials, seals, supports, connection hardware, anchorages, scaffolding, air ventilation and filtration systems, internal lighting and methods of attachment to the structure.
 - I. Procedures and details for installation and removal, including detailed information on attachment points to the structure.
 - J. Removal or retraction details to address weather events or maintenance of traffic requirements. Show components of the containment system to be removed and the methods of removal required to prevent overstress of bridge members or the structure as a whole.



- K. Drawings, including plan and elevation views of the containment system showing vertical and horizontal clearances to be maintained over highways, railways, and waterways.
- L. Calculations, including assumptions, ventilation criteria if applicable, and a complete structural analysis. Demonstrate that the additional dead, live, and wind loads imposed by the containment system and construction activities, including contractor's equipment train do not cause overstress of containment system or bridge members or compromise the structural integrity of the bridge. Check global stability of the containment system and structure. Show anticipated loads on the structure and the maximum permissible debris and wind loads permitted on the containment system.
- M. Design, construct, operate, and maintain containment system to minimize vehicular, railway, and marine traffic disruptions. Unless otherwise specified, maintain existing vertical and horizontal highway, railway and waterway clearances. Provide capability of being removed, retracted, or opened to reduce wind load on the structure during adverse weather or to maintain required vertical and horizontal highway, railway, and waterway clearances. Provide a containment system that can be removed or lowered and secured within 24 hours. Limit the containment system size to an area that will not damage the structure under a 55 mph wind speed.
- N. Design, construct, operate, and maintain containment system so that the additional dead, live, and wind loads imposed by the containment system and construction activities do not cause damage to the structure, overstress of bridge members, or compromise the structural integrity of the bridge.
- O. Permanent attachments or removal of existing fasteners to make temporary connections to the structure will not be allowed without written approval of the ENGINEER. Welding or drilling and bolting connections to structural members are prohibited.
- P. Design and construct platforms and their components to support at least four times their maximum applied load. Design, construct, operate, and maintain cables to support at least six times their maximum applied load. Comply with applicable OSHA regulations regarding rigging, staging, and scaffolding. At a minimum, meet OSHA 3150, A Guide to Scaffolding Use in the Construction Industry and Federal Specification RR-C-27-102, Chains and Attachments-Welded and Weldless.
- Q. Design, construct, operate, and maintain inside lighting in accordance with SSPC Guide 12, Guide for Illumination of Industrial Painting Projects.
- R. Provide lighting to a minimum intensity of 20 ft-cd for general, 50 ft-cd for work, and 200 ft-cd for inspection.
- S. Use fire retardant materials.
- T. Require the engineer responsible for the development of the containment plan to certify that each installation conforms to the submitted, reviewed, and accepted Containment System Plan prior to use. Require the engineer



responsible for the development of the containment plan to inspect and recertify after each modification and after any hurricane, tropical storm, or local storm event affecting the work area.

- U. Maintain the containment system and comply with the working drawings. Modifications require prior submittal, review and acceptance by the ENGINEER.
- V. Coordination through the ENGINEER with permitting agencies is required for construction activities involving structures over waterways. U.S. Coast Guard approval will be required for any closures of, obstructions within, or reductions of vertical or horizontal clearance within navigable waterways. Comply with all requirements for interruptions, closures, obstructions, and clearance reductions affecting marine traffic.
- W. Obtain waterway permits as required. For emergencies affecting navigation, immediately and directly contact the U.S. Coast Guard and/or the U.S. Coast Guard Marine Safety Office, and then notify the ENGINEER. Activities in a navigable waterway will not be allowed without prior approval of the US Coast Guard.
- X. Maintain any existing navigation lighting and aerial beacons at all times for the duration of the contract as well as additional containment obstruction lighting required by the U.S. Coast Guard.
- Y. In the event of a named hurricane or tropical storm forecasted to enter the work area within 72 hours, or in the event of an evacuation order in the work area, remove and re-install the containment system, equipment, and materials.
- Z. Repair damage to the structure caused by the containment system or construction activities to the satisfaction of the ENGINEER. Submit repair procedures to the ENGINEER for review prior to performing repairs.

3.9 SEWER FLOW CONTROL AND ELIMINATION

- A. Control flow in the sewer system to allow for inspection, maintenance, repair or replacement. Accomplish this by either blocking or plugging the incoming lines to restrict flow or through the use of pumps to bypass the flow around the work area until the work is completed.
- B. Assume the full and sole responsibility for damages to private or public property that may result from the sewer flow control operations. Assume full and sole responsibility for any violations of laws, regulations or permits and indemnify and hold the Owner harmless for any and all damages, including but not limited to, fines, penalties and law suits which arise from such violations.
- C. The design and installation of the necessary systems as well as the operation of the temporary pumping systems are the Contractor's responsibility.
- D. Wherever flows in a sewer line are blocked, plugged or bypassed, take sufficient precautions to protect the sewer lines from damage that might be inflicted by excessive sewer surcharging. Further, ensure that sewer flow control operations do not cause flooding or damage to public or private property being served by the sewers involved.



- E.** In situations where flow is running through an open trench during a sewer repair or replacement, take precautions to ensure that debris, bedding/backfill material, sediment, etc. do not enter into the sewer system possibly causing damage to downstream pump stations. In the event debris, bedding/backfill material, sediment, etc. does enter the downstream sewer system due to Contractor negligence, assume the full responsibility and pay all costs for cleaning and videoing the downstream system and also any damage to the downstream pump station equipment at no additional cost to the OWNER.
- F.** Flow control will be required to conduct inspection or other maintenance/rehabilitation operations when the existing flow in the lines is above the following levels:
1. **CCTV Inspection:** The entire circumference of the pipe (360 degrees) must be viewable to the satisfaction of the Engineer. Dewater the pipe as necessary to allow the required visibility.

2. Maximum Depth of Flow for Joint Sealing

6-12" Pipe	40% of Pipe Diameter
15"-24" Pipe	45% of Pipe Diameter
Greater than 24" Pipe	50% of Pipe Diameter

3. **Public Notification:** Conduct notification and coordination with the homeowners according to the following:
 - a. At least 7 days prior to any work, shutdown of service, or reduction in service to any line segment, go door-to-door to distribute an Owner approved Homeowner Door Knocker describing the work to be performed.
 - b. On the day the service is to be shutdown or reduced, prior to commencing the work, knock on the doors of all structures potentially impacted by the work and personally notify the occupants.
 - c. Notify by fax or email to the Owner's designated office the location of line segment in which service is to be shutdown or reduced prior to 7:00 a.m.

G. Plugging or Blocking

1. Insert a sewer line plug permanently marked with a Contractor identification tag into the line upstream of the pipe segment being inspected or repaired. Where necessary, insert plugs permanently marked with a Contractor identification tag, into the storm sewer pipe. Provide and use plugs designed that all or any portion of the flow can be released. Provide each plug a tag line attached to them that extends outside of the manhole or wet well in addition to the air line in case of air line rupture. During CCTV inspection and sealing operations, reduce or eliminate flow to the limits specified herein.



2. After the Work has been completed and restricting the flow is no longer needed for the work, restore flow normal. Remove plugs in an order that permits flow to slowly return to normal without surcharging or causing other major disturbances downstream.
3. Remove temporary plugs and restore flow to normal at the end of each working day. If downstream work is not or cannot be completed during the workday, then provide, operate, and maintain bypass pumping system on a 24 hour basis.
4. Use bypass pumping if the work cannot be scheduled or cannot be completed at a time when flow is within the flow levels specified herein.

H. Performance Requirements

1. It is essential that the sewer service have no interruption through the duration of the Work. If the storage capacity of the upstream line is not adequate to store the flow during the duration of the work or if the line is to be shut down for a period greater than 8 hours, provide adequate bypass pumping so that there is no interruption in the flow throughout the duration of the work. Provide, maintain and operate all temporary facilities such as dams, plugs, pumping equipment (both primary and back-up units) as necessary to intercept the flow before it impacts the work area, carry it past the work area and return it to the existing sewer system downstream of the work.
2. Discharge of sewage into the construction trench, private or public property, gutters, streets, sidewalks or storm sewers will not be permitted.

I. Flow Elimination

1. Completely eliminate flow for sewer pipe replacement, structural concrete repairs in deteriorated manholes, or installation of cured-in-place pipe.
2. Flow elimination may be accomplished by temporary shutdown of pump stations where possible, or by plugging upstream sewers and pumping of flows, if required. Temporary shutdown of pump stations will be done by the OWNER's personnel.
3. Make requests to eliminate or adjust the flow within the system in writing to the Owner. Owner and Contractor recognize and acknowledge that the elimination and/or adjustment of the flow are a cooperative effort and that the time and effort required achieving the desired flow varies. Owner and Contractor declare and agree that Contractor will not be allowed, due, or paid any additional compensation, whatsoever, for Contractor's work, effort, time, material, labor, rentals, equipment, expenses, etc., during, as a result of, or arising from the elimination or adjustment of the flow.

J. Pumping and Bypassing

1. Obtain approval and secure all permits for placement of temporary bypass pumping system and pipeline within public right-of-way.



2. Bypass pumping may be required whenever pump stations are shut down or flow in gravity sewer lines are restricted or blocked. Supply the necessary pumps, conduits, and other equipment to divert the flow around the pump station, restriction, blockage, or other structure in which work is to be performed. Temporary shutdowns will be performed by the OWNER's only. Provide a bypass pumping system with sufficient capacity to handle existing flows plus additional flow that may occur during periods of a rainfall. Use electric pumps or diesel silent pack pumps. No other type of pump will be acceptable without prior approval of the Owner.
3. Furnish all the necessary equipment, power, labor, and supervision to set up and operate the pumping and bypassing system. If pumping is required on a 24-hour basis, operate all equipment in a manner to keep the pump noise at a minimum, and in accordance with local noise ordinances.
4. Assume full and sole responsibility for the clean-up, repair, property damage costs and claims resulting from failure of the diversion system.
5. Ensure that bypass pumping does not damage private or public property, or create a nuisance or public menace. At all times, pump sewage in an enclosed pipe that is adequately protected from traffic, and redirected into sanitary sewer system or alternatively into an enclosed tank for hauling to the wastewater treatment plant. Dumping or free flow of sewage on private or public property, gutters, streets, sidewalks, or into storm sewers is prohibited. Dumping of storm water may be discharged at a downstream location, as approved by the Engineer.
6. Make all arrangements for bypass pumping during the times when the main is shut down for any reason. Perform work during a low-flow period whenever possible.
7. Furnish, install, and maintain power, primary and standby pumps, equipment, and bypass piping required to maintain existing flows and services.
8. Use fully automatic self-priming units that do not require the use of foot-valves or vacuum pumps in the priming system. All pumps used must be constructed to allow dry running for long periods of time to accommodate the cyclical nature of effluent flows.
9. Provide the necessary stop/start controls for each pump.
10. Include a minimum of one stand-by pump of each size on site. Back-up pumps must be on-line and isolated from the primary system by a valve.
11. In order to prevent the accidental spillage of flows, construct all discharge systems of a secure, tight, leak free discharge pipe. Under no circumstances will aluminum "irrigation" type piping or glued PVC pipe be allowed.
12. Assume the full responsibility for continuity of sewer service to each facility connected to the section of sewer main during the execution of the work, and bypass the main sewer flow around the pipe to be replaced, or into adjacent sewers.



13. Provide pumps and the bypass lines of adequate capacity and size to handle all flows without backup to private property.

K. Service Lateral Disconnection

1. Accommodate disconnected sewer service lateral connections by bypass pumping or containment of the flow from time of disconnection to time of reconnection. Accomplish this by a mechanical pump and manifold system or by a storage system such as a bladder tank system. Provide storage system capable of holding adequate sewage from each sewer service lateral connection for a period of 24 hours. Empty or pump each storage system each 24-hour period and properly disposed of all wastewaters.
2. When a service lateral must be disconnected from the main for more than 1 workday, positively drain or pump each lateral a minimum of once every 24 hours. Monitor status of flow and storage, and pump lateral more frequently if flows exceed the storage capacity of the lateral or the temporary storage.
3. Reconnect services in uncompleted sections during times of construction inactivity.
4. Notify building occupants when work is complete and full uninterrupted service restored.
5. No service is to remain shut down for more than a period of 8 hours, unless Contractor provides substitute services for the residents. If the service is to be shut down for more than 8 hours and Contractor cannot provide substitute services, provide temporary living quarters (i.e. hotel) for the resident at no additional cost to Owner or the resident. Provide temporary living quarters approved by Engineer.

L. Field Quality Control and Maintenance

1. Perform leakage tests of the bypass pumping discharge piping using clean water prior to operation.
2. Inspection: Inspect the bypass-pumping system no less than once every 2 hours to ensure that the system is working correctly.
3. Maintenance of Service: Ensure that the temporary pumping system is properly maintained and that a responsible operator is on hand at all times when pumps are operating.

END OF SECTION



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SECTION 01 55 00 - SITE ACCESS AND STORAGE

PART 1 -- GENERAL

1.1 THE REQUIREMENT

- 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.

1.2 TEMPORARY CROSSINGS

- 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 feet. Cooperate with parties involved in the delivery of mail and removal of trash and garbage and 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.

1.3 CONTRACTOR'S WORK AND STORAGE AREA

- A.** The OWNER may (but will not be obligated) to 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.
- B.** Make all arrangements for any necessary off-Site storage or shop areas necessary for the proper execution of the WORK.
- C.** Construct and use a separate storage area for hazardous materials used in constructing the WORK.

1.4 PARKING

- 1. Direct employees to park legally.
- 2. Maintain access routes and parking areas in a sound condition, free of excavated material, construction equipment, mud, and construction materials. Repair breaks, potholes, low areas which collect standing water, and other deficiencies.

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION (NOT USED)

END OF SECTION



SECTION 01 55 26 TEMPORARY TRAFFIC CONTROL

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
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- 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
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- D. Louisiana Department of Transportation and Development (LDOTD):

AML	Approved Materials List
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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 01 33 00 – Contractor Submittals and Section 01 45 00 – Quality Control.

B. Submittals: Submit the following:

1. Submit product information on all temporary traffic control devices and products to be utilized or incorporated into the WORK. Include evidence of each product's listing on the LDOTD AML, compliance with applicable standards, and any other information required sufficient for the ENGINEER to review the acceptability of the proposed products.
2. Prior to the start of the WORK, submit a traffic control device plan, which clearly depicts the arrangement of all temporary traffic control devices for all phases or portions of the WORK. Clearly depict all temporary traffic control device products to be utilized, along with appropriate certifications to be included therewith.
3. Provide plan that has been prepared under the supervision of a licensed professional engineer registered in the State of Louisiana and signed and sealed by such. Include within the sealed plan product data detailing all traffic control devices to be utilized. WORK on public roads will not be authorized by the ENGINEER until such time as this plan has been submitted and reviewed by the ENGINEER. Prior to the start of the WORK, submit to the ENGINEER proof of the TCS and TCT authorizations. Ensure that TCS's and TCT meet all requirements of the Louisiana Department of Transportation and Development's requirements for such personnel.

C. **Sampling:** No materials are anticipated to be sampled under this Section.

D. **Testing:** No testing laboratory tests are anticipated under this Section.

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 will 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 which 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 are minimum 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 which 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 signs, 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	LDOTD TTC – 08



Divided Highways	
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 only.

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 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 drivers.
- 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, retro reflectivity, 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 signs 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 working hours.
 - 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). The CONTRACTOR may use an alternate form where acceptable to the ENGINEER and OWNER. 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 responsibility 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 of 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 ENGINEER 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 given 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.

- END OF SECTION -



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SECTION 01 57 19 - 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 CONTRACTOR SUBMITTALS, SAMPLING, AND TESTING

- A. Provide submittals, samples for testing, and testing of materials in accordance with Section 01 33 00 – Contractor Submittals and Section 01 45 00 – Quality Control.
- B. Submittals: Submit the following:
 - 1. Where a stormwater pollution prevention plan is required, submit to the ENGINEER as specified herein. Submit all activity reports as required by permits as applicable.
 - 2. Where certificates, inspection reports, or other items are required, submit to the ENGINEER as specified herein.
- C. **Sampling:** No materials are anticipated to be sampled under this Section.
- D. **Testing:** No testing laboratory tests are anticipated under this Section.

1.4 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.

1.5 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.

1.6 STORMWATER POLLUTION PREVENTION PLAN (SWPPP) AND SEDIMENTATION ABATEMENT FOR WORK DISTURBING MORE THAN ONE ACRE

- A. Prepare, implement, and maintain a Storm Water Pollution Prevention Plan (SWPPP), for work disturbing one acre or greater. Within the plan, describe in specific details the CONTRACTOR's program to prevent contamination of the storm water collection system for this project.
- B. A suggested Template and Sample SWPPP Inspection Report, as well as other valuable information can be found at EPA's website: <http://cfpub.epa.gov/npdes/stormwater/swppp.cfm>.
- C. Comprise the plan of all relevant components specified in the U.S. Environmental Protection Agency document entitled, "Storm Water Management for Construction Activities".
- D. Implement, maintain, and inspect all erosion and sediment controls identified in the SWPPP. Address both common construction activities and extraordinary events. Remove all temporary SCMs, such as silt fences, catch basin filters, wash areas, etc. at the end of construction.
- E. Include Water Pollution Control Drawings (WPCD) in the SWPPP to illustrate the locations, applications, and deployment of the Storm Water Control Measures (SCMs) identified in the SWPPP. Include WPCD's as an attachment to the SWPPP.
- F. **Storm Water Control Measures (SCMs):** The Storm Water Control Measures (SCMs) are techniques, processes, activities, or structures used to reduce the pollutant content of a storm water or non-storm water discharge. SCMs may include simple, non-structural methods such as good housekeeping, staff training, and preventative maintenance. Additionally, SCMs may include structural modifications such as the installation of berms, canopies, or treatment control.
- G. Comply with laws, rules, and regulations of the State of Louisiana and agencies of the United States Government prohibiting the pollution of lakes, wetlands, streams, or river waters from the dumping of contaminants, refuse, rubbish, or debris.
- H. Submit copies of the SWPPP a minimum of 10 working days prior to beginning construction, to the ENGINEER. Update the SWPPP as necessary during the work to prevent contamination of the storm water collection system.



- I. Before the start of work, train all employees and Subcontractors on the approved SWPPP and related WPCD. Provide the ENGINEER with written documentation of said training.
- J. For work disturbing one to five acres, Storm Water Control Measures (SCMs) must be in place. Prepare SWPPP and post prominently on the job site. Post the LAR 200000 General Permit posted on the job site. No Notice of Intent (NOI) will be required. Complete all required reports and submit them to OWNER.
- K. For work disturbing five acres or more, Storm Water Control Measures (SCMs) must be in place. The CONTRACTOR must have Notice of Intent (NOI) completed, sent to DEQ, and posted. Prepare a SWPPP and post prominently on the site. Have the LAR 100000 General Permit posted on site with DEQ permit number for specific site. Complete a Notice of Termination (NOT) upon completion of the WORK and submit it to LDEQ with a copy to the OWNER and ENGINEER.

1.7 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 requirements of Part 1926 of the OSHA Safety and Health Standards for Construction.

1.8 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.

1.9 ARCHAEOLOGICAL 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.



PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION



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SECTION 01 60 00 - PRODUCTS, MATERIALS, EQUIPMENT, AND SUBSTITUTIONS

PART 1 - GENERAL

1.1 THE REQUIREMENT

- A. The word "Products," as used in the Contract Documents, is defined to include purchased items for incorporation into the WORK, regardless of whether specifically purchased for the project or taken from CONTRACTOR's stock of previously purchased products. The word "Materials," is defined as products which must be substantially cut, shaped, worked, mixed, finished, refined, or otherwise fabricated, processed, installed, or applied to form WORK. The word "Equipment" is defined as products with operational parts, regardless of whether motorized or manually operated, and particularly including products with service connections (wiring, piping, and other like items). Definitions in this paragraph are not intended to negate the meaning of other terms used in the Contract Documents, including "specialties," "systems," "structure," "finishes," "accessories," "furnishings," special construction," and similar terms, which are self-explanatory and have recognized meanings in the construction industry.
- B. Neither "Products" nor "Materials" nor "Equipment" includes machinery and equipment used for preparation, fabrication, conveying, and erection of the WORK.

1.2 QUALITY ASSURANCE

- A. **Source Limitations:** To the greatest extent possible for each unit of WORK, provide products, materials, and equipment of a singular generic kind from a single source.
- B. **Compatibility of Options:** Where more than one choice is available as options for CONTRACTOR's selection of a product, material, or equipment, select an option which is compatible with other products, materials, or equipment. Compatibility is a basic general requirement of product, material and equipment selections.

1.3 PRODUCT DELIVERY AND STORAGE

- A. Deliver and store the WORK in accordance with manufacturer's written recommendations and by methods and means which will prevent damage, deterioration, and loss including theft. Control delivery schedules as to minimize long-term storage of products at the Site and overcrowding of construction spaces. In particular, ensure coordination to ensure minimum holding or storage times for flammable, hazardous, easily damaged, or sensitive materials to deterioration, theft, and other sources of loss.

1.4 TRANSPORTATION AND HANDLING

- A. Require products to be transported by methods to avoid damage and to be delivered in undamaged condition in manufacturer's unopened containers and packaging.



- B. Provide equipment and personnel to handle products, materials, and equipment by methods to prevent soiling and damage.
- C. Provide additional protection during handling to prevent marring and otherwise damaging products, packaging, and surrounding surfaces.

1.5 STORAGE AND PROTECTION

- A. Store products in accordance with manufacturer's written instructions and with seals and labels intact and legible. Store sensitive products in weather-tight climate controlled enclosures and maintain temperature and humidity ranges within tolerances required by manufacturer's recommendations.
- B. For exterior storage of fabricated products, place products on sloped supports above ground. Cover products subject to deterioration with impervious sheet covering and provide ventilation to avoid condensation.
- C. Store loose granular materials on solid flat surfaces in a well-drained area and prevent such materials from mixing with foreign matter.
- D. Arrange storage to provide access for inspection. Periodically inspect stored materials to assure products are undamaged and are maintained under required conditions.
- E. Arrange storage in a manner to provide access for maintenance of stored items and for inspection.

1.6 MAINTENANCE OF PRODUCTS IN STORAGE

- A. Periodically inspect stored materials on a scheduled basis. Maintain a log of inspections and make the log available on request.
- B. Comply with manufacturer's product storage requirements and recommendations.
- C. Maintain manufacturer-required environmental conditions continuously.
- D. Ensure that surfaces of products exposed to the elements are not adversely affected and that weathering of finishes does not occur.
- E. For mechanical and electrical equipment, provide a copy of the manufacturer's service instructions with each item cause the exterior of the package to contain notice that instructions are included.
- F. Service products on a regularly scheduled basis, and maintain and submit as a record document prior to final acceptance by the OWNER in accordance with the Contract Documents.

1.7 PROPOSED SUBSTITUTIONS OR "OR-EQUAL" ITEM

- A. Refer to the General Conditions for procedures related to substitutions or "or – equal" items.



PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION



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SECTION 01 71 33 – CONSTRUCTION LAYOUT AND STAKING

PART 1 -- GENERAL

1.1 THE REQUIREMENT

- A. Perform all surveying, layout, staking, calculating, and recording of data for the accurate layout and control of the WORK.
- B. Provide technically qualified survey crews experienced in construction survey and staking of the type of WORK to be constructed under this contract. Provide personnel who will perform the layout and staking in a timely and accurate manner.
- C. Assume full liability for the accuracy of the layout of the WORK.

1.2 REFERENCE STANDARDS

- A. NOT USED

PART 2 -- PRODUCTS (NOT USED)

2.1 MATERIAL

- A. Furnish acceptable tools and supplies of the type and quality suitable for heavy duty construction survey work. Furnish stakes and hubs of sufficient length to provide a solid set in the ground with sufficient surface area above ground for necessary legible and durable markings.

2.2 EQUIPMENT

- A. Furnish survey instruments and supporting equipment which will achieve the specified tolerances.
- B. Construction equipment controlled with a Global Positioning System (GPS) and Robotic Total Station (RTS) machine guidance system may be used in the construction of subgrade, subbase, and base aggregate courses, or other construction operations when approved subject to required tolerances being met. Develop a 3D model for RTS machine guidance and assume full responsibility for the accuracy of work staked with RTS machine guidance systems. The ENGINEER will not furnish a 3D model of the WORK for RMG work.

PART 3 -- EXECUTION

3.1 GENERAL

- A. Provide a competent crew supervisor experienced in construction layout whenever surveying and staking is in progress.
- B. Include staking and layout activities in the construction schedule. Include the dates and sequence of each staking activity.



- C. The ENGINEER has set horizontal control points, vertical control points, and will provide data for use in establishing control for completion of each element of the work.
- D. Data relating to horizontal and vertical alignment, theoretical slope stake catch points, and other design data will be furnished. Reformatting and additional calculations may be required for the convenient use of the furnished data. Provide immediate notification of apparent errors in the initial staking or in the furnished data.
- E. Record survey and measurement field data in an approved format. Submit as-staked data and corrections made to the furnished survey data. Submit survey and measurement data at least weekly. Field data and supporting documentation become the property of the OWNER upon completion of the work.
- F. Discuss and coordinate the following with the ENGINEER before surveying or staking:
 - 1. Surveying and staking methods;
 - 2. Stake marking;
 - 3. Grade control for courses of material;
 - 4. Referencing;
 - 5. Structure control;
 - 6. Field staking data;
 - 7. Localization of the GPS systems to the established control points; and
 - 8. Other procedures and controls necessary for the work.
- G. Do not start work until staking or three-dimensional (3D) verification data for the affected work has been approved.
- H. Preserve initial reference and control points. Notify the ENGINEER of missing control points or stakes at least 10 days before beginning construction. The ENGINEER will reestablish control points missing before the beginning of construction.
- I. Acceptance or inspection of the construction staking does not relieve the CONTRACTOR of responsibility for correcting errors discovered during the work and for bearing additional costs associated with the error.
- J. Maintain legibility of stake markings for the duration of the project or until notified in writing the stakes are no longer needed. Replace stakes if necessary to ensure markings are maintained.
- K. Remove and dispose of flagging, paint, lath, stakes, and other staking material



after the project is complete.

3.2 SURVEY AND STAKING REQUIREMENTS

- A. **General:** Perform survey, staking, recording of data, and calculations as necessary to construct the project from the initial layout to final completion. Survey and set stakes to the tolerances in Table 017133-1. Reset stakes, refine 3D data, or both as many times as necessary to construct the work.
- B. **Relationships to Property Lines and Servitudes:** Where the drawings indicate coordinates (or baseline station and offsets) along with distances from property or servitude lines, verify the agreement of the layout based on plan coordinates with plan dimensions from said lines. Notify the ENGINEER of any discrepancies prior to proceeding with construction. Avoid encroaching onto private property or servitudes.
- C. **Control Points:** Relocate initial horizontal and vertical control points in conflict with construction to areas that will not be disturbed by construction operations. Furnish the coordinates, elevations, and supporting documentation for the relocated points before the initial points are disturbed. Set durable monuments for survey control that uniquely identify the points. Furnish the GPS localization results at least 7 days before beginning construction layout survey work. The ENGINEER may order the GPS localization calibration and associated 3D model to be broken into two or more zones to maintain the localized relationship between control points and original ground.
- D. **Centerline Establishment:** Establish or reestablish centerline at roadway design cross-section locations and as necessary to construct the work. Reestablish the centerline when construction survey and staking work does not meet the tolerances.
- E. **Original Ground Topographic Verification:** Use an approved method to regenerate cross-section data in areas where theoretical and actual ground elevations do not meet a tolerance of plus or minus 0.5 feet. Retake cross-section to verify existing ground topography to mapping. Submit cross-section or 3D data in electronic and printed format for approval. Reduce cross-sections to horizontal and vertical distances from centerline. Retake cross-section 10 feet beyond catch points to verify existing ground topography.
- F. **Slope and Reference Stakes: Perform the following:**
 - 1. **AMG Method:** After clearing operations are completed, set centerline reference stakes and hubs on both sides of centerline at 100-foot intervals at the clearing limit locations. Where clearing limits are greater than 10 feet (vertically, 25 feet horizontally, or both from subgrade hinge point; provide an additional reference stake and hub as approved by the ENGINEER. Label each centerline reference stake with station, hub elevation, and offset from centerline. Construct a 1000-foot long test section using AMG on the project at an approved location before beginning grading operations. Select a test location with superelevation and curve widening transitions if applicable. Notify the ENGINEER 10 days before beginning the test section. Demonstrate capability, knowledge, equipment, and experience to achieve work within



tolerances. Allow 14 days to evaluate the test section. Do not start full grading operations until the test section is approved. Provide as-built cross-sections at random locations specified by the ENGINEER not to exceed 500-foot intervals. If as-built cross-sections do not meet the tolerances in Subsection 204.13(d); rework the section until the specified tolerances are achieved and provide additional cross-sections as directed by the ENGINEER at no cost to the Government.

2. **Conventional Methods:** Verify and set slope stakes on both sides of centerline at the theoretical catch point. If the theoretical catch point is not within a tolerance of 0.5 feet perform original ground topographic verification. Set the slope stake at the actual intersection of the design roadway slope with the natural ground-line. Set reference stakes outside the clearing limits. Include reference points and slope-stake information on the reference stakes. Establish slope stakes in the field as the actual point of intersection of the design roadway slope with the natural ground-line when theoretical catch point information is not available.
- G. Clearing and Grubbing Limits:** Set clearing and grubbing limits on both sides of centerline based on the actual slope-stake locations.
- H. Grade Finishing Stakes:** Perform the following:
1. **AMG Method:** Construct a 1000-foot test section using AMG on the project at an approved location before beginning grading operations. Select a test location with superelevation and curve widening transitions if applicable. Notify the ENGINEER 10 days before beginning the test section. Demonstrate the capability, knowledge, equipment, and experience to achieve work within tolerances. Allow 14 days to evaluate the test section. Do not start full grading operations until the test section is approved. Verify the grade elevation and horizontal alignment of roadway grade-finishing operations. Use conventional survey methods at random locations specified by the ENGINEER, not to exceed 500-foot intervals. Submit 3D coordinates of grade-finishing quality control checks.
 2. **Conventional Methods:** Set grade-finishing stakes for grade elevations and horizontal alignment, on centerline and on each shoulder at design roadway cross-section locations. Set stakes at the top of subgrade and the top of each aggregate course. Reset grade finishing stakes as many times as necessary to construct the subgrade and each aggregate course. During turnout or pullout construction, set stakes on the centerline, on each normal shoulder, and on the shoulder of the turnout. In parking areas, set stakes at the center and along the edges of the parking area. Set stakes in ditches to be paved. When the centerline curve radius is less than or equal to 250 feet, use a maximum longitudinal spacing between stakes of 25 feet. When the centerline curve radius is greater than 250 feet, use a maximum longitudinal spacing between stakes of 50 feet. Use a maximum transverse spacing between stakes of 20 feet. Use brushes or guard stakes at each stake
- I. Culverts:** Verify and set culvert locations at the inlet, outlet, and inlet basin points according to the plans. Perform the following if culvert design does not fit field



conditions:

1. Survey and record the ground profile along the culvert centerline;
2. Determine the slope catch points at the inlet and outlet;
3. Set reference points and record information necessary to determine culvert length and end treatments;
4. Plot to scale the profile along the culvert centerline. Show the natural ground, the flow line, the roadway section, and the culvert including end treatments and other appurtenances. Show elevations, grade, culvert length, and degree of elbow.
 - a. For single skewed culverts, submit a plotted field-design cross-section normal to roadway centerline and at each end section. Plot the offset and elevation of natural ground at the end section and at proposed template break points between centerline and the end section. Ensure the template design embankment slope is not exceeded;
 - b. For multiple skewed culverts, submit a plotted field design cross-section normal to roadway centerline and at the end sections (left and right) nearest to the shoulder. Plot the offset and elevation of natural ground at the end section and at proposed template break points between centerline and the end section. Ensure the template design embankment slope is not exceeded;
 - c. Submit the plotted field-design cross-section for approval of final culvert length and alignment. Plot at a clear and readable scale;
 - d. Set inlet, outlet, and reference stakes when the field design has been approved. Stake inlet and outlet ditches to make sure the culvert and end treatments (such as drop inlets) are functional; and
 - e. Adjust slope, reference, and clearing stakes as necessary to provide for culvert inlet treatments in cut slopes. Readjust slope, reference, and clearing stakes as necessary when culvert inlets are moved
- J. **Bridges:** Set adequate horizontal and vertical control and reference points for bridge substructure and superstructure components. Establish and reference the bridge chord, bridge tangent, or control lines as specified on the bridge plans. Also establish and reference the centerline of each pier, bent, and abutment.
- K. **Retaining Walls and Reinforced Soil Slopes:** Survey and record profile measurements along the face of the proposed wall or reinforced soil slope at 5 feet and 10 feet in front of the wall or slope face. Take cross-sections every 25 feet along the length of the wall or reinforced soil slope and at major breaks in terrain within the limits designated by the ENGINEER. Measure and record points every 25 feet and at major breaks in terrain for each cross-section. Set additional references and control points to perform the work.
- L. **Borrow and Waste Sites:** For unit price contracts involving borrow and waste sites, perform field work necessary for initial layout and measurement of the borrow or



waste site. Establish site limits and clearing limits. Measure both original and final ground conditions and submit cross-sections as directed by the ENGINEER.

M. Permanent Monuments and Markers: Perform survey and staking work necessary to establish permanent monuments and markers as specified in other sections or as directed, or reestablish monuments as specified in other sections or as directed.

N. Miscellaneous Surveying and Staking: Survey and stake other work (such as guardrail, pump stations, structures other than bridges, curb and gutter, turf establishment, utilities, and excavation limits for structures) to the proper location and required tolerances. Propose staking increments for approval by the ENGINEER when not specified.

O. Construction Surveying and Staking Tolerances: Provide layout work meeting the tolerances in Table 017133 – 1 below.

Item	Horizontal Tolerance	Vertical Tolerance
Control Points set from existing control provided by ENGINEER	+/- 0.03 feet	+/- 0.01 feet x \sqrt{N}
Mapping, Topography, and Cross Section Points	+/-0.16 feet	+/-0.16 feet
Centerline Points, including Point of Curvature, Point of Tangency, Point on Curve, Point on Tangent and References	+/-0.06 feet	+/-0.06 feet
Culverts, Ditches, and Minor Drainage Structure Stakes	+/-0.16 feet	+/-0.16 feet
Retaining Wall Stakes	+/-0.06 feet	+/-0.03 feet
Bridge Substructure Staking	+/-0.03 feet	+/-0.03 feet
Bridge Superstructure Staking	+/-0.03 feet	+/-0.03 feet
Clearing and Grubbing Limit Stakes	+/-1.00 feet	--
Roadway Subgrade Finish Stakes	+/-0.16 feet	+/-0.03 feet
Roadway Finish Grade Stakes	+/-0.16 feet	+/-0.03 feet
Miscellaneous Stakes, including structures	+/-0.03 feet	+/-0.03 feet

- END OF SECTION -



SECTION 01 74 30 - PRESSURE PIPE TESTING

PART 1 - GENERAL

1.1 THE REQUIREMENT

- A. Test pressurized pipelines and appurtenant piping, in accordance with the Contract Documents.
- B. Obtain necessary permits for discharging excess testing water if required to satisfy permit limits.

1.2 CONTRACTOR SUBMITTALS

- A. Furnish submittals in accordance with Section 01 33 00 – Contractor Submittals.
- B. **Furnish:**
 - 1. Submit a testing plan and schedule, including method for water conveyance, control, and disposal, in writing for approval.

PART 2 - PRODUCTS

2.1 MATERIAL REQUIREMENTS

- A. Determine the required test equipment, temporary valves, bulkheads, and other water control equipment. No materials may be used which would be injurious to the WORK for future conveyance of water.

PART 3 - EXECUTION

3.1 GENERAL

- A. Water for testing water pipelines will be furnished by the OWNER. Convey the water from the OWNER-designated source to the points of use.
- B. Test all pipelines. Perform testing operations in the presence of the ENGINEER.
- C. Dispose of flushing water and water containing chlorine by methods acceptable to the ENGINEER and OWNER.

3.2 PRESSURE TESTING OF PIPELINES

- A. **Acceptance Tests:** Upon completion of backfilling, ensure pipelines pass the following tests:
 - 1. **Pipe:** Subject all newly installed and backfilled pipe to a leakage test, conducted in the presence of the ENGINEER. Ensure test pressure is 150 percent of systems operating pressure based on pressure as measured at the most elevated point in pipeline or 100 psi, whichever is greater. Slowly fill the force main with water, and then apply the specified test pressure (based on the elevation of the lowest point of the line or section under test



and corrected to the elevation of the test gauge) with a pump connected to the pipe in a manner satisfactory to the ENGINEER.

Furnish all necessary apparatus to perform pressure testing including but not limited to the pump, water, pipe, temporary valves, temporary fittings, connections, gauges, and thrust restraints and blocking. Use thrust collars to restrain the force main where needed to restrain the pipe near the blind flange required for testing. The required number of thrust collars would be dependent on the magnitude of the thrust force to be restrained and the allowable load per collar. Be responsible to design the thrust collar based on the soil conditions at the collar location. Submit thrust restraint calculations for approval. The CONTRACTOR may elect to install restrained joint force main of adequate length to restrain the pipe for testing purposes at no additional cost to the OWNER. The CONTRACTOR may choose to test at points shown to be restrained on the plans (within the stipulated testing limits), however any thrust restraints or restrained joint force main beyond the limit shown on the plans required for testing purposes will be at no additional cost to the OWNER. Before applying the specified test pressure, expel all air from the pipe. If necessary, make taps at the points of highest elevation before testing, and insert plugs after the test has been completed. Conduct the leakage test by measuring, through a calibrated meter, the amount of water which enters the test section for a period of at least 2 hours. No installation will be accepted until the leakage is less than the number of gallons per hour as determined by the formula:

For PVC Pipe:

$$L = \frac{ND\sqrt{P}}{7,400}$$

- L = allowable leakage, gallons/hour
- N = number of joints in length of pipe tested
- D = nominal diameter of the pipe, inches
- P = average test pressure during the leakage test, psig

2. For HDPE Pipe:

- a. Make-up Water Allowance: Maximum allowable make-up water at conclusion to test phase cannot exceed recommended amounts stated in the following table. The table is based on test pressure equal to 1.5 times pressure class of pipe. If lower pressure is used for test, reduce allowances by ratio of test pressure to pressure class of pipe.

Make-Up Water Allowance for Test Phase (U.S. Gallons per 100 feet of Pipe)					
Nominal Pipe Size (inches)	1-Hour Test (gallons)		2-Hour Test (gallons)		
3	0.10		0.15		



4	0.13	0.25
6	0.30	0.60
8	0.50	1.0
10	0.75	1.3
12	1.1	2.3
14	1.4	2.8
16	1.7	3.3
18	2.2	4.3

Make-Up Water Allowance for Test Phase (U.S. Gallons per 100 feet of Pipe)			
Nominal Pipe Size (inches)	1-Hour Test (gallons)	2-Hour Test (gallons)	
20	2.8	5.5	
24	4.5	8.9	
28	5.5	11.1	
32	7.0	14.3	
36	9.0	18.0	

3. Replace any cracked or defective pipes or fittings discovered in consequence of this leakage test with sound material in the manner specified at no cost to the OWNER. Repeat the test until the results are satisfactory to the ENGINEER.
4. **Tap Testing:** No testing other than the pressure test is required. However, ensure the testing requirements for the connection pipeline include testing of the restrained joint section, including the connection to the tapping valve. Visually inspect the entire tapped connection and repair any visible leaks. Perform testing in accordance with the requirements described as noted above.
5. Coordinate testing plan with surface restoration requirements. Any removal or replacement of temporary or final surface restoration by the CONTRACTOR to investigate leaks will be at no additional cost to the OWNER.



END OF SECTION



SECTION 01 75 00 – EQUIPMENT TESTING AND STARTUP

PART 1 - GENERAL

1.1 THE REQUIREMENT

- A. Startup is prerequisite to satisfactory completion of the contract requirements and must be completed within the Contract Times.
- B. Conduct all test, check out, startup, and related requirements indicated in the Contract Documents and provide documentation of same to the ENGINEER prior to requesting Substantial Completion from the ENGINEER. Where manufacturer onsite inspections are required before startup, furnish a written statement from the manufacturer attesting that the installation and check out is complete and proper and that the item(s) are ready for startup.
- C. Coordinate all parties for a successful startup: the ENGINEER and OWNER will be available for technical and operational advice prior to and during startup.
- D. General requirements for startup activities are included in this Section. More specific requirements may also be included in other portions of the Contract Documents.
- E. Temporary facilities may be necessary. If so, design, provide, operate, and later decommission them.

1.2 DEFINITIONS

- A. Startup is defined as testing, demonstrations, and other activities as required to achieve Substantial Completion. Startup includes pre-commissioning and commissioning activities, manufacturer's services, certifications of readiness for testing, and troubleshooting, checkout, and shakedown activities.
- B. Pre-commissioning is the systematic demonstration through testing and extended operation that major equipment and auxiliary systems, including related components, sub-systems, and systems operate properly and consistent with their intended function. Pre-commissioning involves balancing, adjustments, calibration, loop checks, and loop validation. During pre – commissioning, simulate shutdown conditions, failure conditions, power fail and restart, bypass conditions, and failure resets. Pre-commissioning will not be considered complete until successful results and documentation of tests and manufacturer's certifications required by the Contract Documents are submitted and accepted by the ENGINEER. Pre-commissioning of all portions of the WORK must be successfully completed prior to starting Commissioning.
- C. Commissioning is the verification that the complete WORK functions on an extended basis in full conformance with the Contract requirements.

1.3 SUBMITTALS

- A. Schedule: Submit the schedule for startup in accordance with the requirements of Section 01 32 14 – Bar Chart Construction Schedule.



- B.** Startup Plan: Not less than 30 Days prior to startup, submit for review a detailed Startup Plan. Revise the Plan as necessary based on review comments. Ensure that the plan includes at a minimum the following:
1. Schedules for manufacturers' equipment certifications
 2. Schedules for submitting final Technical Manuals,
 3. Schedule for training the OWNER's personnel,
 4. Description of temporary facilities and schedule for installation and decommissioning them
 5. List of OWNER and CONTRACTOR-furnished supplies
 6. Detailed schedule of operations to achieve successful pre-commissioning and commissioning.
 7. Checklists and data forms for each item of equipment
 8. Address coordination with the OWNER's staff.
 9. Designate a representative of the CONTRACTOR who has the authority to act in matters relating to startup and has experience in testing pump stations and pipelines. Designate the roles and responsibilities of any Subcontractors that may be involved in startup activities.
 10. Safety, startup, and testing procedures and proposed inspection and certification forms and records.
 11. Interconnection of new to existing facilities
 - a. Date and time frame of proposed shutdown or interconnection, including sequence of events and activities to be conducted.
 - b. A detailed description of sequences and activities for the planned shutdown and interconnection.
 - c. Staff, equipment, and materials that will be at the Site before commencing the shutdown.
 - d. Other provisions so that interconnection, testing, and startup will be completed within the planned time.
 12. Hydrostatic testing of water-holding structures and pipelines and other potable water equipment. Indicate source of water, testing and disinfection sequence, disinfection procedures, and the disposal of the water following disinfection.
- C.** System Outage Requests: Request for shutdown of existing systems as necessary to test or start up new facilities.
- D.** Records and Documentation



1. Where required by the specifications, submit equipment installation certifications under those Sections.
2. Records of startup as indicated below.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 MALFUNCTIONS

- A.** During the extended operational demonstrations, all components, subsystems, systems, and equipment must properly run continuously 24 hours per day at rates indicated by the ENGINEER throughout the test period. Unless indicated otherwise, if any item fails or malfunctions during the test, repair the item and restart the test at time zero with no credit given for the operating time before the failure or malfunction. Malfunctions satisfying all 3 of the following conditions will allow the demonstration period to resume at the elapsed time when the malfunction started:
 1. Malfunction did not cause any interruption of the continuous operation of any other components, subsystems, systems, and equipment.
 2. Malfunction was corrected without causing or requiring any components, subsystems, systems, and equipment to cease operations.
 3. Malfunction was corrected within one hour of the time the malfunction was detected (the one-hour period includes the time required to locate the cause of the malfunction, beginning upon CONTRACTOR's notification from the ENGINEER that a malfunction has occurred and ending when the item is corrected and the system is successfully placed back into operation).
- B.** Arrange for manufacturer's representatives to visit the Site as often as necessary to correct malfunctions.

3.2 PREREQUISITES

- A.** Schedule pre – commissioning and commissioning according to Section 01 32 14 – Bar Chart Construction Schedule. Do not start the 7 Day demonstration and the 8 Day demonstration prior to midday on a Monday, Tuesday, or Wednesday. Testing periods may not include holidays, based on the OWNER's calendar.
- B.** Complete the following before pre-commissioning begins.
 1. Submit all Technical Manual information required by the Contract Documents.
 2. Ensure that all required safety equipment, emergency shower and eyewash units, fire extinguishers, gas detectors, protective guards and shields, emergency repair kits, safety chains, handrails, gratings, safety signs, and valve and piping identification required by the Contract Documents are



provided. Ensure that all devices and equipment are fully functional, adjusted, and tested.

3. Manufacturer's certifications of proper installation have been accepted.
4. Leakage tests, electrical tests, and adjustments have been completed.
5. The ENGINEER has approved the Startup Plan.
6. Temporary facilities are functional, adjusted, and ready for use.
7. Individual instrumentation loops (analog, status, alarm, and control) have been verified functionally.
8. Pressure switches, flow switches, timing relays, level switches, vibration switches, temperature switches, RTD monitors, pressure regulating valves, and other control devices to the settings determined by the ENGINEER or the equipment manufacturer have been adjusted for accuracy.
9. Individual interlocks between the field-mounted control devices and the motor control circuits, control circuits of variable-speed controllers, and packaged system controls have been verified.

3.3 GENERAL

A. Supplies

1. Furnish:
 - a. Chemicals
 - b. Oil and grease
 - c. Other necessary materials not listed for the OWNER to furnish
2. The OWNER will furnish:
 - a. Water
 - b. Power

B. Startup Records: Maintain the following during testing and startup and submit originals to ENGINEER:

1. Lubrication and service records for each mechanical and electrical equipment item
2. Hours of daily operation for each mechanical and electrical equipment item
3. Equipment alignment and vibration measurement records
4. Logs of electrical measurements and tests



5. Instrumentation calibration and testing logs
6. Testing and validation of SCADA inputs, outputs, logic functions, status indications, and alarms
7. Factory and field equipment settings
8. Log of problems encountered and remedial action taken
9. Other records, logs, and checklists as required by the Contract Documents

3.4 PRE-COMMISSIONING

- A. After individual equipment items and subsystems have been tested and certified as required by the Technical Specifications, tests systems comprised of single or multiple equipment items with appurtenant equipment and instruments and controls. Test items of equipment as part of a system to the maximum extent possible.
- B. Subject to the malfunction criteria above, demonstrate each system for a continuous, 7 Day, 24 hour/day period. If any system malfunctions, repair the item or equipment and restart the test at time zero with no credit given for the elapsed time before the malfunction.
- C. Demonstrate the manual and automatic modes of operation to verify proper control sequences, software interlocks, proper operation of software logic and controllers, etc. Include in systems testing the use of water or other process media, as applicable, to simulate the actual conditions of operation.
- D. Follow the detailed procedures and checklists in the Testing and Startup Plan. Document the checkout of systems by a formal report submitted to the ENGINEER.
- E. Demonstrate utility, chemical feed, safety equipment, and other support systems before whole process systems.
- F. Furnish the ENGINEER at least 10 Days written notice confirming the start of pre-commissioning. The OWNER's staff will observe pre-commissioning.

3.5 COMMISSIONING

- A. Start up each lift station and operate it without malfunction for a continuous 8 Day, 24 hour/day period. The ENGINEER will determine the operational parameters.
- B. Promptly correct defects that appear. Time lost for wiring corrections, control point settings, or other reasons that interrupt the test may, at the judgement of the ENGINEER, be cause for extending the demonstration an equal amount of time.



- C.** Do not begin commissioning until leakage tests, instrumentation tests and adjustments, electrical tests and adjustments, equipment field tests, and system tests have been completed to the satisfaction of the ENGINEER.
- D.** Detail Requirements: Prior to starting the test, introduce raw sewage into each pumping station.
- E.** During commissioning:
 - 1.** Lubricate and maintain equipment in accordance with the manufacturers' recommendations.
 - 2.** Clean or replace strainers, screens, and filter elements.

END OF SECTION



SECTION 01 77 00 - PROJECT CLOSEOUT

PART 1 - GENERAL

1.1 THE REQUIREMENT

- 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.

1.2 CLOSEOUT TIMETABLE

- A. 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.

1.3 FINAL SUBMITTALS

- A. Prior to requesting final payment, obtain and submit the following items to the ENGINEER for transmittal to the OWNER:
 - 1. Written guarantees, where required.
 - 2. Technical Manuals and instructions.
 - 3. Completed record drawings.
 - 4. Certificates of inspection and acceptance by local governing agencies having jurisdiction.
 - 5. Releases from all parties who are entitled to claims against the subject project, property, or improvement pursuant to the provisions of law.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION



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SECTION 02 22 00 - SITE CONDITIONS SURVEYS

PART 1 -- GENERAL

1.1 THE REQUIREMENT

- 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 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.

1.1 CONTRACTOR SUBMITTALS, SAMPLING, AND TESTING

- A. Provide submittals, samples for testing, and testing of materials in accordance with Section 01 33 00 – Contractor Submittals.

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION

3.1 PHOTOGRAPHS AND VIDEO RECORDINGS

A. 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 minimum, 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.

B. 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 of digital photographs to the owner as JPEG images on CD ROM or USB drive devices.

END OF SECTION



SECTION 02 41 19 – 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.
- D. The CONTRACTOR shall be responsible for the offsite disposal of debris resulting from reconstruction in compliance with local, state, and federal codes and requirements.

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

1.1 CONTRACTOR SUBMITTALS, SAMPLING, AND TESTING

- A. Provide submittals, samples for testing, and testing of materials in accordance



with Section 01 33 00 – Contractor Submittals.

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 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. Structures:**
 - 1. Unsalvageable materials in a structure designated for removal become the property of the CONTRACTOR. Remove and dispose of such material. Demolish and remove appurtenances forming a part of a structure to be demolished, whether integral or not integral to the structure.
- F. Pavement, Base Courses, Walks, and Curbs:** Dispose of pavements, stabilized or treated base courses, walks, curbs, and gutters, designated for removal as shown on the plans and as directed. When the existing shoulder underdrain at the pavement edge is to remain in place and in service but removal of the shoulder surfacing and base is required, do not damage the existing shoulder underdrains. Repair damaged shoulder underdrains at no additional cost to the OWNER.
- G. 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. **Underground Fuel Tanks:** Use a DEQ approved subcontractor to perform all site activities, including the collection of closure samples and tank removal, as defined in the latest DEQ Underground Storage Tank (UST) regulations. Submit closure test results, all documentation, and all necessary forms to the ENGINEER to be approved and forwarded to DEQ. Take all necessary precautions to prevent the infiltration of water into tanks and tank excavations during the work. During routine site closure, conduct the removal, transportation, and disposal of tanks, and the handling of contaminated soil and contaminated fluid, in accordance with all local, state, and federal laws and regulations. Limits of excavation and quantities of contaminated soil and contaminated fluid to be removed, transported, and disposed will be as specified or as directed. When underground storage tanks (UST) have been filled with concrete, sand, or other such material and are designated on the plans for removal, use a certified UST subcontractor to remove, transport and dispose of such tanks in accordance with the recommendations of the American Petroleum Institute (API) and the requirements of the Louisiana Department of Environmental Quality (DEQ) or other regulatory agency of jurisdiction. When such UST are discovered during construction, stop construction activity in the immediate vicinity of the UST and notify the engineer in accordance with this subsection. The ENGINEER will verify the closure status of such filled UST discovered during construction prior to any UST site activity by the contractor or certified UST subcontractor. Use a certified UST subcontractor to collect for laboratory analysis a representative sample of non-solidified fill material within the storage tank for landfill acceptance. The results of the laboratory analysis will be used to determine the disposition of the



UST fill material. Provide a copy of all laboratory analyses to the ENGINEER for verification prior to profiling materials for landfill acceptance

- G. 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.
- H. 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. 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 OWNER 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.
- I. 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 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 Generator number on it and should be signed by the contractor, 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 OWNER. 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

- J. 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 OWNER. Dispose of all materials that are not designated to be salvaged by the OWNER 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.
- K. Universal Wastes:** Universal wastes are hazardous wastes defined in LAC Title 33, Part V, Chapter 38, Section 3813 to include batteries, pesticides, thermostats, lamps and antifreeze. 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.
- L. 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 03 20 10 – REINFORCING FOR PORTLAND CEMENT CONCRETE

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 01 33 00 – Contractor Submittals.

- B. **Submittals: Submit the following:**

1. Before placing reinforcing steel, furnish a list of all reinforcing steel showing location, mark number, size and type bend to the ENGINEER.
2. Furnish the ENGINEER placing plans for all structures where reinforcing steel is involved, unless the plans contain sufficient detail for proper placement of reinforcing steel. Show show the location, type and spacing of supports.
3. Submit to the ENGINEER the name and address of each mill providing reinforcing steel. For each type of reinforcement to be used, a statement that the material meets the requirements of this section. submit the name, address, and current status of mills listed on the LDOTD AML to provide steel for the project.

- C. **Sampling:** No materials are anticipated to be sampled under this Section.

- D. **Testing:** No testing laboratory tests are anticipated under this Section.

1.3 REFERENCE STANDARDS

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO M 284 Standard Specification for Epoxy Coated Reinforcing Bars

American Welding Society (AWS)

AWS D1.4 Structural Welding Code – Reinforcing Steel

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

Concrete Reinforcement Steel Institute



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 QPL 71).
 - 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 QPL 71).
 - 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 QPL 71).
 - 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:

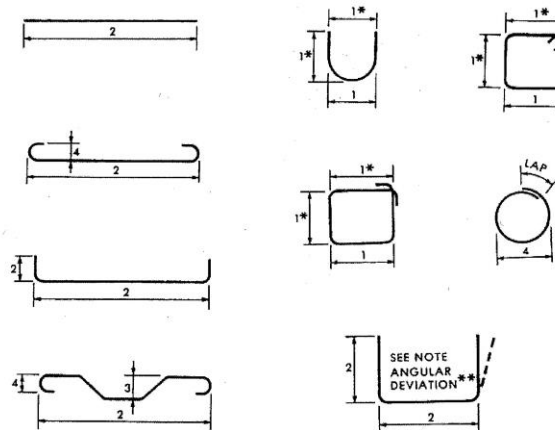
- 1) **Bending:** Bend stirrups and ties around a pin having a diameter of at least four bar diameters for No. 5 or smaller bars, and at least five bar diameters for larger bars. Bend all other bars, except as otherwise specified herein, around a pin having a diameter as specified in the table below:

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 -



SECTION 03 31 00 – 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 31 30 00 – 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
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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
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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 01 33 00 – Contractor Submittals and Section 01 45 00 – Quality Control.
- 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.



1.4 CLASSES AND USES OF CONCRETE

- A. Unless noted otherwise on the drawings, furnish concrete as indicated in the table below:

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

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. Do 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 ensure 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. Furnish and place reinforcing steel conforming to the requirements of Section 03 32 10 – Reinforcement unless otherwise noted.

2.4 PORTLAND CEMENT CONCRETE

- A. Furnish and place Portland cement concrete conforming to the requirements of Section 03 31 10 – Portland Cement Concrete unless otherwise noted.

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, use **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. Use 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 in accordance 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. Include 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 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 03 20 10 – 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 03 31 10 – Portland Cement Concrete.
- G. **Grout:** Comply with the requirements of Section 03 60 00 – Grouting.

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. Use grout meeting the requirements in Section 03 60 00 – Grouting.
- C. **Structural Foam:** Where indicated on the drawings, use a lightweight, closed cell, rigid insulation block manufactured from expanded polystyrene (EPS). Use foam which meets exceeds ASTM C578, Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation, Type XV. Use foam complying with the following requirements:

Properties	Requirement	Test Method (ASTM International)
Nominal Density	3.0 pounds per cubic foot	ASTM C303
Compressive Strength at 10% Deformation	60.0 pounds per square inch	ASTM D1621
Flexural Strength, Minimum	75.0 pounds per square inch	ASTM C203
Flame Spread	<20	ASTM E84
Smoke Developed	150-300	ASTM E84

Use StarRfoam XV, manufactured by StarRfoam Manufacturing, Inc, Arlington, Texas or equal.



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 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 not 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. Deposit 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. Ensure the surface of the concrete is level whenever a run of concrete is stopped. To ensure 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 the requirements of Section 03 31 10 – Portland Cement Concrete and the requirements specified herein.
- C. Concrete Placement:** Comply with the requirements of Section 03 31 10 – 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 steam 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 area 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 -



SECTION 03 31 10 – PORTLAND CEMENT CONCRETE

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. Louisiana Department of Transportation and Development (LDOTD)

AML Approved Materials List

1.3 CONTRACTOR SUBMITTALS, SAMPLING, AND TESTING

- A. Provide submittals, samples for testing, and testing of materials in accordance with Section 01 33 00 – Contractor Submittals.
 - B. Materials proposed for and utilized in the WORK will be sampled as indicated in herein. The frequency of testing may be altered at the discretion of the ENGINEER. Provide all materials required for testing at no additional cost to the OWNER.
- A. Submit the following:**
- 1. Submit a proposed concrete mix designs on a form acceptable to the ENGINEER giving the intended sources of materials and the mix design for concrete for each concrete mixture to be furnished.
 - 2. Product Data: Submit product data for all components included in the mixture, including evidence of all product's current listing on the LDOTD AML.
- B. Sampling/Testing:**
- 1. Structural Concrete (Classes AA(M), AA, A(M), A, D, F, P(X), P(M), S - The ENGINEER will conduct the following acceptance tests of a per – lot basis. Unless noted otherwise, a lot is defined as an identifiable placement of concrete not to exceed 200 cubic yards.
 - a. Entrained Air: Plastic concrete will be tested for air content at least once per lot or as otherwise determined by the ENGINEER. The air content will be determined in accordance with LDOTD TR 202.



- b. Slump: Plastic concrete will be tested for slump at least once per lot or as otherwise determined by the ENGINEER. The slump of plastic concrete will be determined in accordance with LDOTD TR 207.
 - c. Compressive Strength: Compressive strength for acceptance of structural concrete will be determined by DOTD TR 226. Two (2) batches of three (3) 6 – inch by 12 – inch cylinders will be made and tested in accordance with DOTD TR 226 for each lot of structural concrete placed.
 - d. Batch Tickets: Provide batch tickets for each batch of concrete as indicated in Part 3 – Execution.
2. Minor Structural Concrete (Classes M, R, Y) - The ENGINEER will conduct the following acceptance tests of a per – lot basis. Unless noted otherwise, a lot for minor concrete will be 50 cubic yards, regardless of day placed.
- a. Entrained Air: Plastic concrete will be tested for air content at least once per lot or as otherwise determined by the ENGINEER. The air content will be determined in accordance with LDOTD TR 202.
 - b. Slump: Plastic concrete will be tested for slump at least once per lot or as otherwise determined by the ENGINEER. The slump of plastic concrete will be determined in accordance with LDOTD TR 207.
 - c. Compressive Strength: Compressive strength for acceptance of structural concrete will be determined by DOTD TR 226. Two (2) batches of three (3) 6 – inch by 12 – inch cylinders will be made and tested in accordance with DOTD TR 226 for each lot of structural concrete placed.
 - d. Batch Tickets: Provide batch tickets for each batch of concrete as indicated in Part 3 – Execution.

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 Maximum Size of Aggregate	Volume of Dry – Rodded Coarse Aggregate per Unit Volume of 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
1/2 Inch	0.61	0.59	0.57	0.55	0.53
3/4 Inch	0.6	0.66	0.64	0.62	0.60
1 Inch	0.73	0.71	0.69	0.67	0.65
1 – 1/2 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 31 05 16 – 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 03 31 10-3 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 03 31 10-3.

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 31 05 16 – 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 31 05 16 – Aggregates. For additional QC requirements for Mass Concrete, see Part 3 of this Section 03 31 10 – 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 31 05 16 - 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 03 31 10-3. 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.

F. Acceptance and Verification for Type B and D Portland Cement Concrete Pavement: Use the LDOTD Materials Sampling Manual to determine sampling and testing requirements for acceptance and verification for concrete for Types B and D pavements, except as follows:

1. Gradation testing of individual stockpiles for acceptance will not be required.
2. Verification tests, performed by the ENGINEER or Testing Laboratory to assure conformance to the combined aggregate gradation shown in Section 31 05 16 - Aggregates, are at the frequency of one sample every five days of production.
3. Upon determination of the gradation of each aggregate size sampled, mathematically determine the percent retained based on the dry weight of the total combined aggregates based on the proportions of the combined



aggregate blend, and check for conformance with Section 31 05 16 -
Aggregates

4. If the results of the verification sample indicate that, the combination of aggregates does not meet the requirements of Section 31 05 16 – Aggregates, resample the aggregates, and test again.
5. If the results of the second verification sample indicate that the combination of aggregates does not meet the requirements of Section 31 05 16 - Aggregates, adjust operations to produce a mix meeting these specifications. The ENGINEER will investigate and compare verification results to quality control results, for the same period, to determine appropriate action.

1.5 DELIVERY, STORAGE, AND HANDLING:

- A. Comply with the requirements of Part 3 – Execution of this Section 03 31 10 – 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 03 31 10 – 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 LDOT 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 03 31 10-2, these are the allowable mixture substitutions:



Structural Class	Substitute
A1	No Substitutions
A2	No Substitutions
A3	No Substitutions
P1	P2, P3
P2	P3
P3	No Substitutions
S	No Substitutions
MASS (A1)	No Substitutions
MASS (A2)	No Substitutions
MASS (A3)	No Substitutions
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 03 31 10 – Portland Cement Concrete and Table 03 31 10-3. For mix designs not conforming to the requirements of this Section 03 31 10 or Table 03 31 10-3, 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 II



	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
Sewer Structures	Type II or Type V Portland Cement, Type III Cement for High Early Strength Applications Only
Pre – Stressed or Pre – Cast Concrete	Type III 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 03 31 10 – 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



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 03 31 10-3.
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 03 31 10-3. 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 31 05 16 – Aggregates.

G. Fine Aggregates: Ensure that fine aggregates comply with the requirements of Section 31 05 16 – Aggregates.

H. Course Aggregates: Ensure that coarse aggregates are the grade specified in Table 03 31 10 – 3 and comply with Section 31 05 16 – 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 31 05 16 – 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 the mixer

- D. Truck Mixing:** 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. Portable Mixing:** Obtain written approval from the ENGINEER to use portable or volumetric mixers for PCCP patching and minor structure concrete.
- 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 below 32°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 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 90°F 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 03 31 10-3. 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 90°F 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 99°F 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 35°F, 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 160°F and a maximum differential temperature of 35°F 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 180°F with an accuracy of $\pm 2^\circ\text{F}$. 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.

- END OF SECTION -



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	Average Compressive Strength, psi, at 28 Days	Grade of Coarse Aggregate ¹	Surface Resistivity, k Ω -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

6. Use combined aggregate gradation complying with Section 31 05 16 – Aggregates.

7. Value based on 4" x 8" cylinder tested at 28 – days of age.

8. See specifications for air entrainment requirements.

9. 8 inch maximum slump allowed if water reducers are used.

10. Additional slump may be allowed only with approval of the ENGINEER.

11. Also slump range for other concrete placed by extrusion methods.

12. 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 differential for any design 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.

SECTION 03 60 00 – GROUTING

PART 1 -- GENERAL

1.1 THE REQUIREMENT

- A. Furnish and place grout, complete and in place, in accordance with the Contract Documents. For
- B. Where grout is provided as a base support for mechanical and electrical equipment, conform to manufacturer's requirements and the requirements of this section.
- C. The following types of grout are covered in this Section:
 - 1. Non-Shrink Grout
 - 2. High Strength Non-Shrink Grout
 - 3. Non-Shrink Grout for High Sulfate Environments
 - 4. Non-Shrink Epoxy Grout
 - 5. Topping Grout and Concrete/Grout Fill

1.2 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

ASTM C109	Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens)
ASTM C307	Standard Test Method for Tensile Strength of Chemical-Resistant Mortar, Grouts, and Monolithic Surfacing
ASTM C531	Standard Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes
ASTM C579	Standard Test Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes
ASTM C580	Standard Test Method for Flexural Strength and Modulus of Elasticity of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, 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 C1090	Standard Test Method for Measuring Changes in Height of Cylindrical Specimens from Hydraulic-Cement Grout
ASTM C1107	Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
ASTM C1116	Standard Specification for Fiber-Reinforced Concrete
ASTM C1339	Standard Test Method for Flowability and Bearing Area of Chemical-Resistant Polymer Machinery Grouts

1.3 CONTRACTOR SUBMITTALS

A. Furnish submittals in accordance with Section 01 33 00 - Contractor Submittals.

1. Certified testing lab reports for tests indicated herein.
2. Test results and service report from the field tests and the demonstration and training session verifying the requirements indicated herein.
3. Manufacturer's literature containing instructions and recommendations on the mixing, handling, placement, curing, and appropriate uses for each type of grout used in the WORK, and location of use.
4. Documentation indicating that the grouts contain no chlorides or other chemicals that cause corrosion.
5. Manufacturer's Safety Data Sheet documenting composition of grouts.
6. Submit manufacturer's written warranty as indicated herein.
7. Name and telephone number of grout manufacturer's representative who will give on-site service. Employ representative having at least one year of experience with the indicated grouts.

1.4 QUALITY ASSURANCE

A. Field Tests

1. Compression test specimens will be taken from the first placement of each type of grout, and at intervals thereafter selected by the ENGINEER. The specimens will be made by the ENGINEER or its representative.
2. Compression tests and fabrication of specimens for cement grout and cement based non-shrink grout will be performed in accordance with ASTM C1107 at intervals during construction selected by the ENGINEER.
3. Compression tests and fabrication of specimens for topping grout and concrete/grout fill will be performed in accordance with Section 03 31 00 – Structural Concrete at intervals during construction selected by the ENGINEER.



4. Compression tests and fabrication of specimens for epoxy grouts will be performed in accordance with ASTM C579, Method B, at intervals during construction selected by the ENGINEER. A set of 3 specimens will be made for testing at 7 Days and each earlier time period as appropriate.
 5. The cost of laboratory tests on grout will be paid by the OWNER except where test results show the grout to be defective. In such case, assume responsibility for and pay all costs for the tests, removal and replacement of Defective Work, and re-testing, all as part of the WORK.
 6. Assist the ENGINEER in obtaining specimens for testing and furnish materials necessary for fabricating the test specimens.
- B. Construction Tolerances:** Construct grout to tolerances as indicated in Section 03 31 00 – Structural Concrete unless indicated otherwise.
- C. Pre-Installation Demonstration and Training**
1. Non-Shrink Grouts
 - a. Require the grout manufacturer to give a demonstration and training session for the cement based and epoxy non-shrink grouts to be used on the project before any installation of grout is allowed.
 - b. Use a minimum of 5 bags of cement-based non-shrink grout mixed to fluid consistency. Conduct test for flow cone and bleed tests. Make six cubes for testing at 1, 3, and 28 Days. Place the remaining grout, and curing may be initiated on actual project placements such as baseplates to provide on-the-job training for the CONTRACTOR and ENGINEER. Require CONTRACTOR employees who will be doing the grouting to participate in this training and demonstration session. Require the training session to include methods for curing the grout.
 - c. Transport the test cubes to an independent test laboratory, obtain the test reports, and report these demonstration and training test cube strengths to the ENGINEER.

1.5 SPECIAL CORRECTION OF DEFECTS PROVISIONS

- A. Manufacturer's Warranty**
1. Furnish one year warranty for WORK provided under this section.
 2. Manufacturer's warranty may not contain a disclaimer limiting responsibility to the purchase price of products or materials.

PART 2 -- PRODUCTS

2.1 APPLICATION

- A.** Unless indicated otherwise, Provide as listed below whether indicated on the Drawings or not.



Application	Type of Grout
Beam and column (1 or 2 story) base plates less than 16-inches in the least dimension.	Non-Shrink
Column base plates (greater than 2 story or larger than 16-inches in the least dimension)	High Strength Non-Shrink
Under precast concrete elements	High Strength Non-Shrink
Storage tanks and other non-motorized equipment or machinery under 30 horsepower	Non-Shrink
Motorized equipment over 30 horsepower and equipment under 30 horsepower but subject to severe shock loads and high vibrations	Non-Shrink Epoxy
Filling blockout spaces for embedded items such as railing posts, gate guide frames, etc.	Non-Shrink
Toppings and concrete/grout fill less than 3-inches thick	Topping Grout
Toppings and concrete/grout fill greater than 3-inches thick	Minor Concrete per Section 03 31 10
Anchor bolts, anchor rods and reinforcing steel required to be set in epoxy or adhesive.	Post Installed Anchors in Concrete per Section 05 05 19
Repair of holes and defects in concrete members.	Concrete Repair and Rehabilitation per Section 03 31 00

2.2 NON-SHRINK GROUTS

A. General

1. Use cement based non-shrink grout unless otherwise noted.
2. Furnish and place 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.
3. Furnish and place a grout with the manufacturer's instructions printed on each bag or other container in which the materials are packaged. Provide specific formulation for each non-shrink grout as recommended by the manufacturer for the particular application.



4. Require that the manufacturer's product information state the acceptability of the non-shrink grout for the intended purpose and location.
5. Do not use grout containing chlorides or additives that may contribute to corrosion.
6. Grout placed in continuously wet environments or in exterior conditions may not contain gypsum or calcium salt.
7. Provide cement-based non-shrink grout having the following general properties:
 - a. Compliance with the requirements of ASTM C1107.
 - b. A maximum early age height change of 4.0 percent expansion, and no shrinkage (0.0 percent) in accordance with ASTM C827. The grout when tested may not bleed or segregate at maximum allowed water.
 - c. No shrinkage (0.0 percent) and a maximum of 0.3 percent expansion in the hardened state when tested in accordance with ASTM C1090.
 - d. A minimum bond strength (concrete to grout) of 1900 psi per modified ASTM C882.
8. Consider environmental and ambient conditions in the selection of non-shrink grout. If a non-shrink grout is to be used in a high sulfate environment, marine environment, high temperature environment, or freeze/thaw environment, furnish and place a grout which is stated by the manufacturer as suitable for each environmental condition.
9. Where grout is placed in marine environments, furnish and place grout suitable for use in a marine environment.
10. Where placed in outdoor environments or other environments subject to freezing and thawing, furnish and place a grout suitable for use in freeze/thaw environments.
11. Where grout is placed in a high – sulfate environment, furnish and place a grout suitable for use in high sulfate environments.

B. Regular Non-Shrink Grout

1. Provide Non-Shrink Grout having a minimum 28 Day compressive strength of 5000 psi when mixed at a fluid consistency and tested per ASTM C109.
2. **Manufacturer or Equal: Five Star Grout by Five Star Products, Five Star Fluid Grout 100 by Five Star Products, Sikagrout 212 by Sika Corporation, or approved equal.**

C. High Strength Non-Shrink Grout



1. Provide High Strength Non-Shrink Grout having a minimum 28-Day compressive strength of 10,000 psi when mixed at a fluid consistency and tested per ASTM C109.
2. **Manufacturer or Equal: Five Star High Strength Grout** by **Five Star Products, SikagROUT 428 FS**, or approved equal.

D. Non-Shrink Grout for High Sulfate Environments

1. Provide a grout having minimum 28 Day compressive strength of 7000 psi when mixed at a fluid consistency and tested per ASTM C109.
2. **Manufacturer or Equal: Five Star Special Grout 150** by **Five Star Products**, or approved equal.

2.3 NON-SHRINK EPOXY GROUT

- A.** Furnish and place non-shrink epoxy grout of be a flowable, non-shrink, 100 percent solids system. Provide grout system having components: resin, hardener, and specially blended aggregate, each premeasured and prepackaged. The resin component may not contain any non-reactive diluents.
- B.** Use grout with manufacturer's product information stating the acceptability of the epoxy grout for the intended purpose and location.
- C.** Variation of component ratios is not permitted unless specifically recommended by the manufacturer. Use grout with manufacturer's instructions printed on each container in which the materials are packaged.
- D.** Resins containing butyl glycidyl ether (BGE) or other highly volatile and hazardous reactive diluents are not acceptable.
- E.** Provide non – shrink 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 in accordance with ASTM C531.
- F.** Provide non – shrink epoxy grout which develops a minimum compressive strength of 9000 psi in 24 hours and 13,000 psi in seven days when tested in accordance with ASTM C579, method B.
- G.** For the purposes of testing, use an effective bearing area of a minimum of 85 percent effective bearing area (EBA) in accordance with ASTM C1339, for bearing area and flow.
- H.** Provide non – shrink epoxy grout of chemical formulation recommended by the manufacturer for the particular application. Do not reduce aggregate loading or add solvents to increase flowability.
- I.** Provide non – shrink epoxy grout having the following minimum properties when tested at 7 Days:
 1. Minimum bond strength to concrete of 3000 psi per ASTM C882 modified.



- G. **Strength:** Provide topping grout and concrete grout/fill having a minimum compressive strength of fill at 28 days be 4500 psi.
- H. Use fiber reinforcing in topping grout used in clarifiers, or where the fill thickness is 3 inches or greater, unless otherwise shown on the Contract Documents. Use 100 percent virgin polypropylene fibrillated fibers specifically manufactured in a blended gradation for use as concrete secondary reinforcement. Add fibers at a rate of 1.5 pounds per cubic yard of concrete. Use fibers conforming conform to ASTM C1116.

2.5 CURING MATERIALS

- A. Use curing materials complying with 03 31 00 and as recommended by the manufacturer of prepackaged grouts.

2.6 CONSISTENCY

- A. Ensure that the consistency of grout is as necessary to completely fill the space to be grouted for the particular application. Dry pack consistency is defined such that the grout is plastic and moldable but will not flow. Where "dry pack" is called for in the Contract Documents, it means a grout of that consistency; the type of grout to be used is to be as indicated herein for the particular application.
- B. Adjust slump for topping grout and concrete/grout fill to match placement and finishing conditions but do not allow the slump to exceed 4-inches.

2.7 MEASUREMENT OF INGREDIENTS

- A. Make measurements for cement grout accurately by volume using containers. Do not use shovel measurements.
- B. Measure ingredients for prepackaged grouts measured by means recommended by the manufacturer.

PART 3 -- EXECUTION

3.1 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Store grout be stored in accordance with manufacturer's recommendations.

3.2 GENERAL

- A. Arrange for the manufacturer of prepackaged grouts to provide on-site technical assistance within 72 hours of request, as part of the WORK.
- B. Do not place grout until base concrete or masonry has attained its design strength, unless authorized otherwise by the ENGINEER.
- C. 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 excess water with clean, oil free compressed air prior to grouting. Concrete substrate may not be wet prior to placement of epoxy grouts.



- D. Conduct surface preparation, curing, and protection of cement grout in accordance with Section 03 31 00. Match the finish of the grout surface to that of the adjacent concrete unless otherwise indicated.
- E. 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.
- F. Shade the WORK from sunlight for at least 24 hours before and 48 hours after grouting.
- G. Contact the grout manufacturer's representative for assistance on hot and cold weather grouting techniques and precautions if applicable.

3.3 GROUTING PROCEDURES

- A. **General:** Conduct the mixing, surface preparation, handling, placing, consolidation, curing, and other means of execution for prepackaged grouts according to the instructions and recommendations of the manufacturer.
- B. Grout structural, equipment, tank, and piping support bases unless indicated otherwise.
 - 1. Block out or finished off the original concrete a sufficient distance below the plate to provide for a minimum one-inch thickness of grout or other thickness if 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 pour of with non-shrink-type grout through a headbox of appropriate size. Use grout of a fluid consistency and pour the grout continuously into the space between the plate and the base concrete. Use forms for grout that 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 by the CONTRACTOR for acceptance by the ENGINEER.
 - 3. Size concrete equipment pads for equipment bases that will be epoxy-grouted so that, when the equipment base is fully grouted, the epoxy grout is stopped not less than 4-inches from the edge of the pad.
- C. Topping Grout and Concrete/Grout Fill
 - 1. Complete mechanical, electrical, and finish WORK prior to placement of topping or concrete/grout fill. To ensure bonding to the base slab, give the base slab an exposed aggregate finish. Alternatively, where accepted by the ENGINEER, give the base slab a roughened textured surface by a close-spaced rake while the surface is green. After curing, use high pressure washing to expose the aggregates and produce not less than a 3/16-inch amplitude



roughness. Jackhammers or chipping hammers may not be used for this operation.

2. Ensure that the minimum thickness of grout topping and concrete/grout fill is not less than one-inch. Where the finished surface of concrete/grout fill is to form an intersecting angle of less than 45 degrees with the concrete surface it is to be placed against, form a key in the concrete surface at the intersection point. Form a key that is a minimum of 3-1/2 inches wide by 1-1/2 inches deep.
3. Thoroughly clean and wet the base slab to saturated surface dry (SSD) condition per the International Concrete Repair Institute (ICRI) -- Technical Guide for Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays, prior to placing topping grout and grout fill. Do not place topping grout until the slab is completely free from standing pools or ponds of water. Broom a thin coat of neat cement grout into the surface of the slab just before topping or fill placement. Do not allow neat cement grout to dry before topping placement. If the neat grout does dry, it must be immediately removed using wet stiff brooms and reapplied. Compact the topping and fill by rolling or thorough tamping, brought to established grade, and floated. Install grout fill for tank and basin bottoms where scraping mechanisms are to be installed by screeding by blades attached to the revolving mechanism of the equipment in accordance with the procedures outlined by the equipment manufacturer after the grout is brought to the established grade. Coat surface with evaporation retardant as needed to prevent plastic shrinkage cracks.
4. Place topping grout placed on sloping slabs uniformly from the bottom of the slab to the top, for the full width of the placement.
5. Test the surface a straight edge to detect high and low spots and immediately eliminate high and low spots. When the topping or fill has hardened sufficiently, trowel the surface to a smooth surface free from pinholes and other imperfections. An approved type of mechanical trowel may be used as an assist in this operation, but make the last pass over the surface by hand-troweling. During finishing, do not apply water, dry cement, or mixture of dry cement and sand to the surface.
6. As soon as topping or fill finishing is completed, coat surface with curing compound. After the topping is set and sufficiently hard in clarifiers and where required by the ENGINEER, fill the tank with sufficient water to cover the entire floor for 14 days.

3.4 CONSOLIDATION

- A. Place and consolidate grout in such a manner, for the consistency necessary for each application, to assure that the space to be grouted is completely filled.

END OF SECTION



SECTION 05 50 00 – 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 Treated, 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
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G. International Organization for Standardization

ISO 898	Mechanical and Physical Properties for Fasteners
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1.3 CONTRACTOR SUBMITTALS, SAMPLING, AND TESTING

A. Provide submittals, samples for testing, and testing of materials in accordance with Section 01 33 00 – Contractor Submittals.

B. Materials proposed for and utilized in the WORK will be sampled as indicated in herein. The frequency of testing may be altered at the discretion of the ENGINEER. Provide all materials required for testing at no additional cost to the OWNER

C. Submittals: Submit the following:

1. Submit shop drawings for all hatches. Include complete details showing all members and their connections, anchor bolts, schedules for fabrication procedures, and diagrams showing requirements for installation. Mill certificates for all fabrications indicating compliance with all referenced specifications. Submit design calculations substantiating the design of the hatches.
2. Submit product data for all bolts and anchors. Submit with each anchor an an ICBO report listing the ultimate load capacity in tension and shear for each size and type of concrete anchor. Submit manufacturer's recommended installation instructions and procedures for adhesive anchors.

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 09 96 00 - 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 bolts 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 with an acceptable coating for isolation.
- 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 09 96 00 - 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 ALUMINUM RAILINGS

- A. General:** Use component systems complete with anchors, attachments, balusters, brackets, caps, fasteners, gates (swing with self-latching hardware or be removable), posts, sleeves, trim, and any other related items required or necessary for a complete installation. Provide gates and removable rail sections complete with hardware such as self-closing hinges, self-latching latches, hasps, etc. Provide complete railings in full compliance with the International Building Code and OSHA General Industry Occupational Safety and Health Standards (29CFR1910).



B. Materials: Conform to the following:

1. **Aluminum:** U.S. Alloy 6063 T-5 or T-6. Use aluminum pipe rail not be less than 1-1/2 inch diameter Schedule 40 pipe.
2. **Electrolysis Protection:** Protect metal from electrolysis in accordance with Section 09 96 00 – Protective Coatings.
3. **Sleeves:** Use sleeves of galvanized steel or PVC.
4. **Grout:** Use inorganic, non-shrink, non-metallic premixed grout in accordance with Section 03 60 00 - Grout with a minimum 28 Day compressive strength of 4,000 psi.
5. **Fasteners:** Use stainless steel or aluminum fasteners, screws, and bolts. Use concealed fasteners.
6. **Welding Rods:** Use be of a type recommended by the aluminum manufacturer for anodized finished products.
7. **Kickplates:** Provide kickplates set on railings, not set in curbs.

C. Finishes: Provide clear anodized finish, AA-M32C22A41, for all pipe railing system including handrails, railings, tube caps, and other miscellaneous parts of rails.

D. Manufacturers or Equal

1. **C-V Pipe Rail** by **Crane Veyor Corp.**
2. **Connectorail** by **Julius Blum and Co.**
3. **Speed – Rail** by **Hollaender**

2.4 IRON CASTINGS

- A. Unless noted otherwise elsewhere in the drawings are specifications, provide gray iron castings complying with AASHTO M306. Provide castings true to pattern in form and dimensions and free from pouring faults, sponginess, cracks, blowholes and other defects in positions affecting their strength and value for the services intended. Provide castings boldly filleted at angles, with rises cleaned of scale and surfaces sanded to a smooth, clean and uniform surface.
- B. Provide covers and grates together evenly, so that the cover fits flush with the surrounding finished surface and so that the cover does not rock or rattle when loading is applied. Provide round covers and frames with machined bearing surfaces.

2.5 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 steel 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 masonry.
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

2.6 METAL GRATING

- A. General:** Provide metal grating of the design, sizes, and types indicated. Provide grating which is completely banded at edges and cutouts using material and cross section equivalent to the bearing bars. Use grating in which such banding is welded to each cut bearing bar. Provide support members for all grating around openings. Where grating is supported on concrete, use embedded support angles matching grating material unless indicated otherwise. Provide such angles mitered and welded at corners.
1. Fasten pieces of grating in 2 locations to each support.
 2. Where grating forms the landing at the top of a stairway, provide the edge of the grating that forms the top riser with an integral non – slip surface, width equal to that of the stairway.
 3. Where grating depth is not given, provide grating that will be within allowable stress levels and which will not exceed a deflection of 1/4-inch or the span divided by 180, whichever is less. For standard duty plank and safety grating, use the uniform live load of the adjacent floor or 100 psf, whichever is greater or a concentrated load of 1000 pounds for determining stresses and deflections. For heavy duty grating, use AASHTO HS-20 for determining stresses and deflections

B. Material



1. Except where indicated otherwise, provide bar grating fabricated entirely of aluminum as follows: Bearing and banding bars, alloy 6061-T6; cross bars, alloy 6063-T5.
2. Provide safety grating fabricated of aluminum alloy 5052-H32.
3. Provide plank grating fabricated of aluminum alloy 6063-T6.
4. Provide grating fabricated entirely of stainless steel, Type 316 for grating that may be partially or wholly submerged.

C. Standard-Duty Grating

1. Do not provide any single piece of grating weighing more than 80 pounds, unless indicated otherwise. Provide serrated bar grating for standard duty grating.
2. Provide grating in which cross bars are welded or mechanically locked tightly into position so that there is no movement allowed between bearing and cross bars.

D. Safety Grating

1. Provide safety grating of sheet metal punched into an open serrated diamond pattern and be formed into plank sections. Provide open diamond shapes approximately 1-7/8 inch by 1 1/16-inch in size. Use **Grip Strut** by **Metal Products Division, United States Gypsum Company**; **Deck Span** by **IKG Industries**, or equal.

E. Heavy-Duty Grating: Provide welded steel heavy – duty grating, galvanized after fabrication. Provide grating with cross bars welded in position.

F. Plank Grating

1. Provide extruded plank grating in 6-inch widths with a minimum of 6 integral 1-bar type bearing bars per plank. Use grating with a solid top surface with raised ribs, unless indicated otherwise. Where punched grating is required, provide the top surface with a pattern of 3-inch by 19/32-inch rectangular openings spaced at 4-inches on center. Use planks with continuous tongue and groove type interlock at each side, except that interlocking planks are to be arranged so that any 4-foot wide section may be removed independently from the other grating sections.
2. Provide plank grating with a clear anodized finish, except that punched grating may have standard mill finish.

2.7 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 pins with longitudinal serrations around the circumference of the shank.

2.8 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.

2.9 LIFT STATION HATCHES

- A. Where access hatches are mounted on a slab, provide a flush – type hatch as indicated.
- B. Provide hatches fabricated from aluminum 5086 H34, 6063-T5 or 6061-T6, unless otherwise indicated. Provide Type 316 stainless steel hardware. Provide gutter-type hatches.; Bilco Type "J" or "JD," Babcock-Davis Type B-FGA or equal.
- C. Where the number of leaves is not given, openings larger than 42-inches in either direction, provide hatches with double-leaf doors. Unless indicated otherwise, provide hatches with hinges located on the longer dimension side. Unless indicated otherwise, provide ladder hatches a minimum of 30-inches wide by 36-inches long, with the ladder centered on the shorter dimension, and the door hinge opposite the ladder.
- D. Provide door leaves with a minimum of 1/4-inch thick checkered pattern plate. Provide channel frames of a minimum of 1/4-inch material with an anchor flange around the perimeter. Provide hatches with an automatic hold-open arm with release handle. Provide hatches designed for easy opening from both inside and outside.
- E. Provide hatches that are designed to be water-tight and that are equipped with a joint gutter and moat-type edge drain. Provide a minimum 1-1/2 inch diameter drain connection, located by the manufacturer.
- F. Where hatches are provided for submersible pump stations, provide a hatch having a unistrut channel around the frame perimeter. Provide hatch having hte face of the unistrut channel flush with the face of the frame and be compatible with the upper guide rail bracket of the submersible wastewater pump manufacturer.
- G. Provide hatches having a recessed hasp for a padlock that is covered by a hinged lid flush with the surface.
- H. For submersible sewerage pumping stations, provide hatches including a fall – through prevention grate. Provide Fall – through prevention grate of aluminum construction with 316 Stainless Steel Hardware, designed for a live load of 300 PSF. Provide fall – through prevention grate that is powder coated, safety orange in color.



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 09 96 00. 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 this section. Finish paint all structural steel as indicated in Section 09 96 00.

3.3 RAILINGS

- A. Aluminum Railings:** Use craftsmen experienced in the fabrication of architectural metalwork to perform aluminum railing fabrication and installation. Provide exposed surfaces free from defects or other surface blemishes. Verify dimensions and conditions in the field. Precision fit joints, junctions, miters, and butting sections with no gaps occurring between sections, and with surfaces flush and aligned. Provide electrolysis protection of materials.

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 -



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SECTION 09 96 00 – 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 01 33 00 – Contractor Submittals and Section 01 45 00 – Quality Control.
- B. Submit the following:
 - 1. Eight copies of a coating materials list showing the manufacturer and the coating number, keyed to the coating systems herein. Submit the list prior to or at the time of submittal of samples.
 - 2. Paint Manufacturer's Information: For each coating system to be used, the following data:
 - 1) Paint manufacturer's data sheet for each product proposed, including statements on the suitability of the material for the intended use.
 - 2) Technical and performance information that demonstrates compliance with the system performance and material requirements.
 - 3) Paint manufacturer's instructions and recommendations on surface preparation and application.
 - 4) Colors available for each product (where applicable).
 - 5) Compatibility of shop and field applied coatings (where applicable).
 - 6) Material Safety Data Sheet for each product used.
 - 3. **Piping and Valve Identification:** Submit product information for piping and valve identification materials.

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.

- B. Extended Maintenance of Chemical Tank Lining Systems:** Promptly repair any defects in the chemical resistant sheet lining system for a period of 2 years after the lining has been placed into service. Include repair of the chemical tank and any equipment or facilities damaged by the corrosive action of the chemicals.
- C. Steel Reservoir Coating System Inspection:** Conduct an inspection during the eleventh month after the date when the reservoir was filled with water and placed into service. Attend the inspection along with a representative of the coating material manufacturer. Repair all coating defects in accordance with these specifications and to the satisfaction of the OWNER. If a warranty inspection is not held during or before the eleventh month, the CONTRACTOR is not relieved of its warranty responsibilities under the Contract Documents. If the CONTRACTOR fails to conduct an 11 month inspection for reasons not attributed to the OWNER, the CONTRACTOR is not relieved of the warranty responsibilities under the Contract Documents, and the warranty period extends until the 11 month inspection is conducted and defective work is repaired.

1.5 PIPING AND VALVE IDENTIFICATION

- A.** Provide identification for exposed piping and valves, complete and in place, in accordance with the Contract Documents.

PART 2 -- PRODUCTS

2.1 GENERAL

- A. Suitability:** 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 1 - Alkyd Enamel: Utilize a high quality, gloss or semi-gloss, medium long oil alkyd finish with a minimum solids content of 49 percent by volume and follow the manufacturer's recommended primer.

1. Prime coat DFT = 3 mils **Tnemec 10-99, Carboline Carbocoat 150 UP, Sherwin Williams Kem Kromik Universal Primer**, or equal.
2. Finish coats (two or more, DFT = 3 mils), **Tnemec 2H, Carboline Carbocoat 8215, Sherwin Williams Industrial Enamel VOC**, or equal.
3. Total system DFT = 6 mils.

B. System 2 - Not Used

C. 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

D. System 4 - Aliphatic Polyurethane: Provide a two component aliphatic acrylic polyurethane coating material with superior color and gloss retention, resistance to splash from acid and alkaline chemicals, resistance to chemical fumes and severe weathering and with a minimum solids content of 58 percent by volume. Provide primer with a rust inhibitive two component epoxy coating with a minimum solids content of 68 percent by volume.

1. Prime coat DFT = 4 mils, **Ameron 385, Carboline 890, Tnemec 69, Sherwin – Williams Macropoxy 646 FC Epoxy B58-600 Series**, or equal.
2. Finish coat (one or more, DFT = 3 mils), **Ameron Amersfield, Carbothane 134 HG, Tnemec 1074U, Sherwin – Williams Acroline 218 HS Polyurethane B65-600 Series**, or equal.
3. Total system DFT = 7 mils.



4. Apply more than one finish coat as necessary to produce a finish with uniform color and texture.

E. 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.

F. 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



- G. System 7 - Acrylic Latex:** Provide single component, water based acrylic latex with a fungicide additive with a minimum solids content of 35 percent by volume. Provide prime coat as recommended by manufacturer. Select a coating material from the available ANSI safety colors.
1. Prime coat DFT = 2 mils, as recommended by manufacturer.
 2. Finish coats (2 or more, DFT = 6 mils), **Ameron Amercoat 220, Carboline Carbocrylic 3359 DTM, Tnemec 1028/1029, Sherwin – Williams DTM Acrylic Coating B66-1000 Series**, or equal.
 3. Total system DFT = 8 mils.
- H. System 8 - Epoxy, Equipment:** Provide a two component, rust inhibitive polyamide cured epoxy coating material with a recoatable finish that is available in a wide selection of colors. Provide a coating material with a minimum solids content of 66 percent by volume and be resistant to service conditions of condensing moisture, splash and spillage of lubricating oils, and frequent washdown and cleaning.
1. Prime coat DFT = 3 mils, **Tnemec 69, Carboline Carboguard 890, Sherwin Macropoxy 646 FC** or equal.
 2. Prime coat, where shop applied. (DFT = 3 mils), universal primer, **Tnemec 161, Carboline Carbocoat 150 UP, Sherwin Williams Recoatable Epoxy Primer** or equal.
 3. Finish coats (2 or more, DFT = 6 mils), **Tnemec N69, Carboline Carboguard 890, Sherwin Williams Macropoxy 646 FC** or equal.
 4. Total system DFT = 9 mils.
- I. System 9 - Inorganic Zinc/Epoxy, Equipment:** Provide an inorganic zinc primer that is a water or solvent based, self-curing, zinc silicate, two-component inorganic coating that 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 a finish coats that is a polyamide cured epoxy material with a minimum solids content of at least 80 percent by volume, and is available in a large selection of colors.
1. Prime coat DFT = 3 mils **Tnemec 90-98, Carboline Carbozinc 11, Sherwin Williams Zinc Clad II ES** or equal.
 2. Finish coats (2 or more, DFT = 9 mils) **Tnemec N69, Carboline Carboguard 890, Sherwin Williams Macropoxy 646 FC** ,or equal.
 3. Total system DFT = 12 mils.
- J. System 10 - Acrylic, Concrete:** Provide an acrylic coating material with a single component, industrial grade, high molecular weight, waterborne acrylic material with a solids content of at least 35 percent by volume. Provide a filler-sealer with a two component epoxy masonry sealer for wet and exterior exposure, with a



solids content of at least 64 percent by volume. Utilize a 100 percent solids epoxy surfacer to fill holes and patch the concrete surface after abrasive blasting.

1. Prime coat (filler-sealer), applied in two coats to the entire surface and worked into the surface with a squeegee to achieve a smooth, void-free surface, **Tnemec 130, Carboline Sanitile 130, Sherwin Williams Cement Plex 875** or equal.
2. Finish coats (2 or more, DFT = 6 mils), **Tnemec 180, Carboline Sanitile 255, Sherwin Williams Loxon XP Smooth**, or equal.

K. System 11 - Aliphatic Polyurethane, Concrete: Provide a two component aliphatic polyurethane coating material with superior color and gloss retention, resistance to splash from acid and alkaline chemicals, resistance to chemical fumes and severe weathering, and contain a minimum solids content of 65 percent by volume. Provide a filler-sealer compound with a two-component epoxy material used to provide a smooth surface for the epoxy intermediate coat. The filler-sealer is applied to the entire concrete surface and worked into the concrete surface with a wide blade putty knife or squeegee. Provide an intermediate coat with a high-build epoxy coating with a minimum solids content of 70 percent by volume.

1. Prime coat (Filler-sealer), **Tnemec 130, Carboline Sanitile 500, Sherwin Williams Cement Plex 875**, or equal.
2. Intermediate coat DFT = 4 mils, **Tnemec N69, Carboline Carboguard 890, Sherwin Williams Macropoxy 646 FC**, or equal.
3. Finish coats (2 or more, DFT = 3 mils), **Tnemec 290, Carboline Sanitile 855, Sherwin Williams General Polymers GP4638**, or equal.

L. System 12 - Aliphatic Polyurethane, Fiber Glass: Provide a two-component aliphatic polyurethane coating material with superior color and gloss retention, resistance to splash from acid and alkaline chemicals, and resistance to chemical fumes and severe weathering. Utilize a primer, tie coat, or mist coat as recommended by the manufacturer.

1. Prime coat (Tie coat), **Ameron 385, Tnemec 66, Carboline Carboguard 890, Sherwin – Williams Macropoxy 646 FC Epoxy B58-600 Series**, or equal.
2. Finish coats (2 or more, DFT = 3 mils), **Ameron Amershield, Tnemec 1074U, Carboline Carbothane 134 HG, Sherwin – Williams Acrolon 218 HS Polyurethane B65-600 Series**, or equal.

2.3 SUBMERGED AND SEVERE SERVICE COATING SYSTEMS

A. Material Sources: The manufacturers' products listed in this paragraph are materials which satisfy the material descriptions of this paragraph and have a documented successful record for long term submerged or severe service conditions. Proposed substitute products will be considered as indicated above.

B. System 100 - Amine Cured Epoxy: 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.**

C. System 101 - Cold-Applied Tape: Provide tape coating materials and procedures in accordance with ANSI/AWWA C209. Utilize Type II prefabricated tape. Provide a system with a primer layer, inner layer tape (35 mils), and an outer layer tape (35 mils). Total system DFT = 70 mils.

D. System 102 - Polyamide Cured Epoxy: Provide a high build, polyamide epoxy resin with a solids content of at least 56 percent by volume, suitable for long-term immersion in potable water and municipal wastewater. For potable water service, provide a coating listed by the NSF International as in compliance with NSF Standard 61.

1. Prime coat and finish coats (3 or more, DFT = 12 mils), **Tnemec Pota-Pox N140, Carboline Carboguard 891 HS, Sherwin – Williams Macropoxy 646 PW Epoxy B58-600 Series, or equal.**

E. System 103 - Not Used

F. System 104 - Not Used

G. System 105 - Epoxy, Reservoirs

1. Provide an epoxy coating material that is a 2 component type, either a polyamide-cured epoxy or an amine-cured epoxy suitable for long-term immersion service in potable water. Provide a material listed by NSF International as in compliance with NSF Standard 61 and in conformance with state and local health regulations and policies for service in potable water reservoirs. Submit a written certification that the proposed materials meet the above regulatory agency standards and policies. Apply the material with a primer if recommended by the coating manufacturer.

2. Provide a system consisting of 3 coats in accordance with AWWA D102 - Coating Steel Water Storage Tanks, System ICS-2.

3. Thicknesses

1. First Coat, 3 mils. **Tnemec Series 20, Carboline Carboguard 61, Sherwin Williams Macropoxy 646 PW, or equal**
2. Intermediate, 4 mils. **Tnemec Series 20, Carboline Carboguard 61, Sherwin Williams Macropoxy 646 PW, or equal**
3. Finish, 5 mils. **Tnemec Series 20, Carboline Carboguard 61, Sherwin**



Williams Macropoxy 646 PW, or equal

4. Total System DFT, 12 mils.
4. Pre-coat all lap roof plate edges, both sides. If necessary, primer exposed on exterior of roof may be removed prior to welding. Extend pre-coating at least 6-inches from plate edges.
5. Touch-up coating for areas damaged during erection, or areas not pre-coated. Spot sandblast to SSPC SP-5 - White Metal Blast Cleaning, before application of coating. Utilize indicated material for touch-up or a compatible primer recommended by the manufacturer.
6. Prior to the first complete spray coat, all edges, nuts, bolts, lap joints, weld seams, and the roof rim angle are to receive a one brush-applied coat.
7. Curing Period: Prior to immersion, subject the completed system to at least 240 hours of curing time with the metal temperature at a minimum of 70 degrees F, or 480 hours at a minimum of 60 degrees F, both conditions at a maximum relative humidity of 50 percent and under the forced ventilation conditions required by the paragraph entitled Curing of Coatings. Provide more curing time or a higher temperature if recommended by the epoxy coating manufacturer. If the environmental conditions do not provide the necessary minimum temperature, use heated air to provide the necessary heat for curing. Other combinations of curing time and temperature may be used if the coating manufacturer presents satisfactory documentation and test results to substantiate that the degree of curing is equal or greater than curing for 240 hours at 70 degrees F.

H. System 106 - Fusion Bonded Epoxy: Provide a coating material with a 100 percent powder epoxy, certified as compliant with NSF Standard 61, applied in accordance with the ANSI/AWWA C213 - Fusion-Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines, except with the surface preparation as listed in the coating system schedule of this Section. Apply the coating using the fluidized bed or electrostatic spray process.

1. Coating DFT = 16 mils, **Scotchkote 134 or 206N**, or equal.
2. For coating of valves, DFT = 12 mils.
3. Liquid Epoxy: For field repairs, the use of a liquid epoxy will be permitted, applied in not less than 3 coats to provide a DFT of 15 mils. Utilize a liquid epoxy with a 100 percent solids epoxy recommended by the powder epoxy manufacturer.

I. System 107 - Chemical Resistant Sheet Lining:

1. Materials: Utilize natural rubber, chlorobutyl rubber, ethylene propylene diene monomer (EPDM) rubber, chloroprene polymer (neoprene) rubber, or chlorosulfonated polyethylene (Hypalon) rubber sheet lining materials as indicated. Provide a Shop Drawing submittal containing technical information that confirms the suitability of the lining material system for long-



term immersion in each chemical to be stored. The service temperatures are expected to be up to 150 degrees F.

2. Provide neoprene sheet lining material that is a synthetic rubber formulated for steam curing at atmospheric pressure with a minimum lining thickness of 3/16 - inch. Utilize a lining material of **Polymeric Protective Linings BFG 2011 (59688)**, or equal.
 3. Provide chlorobutyl sheet lining material that is a synthetic rubber formulated for steam curing at atmospheric pressure with a minimum lining thickness of 3/16-inch. Utilize a lining material of **Polymeric BFG 1051 (60924)**, or equal.
 4. Provide a natural rubber (soft) sheet lining material that is a soft natural rubber formulated for steam curing at atmospheric pressure with a minimum lining thickness of 3/16-inch. Utilize a lining material of **Polymeric BFG 2004 (83160)**, or equal.
 5. Provide a natural rubber (hard) sheet lining material that is a hard, natural rubber resistant to oxidizing agents and formulated for autoclave curing with a minimum lining thickness of 3/16-inch. Utilize a lining material of **Polymeric BFG 1006 (8631)**, or equal.
 6. Provide EPDM sheet lining material that is a synthetic rubber suitable for use as a lining for 50 percent sulfuric acid solution and formulated for autoclave or steam curing under pressure. Utilize a lining material of **Polymeric BFG 1039 (EP156)**, or equal.
 7. Provide Hypalon sheet lining material that is a synthetic rubber suitable for use as a lining for 50 percent sulfuric acid solution. Utilize a lining material of **Polymeric BFG 2045 (8706)**, or equal.
 8. Provide primers, adhesives, activators, accelerators and other necessary materials as required by the sheet material manufacturer.
 9. Metal Surface Preparation: Prior to abrasive blast cleaning the base metal, prepare the surface as required by the sheet lining material manufacturer's installation instructions. If the instructions differ from these specifications, provide the highest degree of cleaning and surface preparation. Provide abrasive blast cleaning in accordance with this Section.
 10. Install lining materials in accordance with the material manufacturer's written installation instructions. Line all interior surfaces, including all piping, vents, fittings, flange faces, manhole covers, and blind flanges.
 11. Holiday test the lining system in accordance with this Section before and after curing.
 12. Cure the lining system by steam using the time and temperature as required by the material manufacturer.
- J. **System 108 - Epoxy, Concrete:** Provide a coating material with an amino cured epoxy material suitable for long-term immersion in water and wastewater and for



service where subjected to occasional splash and spillage of water and wastewater treatment chemicals. Provide a finish coating material with a minimum solids content of 69 percent by volume. If used for potable water service, provide a finish coating material that is both listed by the NSF International as in compliance with NSF Standard 61 and conforms with state and local health regulations and policies for service in potable water. Provide a filler-sealer with a 100 percent solids amine-cured epoxy material with silica and inert fillers. Utilize a 100 percent solids epoxy surfacer to fill holes and patch the concrete surface after abrasive blasting.

1. Filler-sealer: (minimum 1/16" and as required to fill voids and bugholes) **Tnemec 218, Sherwin Williams Steel Seam FT910**, or equal.
2. Finish coats (2 or more, DFT = 12 mils): **Tnemec 104 for nonpotable (Tnemec N140 for potable water), Sherwin Wiloiams Macropoxy 5500**, or equal.

K. System 109 - Silicone Modified Polyurea: Provide a coating material with a two – component polyurea designed for wastewater applications. Provide a system with a minimum tensile strength (ASTM D412-06) of 2,670 PSI, a Shore D Hardness of 42 or greater, and a Tear Strength (ASTM D624-00) of 280 PLI and with a total minimum dry film thickness (DFT) of 500 mils. Utilize a coating of **Spectrashield Barrier Coat**, or equal.

L. System 110 - Not Used

M. System 111 - Vinyl Ester: Vinyl ester resin coating material with an inert flake pigment suitable for immersion service in 30 percent hydrochloric acid and 30 percent sulfuric acid solutions.

1. Filler-sealer: (minimum 1/16" and as required to fill voids and bugholes) **Tnemec 218**; or equal.
2. Two or more coats (DFT = 30-36 mils), **Tnemec 120**, or equal. Use a prime coat as recommended by the material manufacturer.

N. System 112 - Vinyl Ester, Concrete: Vinyl ester resin coating material with an inert flake pigment suitable for immersion service in hydrochloric acid and sulfuric acid solutions. Utilize a filler-sealer with a 100 percent solids amine-cured epoxy or vinyl ester material with silica and inert fillers. The filler-sealer is applied to the entire concrete surface. Utilize a 100 percent solids epoxy or vinyl ester surfacer to fill holes and patch the concrete surface after abrasive blasting.

1. Option 1

1. Filler-sealer: (minimum 1/16" and as required to fill voids and bugholes) **Tnemec 218**; or equal.
2. Two or more coats (DFT = 30-36 mils), **Tnemec 120**, or equal. Use a prime coat as recommended by the material manufacturer.

2. Option 2



1. Prime Coat: **Sherwin Williams Corbony Vinyl Ester Primer** (3.5 – 4.5 mils)
2. Intermediate Coat: **Sherwin Williams Polyglass Putty** (as required for bugholes)
3. Finish Coats: **Sherwin Williams CorCote VEN FF** (15.0 – 20.0 Mils)/

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 201 - Rich Portland Cement Mortar:** Provide a rich portland cement mortar coating with a minimum thickness of 1/8-inch, followed by enclosure in an 8-mil thick polyethylene sheet with all joints and edges lapped and sealed with tape.
- C. System 203 - Epoxy Surfacing:** - Not Used.
- D. System 204 - Water-Retardant:**
1. Two coats (or single coat if manufacturer recommends in writing) of a clear, non-staining, silane-modified-siloxane masonry water-retardant material. Provide a water-retardant system after application with not less than a five-year warranty on the performance of the product.
 2. Clean surfaces with a chemical cleaner approved by the manufacturer and power wash. Clean and dry surfaces before application of the material. Utilize the method and rate of application in accordance with manufacturer's published instructions. If necessary for warranty, a manufacturer's representative must be present during applications.
 3. **Tnemec 660** or equal.
- E. System 205 - Polyethylene Encasement:** Apply the polyethylene encasement in accordance with ANSI/AWWA C105 using Method C.
- F. System 206 - Cement Mortar Coating:** Provide a 1-1/2-inch minimum thickness mortar coating reinforced with 3/4-inch galvanized welded wire fabric. Utilize a cement mortar that contains no less than one part Type V cement to 3 parts sand. Utilize a cement mortar curing compound meeting the requirements of "Liquid Membrane Forming Compounds for Curing Concrete," ASTM C 309, Type II, white pigmented, or by enclosure in an 8-mil thick polyethylene sheet with all edges and joints lapped by at least 6-inches.
- G. System 207 – Coal Tar Epoxy:** Two coat coal tar epoxy with minimum solids content of 72% by volume. Total DFT = 16.0 mils. **Carboline Bitumastic 300, Tnemec Series 46H-413, Sherwin Williams HiMil Sher Tar**, or equal.
- H. 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.

- I. **System 209 - Alkyd-Wood:** Industrial quality, gloss or semi-gloss, medium long oil alkyd coating material with a minimum solids content of 49 percent by volume. Utilize a primer with an alkyd primer as recommended by the manufacturer.
 - 1. Prime coat DFT = = 2.5 mils, **Tnemec 10-99W**, **Sherwin Williams Exterior Oil Based Wood Primer**, or equal.
 - 2. Finish coats (two or more, DFT = 3 mils), **Tnemec 2H**, **Sherwin Williams Industrial Enamel VOC**, or equal.
 - 3. Total system DFT = 6 mils.

- J. **System 210 - Acrylic-wood:** Single component, water-based acrylic latex coating material with a fungicide additive and a minimum solids content of 35 percent by volume. Utilize a primer with an alkyd primer as recommended by the manufacturer.
 - 1. Prime coat DFT = 2.5 mils, **Tnemec 10-99W (white)**, **Sherwin Williams Exterior Latex Wood Primer**, or equal.
 - 2. Finish coats (two or more, DFT = 6 mils), **Tnemec 1029**, **Sherwin Williams SherCryl HPA** or equal.
 - 3. Total system DFT = 8 mils.

- K. **System 211 - Acrylic-Drywall:** Single component, water-based acrylic latex coating material with a fungicide additive and a minimum solids content of 35 percent by volume. Utilize a primer with a PVA sealer as recommended by the manufacturer.
 - 1. Prime coat DFT = 1.5 mils.
 - 2. Finish coats (two or more, DFT = 6 mils), **Tnemec 6**, **Sherwin Williams ProIndustrial Acrylic**, or equal.
 - 3. Total system DFT = 7.5 mils.

2.5 PIPING AND VALVE IDENTIFICATION

- A. Except as indicated below for very short pipe lengths, identify exposed piping larger than 2-inches nominal size for the pipe contents and direction of flow.
 - 1. Marker Type
 - 1. Snap Around: Vinyl or polyester sheet with UV- resistant ink, preshaped and sized to tightly curl around the pipe and remain in position.
 - 2. Adhesive: Vinyl or polyester sheet with UV- resistant ink, shaped similar to



pipe curvature and coated with pressure sensitive adhesive.

3. Stencil: Lettering painted directly on surface of pipe inside color coded marker area.
 2. Marker Area: Sized per pipe size according to ANSI A13.1; color from the table below.
 3. Lettering: Sized per pipe size according to ANSI A13.1; color from the table below.
 4. Arrows: at least 2 arrows at each marker area, showing direction of flow.
- B. Identify pipe 2-inches and smaller with plastic plates made from laminated 3-layer plastic with engraved black letters on white background.
- C. Utilize pipe identification as manufactured by **Brady, Seton**, or equal.

2.6 EXISTING PIPING IDENTIFICATION SYSTEMS

- A. Follow the existing system in installations where existing piping identification systems have been established. Where existing identification systems are incomplete, utilize the existing system as far as practical and supplement with the indicated system.

2.7 IDENTIFICATION OF VALVES AND SHORT PIPING LENGTHS

- A. Utilize metal or plastic tags as identifying devices for valves and the sections of pipe that are too short to be identified with markers and arrows.
- B. Provide metal tags that are stainless steel with embossed lettering. Provide plastic tags that are a solid black plastic laminate with white embossed letters. Provide tags to be firmly attached to the valves or short pipes or to the structure immediately adjacent to such valves or short pipes.
- C. Describe the exact function of each valve using wording on the valve tags, e.g., "HWR-BALANCING," "CLS THROTTLING", "RAS-PUMP SHUT-OFF," etc.

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 FOR GALVANIZED FERROUS METAL

- A. Alkaline clean per SSPC SP1 galvanized ferrous metal to remove oil, grease, and other contaminants detrimental to adhesion of the protective coating system to be used. Brush off blast cleaning per SSPC SP7.
- B. Provide pretreatment coatings of surfaces in accordance with the printed recommendations of the coating manufacturer.

3.8 SURFACE PREPARATION OF FERROUS SURFACES WITH EXISTING COATINGS, EXCLUDING STEEL RESERVOIR INTERIORS

- A. **General:** 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.

3.9 CONCRETE AND CONCRETE BLOCK MASONRY SURFACE PREPARATION

A. Concrete Block

1. Allow new mortar to cure a minimum of 14 days prior to coating.
2. Level protrusions and mortar spatter.

B. Nonsubmerged Concrete

1. Do not begin surface preparation until at least 28 days after the concrete or



masonry has been placed. Verify moisture levels are within the limitations of the coating manufacturer.

2. Remove all oil, grease, and form release and curing compounds by detergent cleaning before abrasive blast cleaning.
3. Abrasive blast coat concrete surfaces to be coated to remove existing coatings, laitance, deteriorated concrete, and to roughen the surface equivalent to the surface of the No. 80 grit flint sandpaper.

C. Submerged Concrete

1. Do not begin surface preparation until at least 28 days after the concrete or masonry has been placed. Verify moisture levels are within the limitations of the coating manufacturer.
 2. Remove all oil, grease, and form release and curing compounds by detergent cleaning before abrasive blast cleaning.
 3. Abrasive blast clean all concrete surfaces to be coated to remove existing coatings, laitance, sealers, deteriorated concrete, and to roughen the surface equivalent to ICRI CSP 5.
- D. Ensure all surfaces are clean as recommended by the coating manufacturer before coating is started.
- E. Ensure all surfaces are dry prior to coating unless required for proper adhesion. Determine the presence of moisture with a moisture detection device such as **Delmhorst Model DB**, or equal.

3.10 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.

3.11 ARCHITECTURAL CONCRETE BLOCK MASONRY SURFACE PREPARATION

- A. Cure all mortar surfaces at least 14 days before surface preparation work is started.
- B. Remove all dust, dirt, grease, and other foreign matter prior to abrasive blasting.
- C. Prepare all masonry surfaces in accordance with the material manufacturer's printed instructions.



3.12 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.

3.13 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 psychrometric 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.

3.14 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.
- C. **Forced Air Ventilation of Steel Reservoirs and Enclosed Hydraulic Structures:** Forced air ventilation is required for the application and curing of coatings on the interior surfaces of steel reservoirs and enclosed hydraulic structures. During application and curing periods, continuously exhaust air from a manhole in the lowest shell ring, or in the case of an enclosed hydraulic structure, from the lowest level of the structure using portable ducting. After all interior coating operations have been completed, provide a final curing period for a minimum of 10 days in which, which the forced ventilation system operates continuously. For additional requirements, refer to the specific coating system requirements in Part 2 above.

3.15 TESTING FOR VOLATILE ORGANIC COMPOUNDS IN POTABLE WATER RESERVOIRS

- A. **General:** Furnish the following services to ensure that the interior reservoir coatings or linings do not convey volatile organic compounds to the potable water.
- B. **Selection of Coating or Lining Material:** Provide a coating or lining system that has a successful record in meeting the national, regional, and local regulations and policies pertaining to leaching of volatile organic compounds into potable water.
- C. Before the coating or lining materials are used, write a letter to notify the regulatory agency having jurisdiction. Describe the proposed materials, including brand names, catalog numbers, catalog technical data, application and curing instructions, and material safety data sheets in the letter.
- D. Furnish curing time, temperature and ventilation as required by the manufacturer or this Section, whichever is the most stringent. In some cases, the CONTRACTOR may find it necessary to extend the curing time or ventilation time beyond the requirements in order to comply with the regulatory agency requirements or to reduce the leached organic compounds to the required levels.
- E. Clean, disinfect and fill the reservoir following the curing or ventilation period as indicated.
- F. Allow for a 7-day soaking period following the initial filling to determine the presence of any leached organics. Before the tank is placed into service, samples of the water in the tank will be taken by the ENGINEER and analyzed by a laboratory approved by the State or the EPA. Analyses will be for volatile organic compounds by EPA Method 524.1 - Volatile Organic Compounds in Water by Purge and Trap Gas Chromatography/Mass Spectrometry or 524.2 or equivalent (this test includes TCE, PCE, xylenes, toluene, ketones, carbon



tetrachloride, and similar compounds).

- G. If the tests results are above either (1) 0.005 mg/l for TCE, 0.004 mg/l for PCE, 0.62 mg/l for xylenes, 0.10 mg/l for toluene, 0.75 mg/l for methyl-ethyl ketone (to be used as representative for all ketone compounds), 0.005 mg/l for carbon tetrachloride, or (2) the regulatory agency's recommended Action Level Limits, whichever is less, drain the water from the tank and flush, refill, and retest. Conduct as many curing, soaking, and flushing cycles as necessary to reduce the leached volatile organic compounds to levels below the requirements.]

3.16 IDENTIFICATION OF PIPING

- A. Install markers and identification tags in accordance with the manufacturer's printed instructions, and ensure they are neat and uniform in appearance. Provide tags and markers that are readily visible from all normal working locations.
- B. Permanently attach valve tags to the valve or structure by means of 2 stainless steel bolts or screws.
- C. Label every valve or connection, where it may be possible for a worker to be exposed to a hazardous substance, per Occupational Safety and Health Standards 29CFR1910.1200.
- D. Color-code paint all unburied pipes in structures and in chemical pipe trenches. Colors will be selected by the ENGINEER, or as indicated.
- E. Color-code paint all unburied chemical pipes, including chemical pipes in structures and chemical pipe trenches.
- F. Mark each pipe at:
 1. Intervals of 20-feet in straight runs.
 2. At least once in every room.
 3. Within 2-feet of turns, elbows, and valves.
 4. On the upstream side of tees, branches, and other distribution points.
 5. On both sides of walls and floors through which the piping passes.
- G. Conform identification Colors to the following:

Color Schedule				
Pipe Contents		Pipe Color	Marker Color	Letter Color
Abbreviation	Identification			



A	Air		blue	white
AC	Activated carbon solution		green	white
AW	Filter air wash		blue	white
BD	Bottom drain		green	white
BBD	Boiler blow-down		yellow	black
BP	Plant bypass		green	white
BW	Filter backwash		green	white
C	Condensate		yellow	black
CD	Chemical drain and vent		yellow	black
CL	Chlorine (gas or liquid state)		yellow	black
CLS	Chlorine solution		yellow	black
CLV	Chlorine gas under vacuum		yellow	black
CN	Centrate		green	white
CS	Caustic soda		yellow	black
CSL	Circulated sludge		yellow	black
CV	Chlorine vent & detection line		yellow	black
CWR	Chilled water return		green	white
CWS	Chilled water supply		green	white
DCS	Defoaming chemical solution		green	white
DN	Decant		green	white
DSL	Digested sludge		yellow	black
DW	Demineralized water		green	white
EE	Engine exhaust		yellow	black
EWR	Engine cooling water return		green	white
EWS	Engine cooling water supply		green	white
F	Froth (scum)		yellow	black



FC	Ferric chloride		yellow	black
FE	Final effluent		green	white
FI	Filter influent		green	white
FOR	Fuel oil return		yellow	black
FOS	Fuel oil supply		yellow	black
FS	Froth spray		green	white
FSP	Fire protection sprinkler system		red	white
G	Grit		yellow	black
HR	Heating water return		yellow	black
HS	Heating water supply		yellow	black
HWR	Domestic hot water return		yellow	black
HWS	Domestic hot water supply		yellow	black
IA	Instrument air		blue	white
IE	Intermediate effluent		green	white
LA	Liquid alum		yellow	black
LE	Lagoon effluent		green	white
LO	Lube oil		yellow	black
LPG	Liquified petroleum gas		yellow	black
LS	Lime slurry		yellow	black
LSP	Landscape sprinkler system		green	white
ML	Mixed liquor (aeration tank effluent)		yellow	black
NG	Natural gas		yellow	black
O	Ozone		yellow	black
OF	Overflow		green	white
OX	Oxygen		yellow	black



PA	Plant air		blue	white
PD	Plant drain		green	white
PEA	Polymer-anionic		green	white
PEC	Polymer-cationic		green	white
PEN	Polymer-nonionic		green	white
PEF	Primary effluent		yellow	black
PI	Plant influent		yellow	black
PO	Plant overflow		green	white
PW	Potable water		green	white
RAS	Return activated sludge		yellow	black
REW	Reclaimed water		purple	white
RSL	Raw sludge (primary sludge)		yellow	black
RW	Raw water		green	white
RWL	Rain water leader		green	white
S	Scum		yellow	black
SA	Sample lines		yellow	black
SC	Spare chemical		yellow	black
SD	Sanitary drains and vents		yellow	black
SDR	Storm drain		green	white
SE	Secondary effluent		yellow	black
SF	Sludge filtrate		yellow	black
SG	Sludge gas		yellow	black
SI	Sodium silicate		yellow	black
SL	Sludge		yellow	black
SN	Supernatant		yellow	black
SO	Sulfur dioxide (gas or liquid state)		yellow	black



SOW	Softened water		green	white
SOS	Sulfur dioxide solution		yellow	black
SOV	Sulfur dioxide gas under vacuum		yellow	black
SPD	Sump pump discharge		green	white
SS	Sanitary sewer		yellow	black
ST	Steam		yellow	black
SUC	Structure underdrain collector		green	white
SV	Sulfur dioxide vent		yellow	black
SW	Filter surface wash		green	white
TFE	Trickling filter effluent		yellow	black
TPI	Tertiary plant influent		yellow	black
TPR	Thickener pressurized recycle (DAF)		yellow	black
TS	Thickener subnatant (DAF)		yellow	black
TSL	Thickened sludge (DAF)		yellow	black
TSO	Thickener subnatant overflow (DAF)		yellow	black
UW	Utility water (non-potable water)		yellow	black
V	Vacuum		blue	white
WAS	Waste activated sludge		yellow	black
WLO	Waste lube oil		yellow	black
WW	Filter waste washwater		yellow	black

3.17 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 & Razor 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 & Razor 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.



3.18 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-2	Surfaces in chlorination room, chlorine storage room.	Commercial blast cleaning SSPC SP6	(100) amine-cured epoxy
FM-3	Surfaces of equipment and ferrous surfaces submerged or intermittently submerged in potable water, utility water, and wastewater including all surfaces lower than 2 feet above high water level in hydraulic structures, and all surfaces inside enclosed hydraulic structures and vents (excluding shop-coated valves, couplings, pumps).	White metal blast cleaning SSPC SP5	(100) amine-cured epoxy
FM-4	Surfaces exposed to high temperature (between 251 and 500 degrees F).	Near white metal blast cleaning SSPC SP10	(6) inorganic zinc, silicone resin
FM-5	Surfaces exposed to high temperature (between 501 and 1000 degrees F).	Near white metal blast cleaning SSPC SP10	(3) aluminum silicone resin
FM-6	Buried small steel pipe.	Removal of dirt, grease, oil	(200) PVC tape
FM-7	Where indicated, ferrous surfaces in water passages of all valves 2-inch size and larger, exterior surfaces of submerged valves.	White metal blast cleaning SSPC SP5	(102) polyamide-cured epoxy



FM-8	Where indicated, ferrous surfaces in water passages and submerged surfaces of all pumps which have discharge size of 4 inches or larger.	White metal blast cleaning SSPC SP5	(100) amine-cured epoxy
FM-9	Ferrous surfaces of sleeve couplings.	Solvent cleaning SSPC SP1, followed by white metal blast cleaning SSPC-SP10	(106) fusion-bonded epoxy
FM-10	All ferrous surfaces of sluice gates, flap gates, and shear gates, including wall thimbles.	White metal blast cleaning SSPC SP5	(102) polyamide-cured epoxy
FM-11	Buried surfaces that are not indicated to be coated elsewhere.	Near white metal blast cleaning SSPC SP10	(100) amine-cured epoxy
FM-12	Interior surfaces of all chemical tanks, including tank nozzles, manholes, nozzle necks, flange faces.	White metal blast cleaning SSPC SP5	(107) chemical-resistant sheet lining
FM-13	External surfaces of buried steel tanks.	White Metal blast cleaning SSPC SP5	(100) amine-cured epoxy
FM-14	Structural steel, miscellaneous metalwork, and supports for prefabricated metal buildings.	Near white metal blast cleaning SSPC SP10	(5) inorganic zinc/polyurethane
FM-15	Structural steel, miscellaneous metalwork, and supports for roof and face support systems for buildings.	Near white metal blast cleaning SSPC SP10	(5) inorganic zinc/polyurethane
FM-16	Surfaces of indoor equipment, not submerged	Commercial blast cleaning SSPC SP6	(8) epoxy, equipment



FM-17	Buried pipe couplings, valves, fittings, and flanged joints (where piping is plastic).	Removal of dirt, grease, oil	(201) rich portland cement mortar
FM-18	Buried pipe couplings, valves, and flanged joints (where piping is ductile or cast iron, not tape-coated), including factory-coated surfaces.	As specified by reference specification	(205) polyethylene encasement
FM-19	Buried pipe couplings, valves, and flanged joints (where piping is mortar-coated steel or reinforced concrete), including factory-coated surfaces.	Removal of dirt, grease, oil	(206) cement-mortar coating

B. Coating System Schedule, Ferrous Metal - Galvanized: Apply pretreatment coatings, barrier coatings, or washes as recommended by the coating manufacturer. Coat all galvanized surfaces.

	Item	Surface Prep.	System No.
FMG-1	All exposed surfaces indoors and outdoors, except those included below.	Solvent cleaning SSPC SP1	(4) aliphatic polyurethane
FMG-2	Surfaces in chlorinator room, chlorine storage room.	Solvent cleaning SSPC SP1	(100) amine-cured epoxy
FMG-3	Buried small steel pipe.	Removal of dirt, grease, oil	(200) PVC tape



FMG-4	Surfaces buried or submerged in water or wastewater, including all surfaces lower than two feet above high water level and all surfaces inside enclosed hydraulic structures and vents.	Solvent cleaning SSPC SP1 followed by brush-off grade blast cleaning SSPC SP7	(100) amine-cured epoxy
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C. Coating System Schedule, Steel Water Reservoir Interior: For steel water reservoir exterior coating system, see "Coating System Schedule, Ferrous Metal-Not Galvanized." Perform all surface preparation and coating work on the interior surfaces of steel water reservoirs in the field.

	Item	Surface Prep.	System No.
SR-1	All interior surfaces including all plates, lap roof plate edges (both sides), roof structural members, fittings, and vents, underside of column bases, floor under column bases before columns set in place, submerged contact surfaces that are not accessible after erection. The interior and exterior surface of the overflow, drain and other piping out to the first valve or coupling.	SSPC SP10	(105)

D. Coating System Schedule, Interior Surfaces of Welded Steel Tanks: For steel tank exterior coating systems, see "Coating System Schedule, Ferrous Metal-Not Galvanized":

Product Stored	Surface Prep.	System No.
Zinc orthophosphate	White metal blast cleaning SSPC SP5	(107) Natural rubber (soft) or neoprene
Liquid alum	White metal blast cleaning SSPC SP5	(107) Natural rubber (soft) or



		neoprene
Polymer	White metal blast cleaning SSPC SP5	(107) Natural rubber (soft) or neoprene
Sodium bisulfite	White metal blast cleaning SSPC SP5	(107) Natural rubber (soft) or neoprene
Ferric chloride	White metal blast cleaning SSPC SP5	(107) Natural rubber (hard)
Aqueous ammonia	White metal blast cleaning SSPC SP5	(107) Chlorobutyl rubber
Caustic soda	Commercial blast cleaning SSPC SP6	No coating
Sodium hypochlorite	White metal blast cleaning SSPC SP5	(107) Chlorobutyl rubber
Sulfuric acid (maximum 50% concentration)	White metal blast cleaning SSPC SP5	(107) EPDM or Hypalon
Hydrofluosilicic acid	White metal blast cleaning SSPC SP5	(107) Chlorobutyl rubber
Water, potable water, utility water	White metal blast cleaning SSPC SP5	(100) Amine-cured epoxy

3.19 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-1	All exposed surfaces, indoors and outdoors, except those included below.	Solvent cleaned SSPC SP1	(4) aliphatic polyurethane
NFM-2	Chlorination room, chlorine storage room.	Solvent cleaned SSPC SP1	(100) amine-cured epoxy
NFM-3	Aluminum surfaces in contact with concrete, or with any other metal except galvanized ferrous metal.	Solvent cleaned SSPC SP1	(208) aluminum metal isolation



NFM-4	Polyvinyl chloride plastic piping, indoors and outdoors, or in structures, not submerged.	Solvent cleaned SSPC SP1	(7) acrylic latex
NFM-5	Fiber glass surfaces.	See plastic, fiber glass and nonferrous metals surface preparation as specified herein	(12) aliphatic polyurethane fiber glass
NFM-6	Buried non-ferrous metal pipe.	Removal of dirt, grease, oil	(200) PVC tape

3.20 COATING SYSTEM SCHEDULE-CONCRETE

A. Coating System Schedule, Concrete

	Item	Surface Prep.	System No.
C-1	All surfaces indoors and outdoors, where indicated.	See Concrete And Concrete Block Masonry Surface Preparation as specified herein	(11) aliphatic polyurethane, concrete
C-2	Submerged in water or wastewater including surfaces up to 2 feet above high water line and down to 2 feet below low water line and all surfaces in an enclosed structure.	See Concrete And Concrete Block Masonry Surface Preparation as specified herein	(108) epoxy, concrete
C-2	Submerged in wastewater including surfaces up to 2 feet above high water line and down to 2 feet below low water line and all surfaces in an enclosed structure.	See Concrete And Concrete Block Masonry Surface Preparation as specified herein	(112) vinyl ester, concrete
C-3	Floor slab and walls, exposure to chemicals, where indicated.	See Concrete And Concrete Block Masonry Surface Preparation as specified herein	(108) epoxy, concrete
C-4	Walls, floors, exposure to chemical splash, washdown, where	See Concrete And Concrete Block Masonry Surface Preparation as	(11) aliphatic polyurethane,



	indicated	specified herein	concrete
C-5	Interior surfaces of sewer manholes, lift station wet wells, and including sidewalls, bottom, and metal appurtenances, for manholes indicated.	See Concrete And Concrete Block Masonry Surface Preparation as specified herein	(109) Modified Silicon Polyurea

3.21 COATING SYSTEM SCHEDULE-CONCRETE BLOCK MASONRY

A. Coating System Schedule, Concrete Block Masonry:

	Item	Surface Prep.	System No.
CBM-1	All surfaces, indoors and outdoors, where indicated.	See Concrete And Concrete Block Masonry Surface Preparation as specified herein	(10) acrylic, concrete
CBM-1	All surfaces, indoors and outdoors, where indicated.	See Concrete And Concrete Block Masonry Surface Preparation as specified herein	(11) aliphatic polyurethane, concrete
CBM-2	Submerged in wastewater, including all vertical masonry surfaces above waterline where indicated.	See Concrete And Concrete Block Masonry Surface Preparation as specified herein	(108) epoxy, concrete
CBM-3	Exterior surfaces, above grade, where indicated.	See Architectural Concrete Block Masonry Surface Preparation as specified herein	(204) water-retardant

3.22 COATING SYSTEM SCHEDULE - MISCELLANEOUS SURFACES

A. Coating System Schedule, Miscellaneous Surfaces:

	Item	Surface Prep.	System No.
MS-1	Wood, indoors and outdoors.	Per manufacturer's printed instructions	(209) alkyd-wood
MS-1	Wood, indoors and outdoors.	Per manufacturer's printed instructions	(210) acrylic-wood
MS-2	Drywall	Per manufacturer's printed instructions	(211) acrylic-drywall



- END OF SECTION -



SECTION 26 00 00 – GENERAL SPECIFICATIONS FOR ELECTRICAL WORK

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. Mount and wire isolation transformers, operator stations, and power conversion equipment for all variable speed drive systems furnished under this section or other sections of the Specifications.
- I. Mount and wire any power factor correction capacitors furnished under other Sections of these Specifications. Where capacitors are furnished with quick – release latched covers, furnish and install a bolt and nut on each latch.
- J. Mount and wire process instruments furnished under other sections of these specifications. Furnish and install all conduit, wire, and interconnections between process instrumentation primary elements, transmitters, local indicators, and receivers. Mount and wire all lightning and surge protection equipment at process instrumentation transmitters and receivers.
- K. Make all field connections to process instrument panels and other control panels



and devices furnished under this section and other sections of the Specifications.

- L. Mount and make field connections to packaged equipment, process equipment, controls, and devices furnished under this section and other sections of the specifications.
- M. Furnish and install all conduit and wire between motor operated doors and windows, HVAC units, hoists, and other non – process equipment, and their controls and devices furnished under this section or other sections of the specifications.
- N. Furnish and install all thermostats, agastats, and other devices furnished under other sections of the specifications directly controlling unit heater fan motors.
- O. Mount and wire electric heaters furnished under 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 [[[Specifier to Insert]]].
- 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 herein.

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. Provide submittals, samples for testing, and testing of materials in accordance with Section 01 33 00 – Contractor Submittals and Section 01 45 00 – Quality Control.
- B. Submittals: Submit the following:
 - 1. Submit product information on all electrical components, suitable for engineer to determine compliance with specification.

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 Galvanized Steel Conduit:** Provide rigid steel conduit which is mild steel, hot-dip galvanized inside and out. Furnish rigid steel conduit manufactured in accordance with ANSI C80.1 – Rigid Steel Conduit, Zinc Coated, and UL-6.
 3. **Rigid Non – Metallic Conduit:** Provide rigid non-metallic conduit which is Schedule 40 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.
 4. **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.
 5. **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.
 6. **Flexible Metallic Tubing:** Utilize flexible metallic tubing under the provisions of NEC Article 360. Provide flexible metallic tubing that is hot dipped galvanized steel strips shaped into interlocking convolutions firmly joined to one another assuring a complete lock. Only use flexible metallic tubing indoors for connection to lighting fixtures in NEMA 1 administration and office areas.



Furnish and install insulated bushings at terminations for conductor protection.

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 1 Area Surface Mount:** Provide sheet steel boxes in NEMA 1 areas unless otherwise shown on the Drawings. Provide boxes which are hot dipped galvanized and have continuously welded seams. Ground smooth and galvanize welds. Flange box bodies and ensure without holes or knockouts. Do not provide box bodies less than 14 gauge metal and covers not less than 12 gauge metal. Gasket and fasten covers with stainless steel screws. Furnish conduit connections by conduit hubs only. Provide boxes as manufactured by Hoffman Engineering Co. or equal.
- 2. NEMA 1 Area Flush Mount:** Provide ot-dipped galvanized stressed steel switch and outlet boxes as manufactured by the Adelet Co., O.Z. Manufacturing Co., or equal.
- 3. NEMA 4 Areas:** Provide boxes in NEMA 4 areas which are cast aluminum or cast iron type. Manufacture cast aluminum boxes from copper free aluminum and cast iron boxes which are hot-dipped galvanized. Furnish boxes with gasketed covers and corrosion resistant mounting hardware. Provide products as manufactured by the Crouse-Hinds Co., Appleton Electric Co., Killark Electric Co., or equal.
- 4. 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.
- 5. NEMA 7 Areas:** Require boxes in NEMA 7 areas be of the watertight (NEMA 4) explosion proof type. Procure body and covers which are constructed of copper free cast aluminum with zinc plated steel attachment hardware and stainless steel hinges. Provide neoprene waterproof gaskets. Provide boxes which are EJB series by Crouse-Hinds, Appleton Electric Co., or equal.
- 6. Cast or Malleable Iron Device Boxes:** Provide cast or malleable iron device boxes of Type FD. Provide cast or malleable iron boxes and fittings which have cadmium-zinc finish, threaded conduit connections, cast covers, and stainless steel screws as manufactured by the Crouse-Hinds Co., or equal.
- 7. 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.
- 8. Conduit Hubs:** Provide conduit hubs as manufactured by Myers Electric



Products, Inc., Raco Div., Appleton Electric Co., or equal.

9. **Conduit Wall Seals:** Provide conduit wall seals which are Type WSK as manufactured by the O.Z. Electrical Mfg. Co., or equal.
 10. **Combination Explosion/Deflection Fittings:** Provide combination expansion-deflection fittings which are Type XD as manufactured by the Crouse-Hinds Co., or equal.
 11. **Explosion Proof Fittings:** Provide explosion proof fittings as manufactured by the Crouse-Hinds Co., Appleton Electric Co., O.Z. Electrical Manufacturing Co., or equal.
 12. **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. Wall and Floor Slab Opening Seals:** Seal wall and floor slab openings with "FLAME-SAFE" as manufactured by the Thomas and Betts Co. or equal.
- F. Control Junction and Terminal Boxes:** Conform boxes furnished to the requirements for boxes and fittings for power and control and to the following additional requirements:
1. Furnish each box with 15 amp, 300 volt terminal strips. Stand-off mount the terminal strips from the box back and provide sufficient space for terminal identification.
 2. Provide a minimum of 25 percent spare terminals in all terminal boxes.
 3. **NEMA 1 areas:** Utilize boxes rated NEMA 12 for instrumentation/alarm boxes for NEMA 1 areas.
- G. 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 40 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. Manholes and Handholes:** Provide manholes and handholes which are precast reinforced concrete structures with full bottom and sides and central drain sump. Furnish tops which are either reinforced concrete or galvanized steel plate as detailed on the Drawings. Provide manholes designed for a Class H20 wheel load. Furnish manholes and pullbox covers which are Neenah Foundry No. R-1755-G or equal. Furnish pulling - in irons and cable racks for units larger than 36 inches square. Ensure any required cable racks, pulling-in irons, and hardware required in manholes or pull boxes be galvanized steel. Size block outs for duct bank entrance windows to conform to duct bank elevations and duct bank contents as detailed on the Drawings. Ensure reinforcing rods which are displaced by the location of the duct bank block out are bent outward to tie into the duct bank concrete. Cast two sleeves in the manhole and handhole floor to provide for insertion of grounding rods. Ensure entrance hatches are not less than 36 inches square (or the size of the lid if less than 36 inches square). Size manholes in accordance with Article 370 of the National Electric Code.
- C. Duct Banks:** Furnish underground ducts that are Schedule 40 PVC. Encase ducts in red-dyed concrete with steel reinforcing bars. Provide Class M concrete conforming to Section 03 31 10 – Portland Cement Concrete. Require colorant be 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.
- D. Above – Ground Pull Boxes:** Furnish above ground pull boxes with a 10 GA. 316 stainless steel cover with 7/16" steel plate bottom hot-dipped galvanized after punching. Size boxes for each feeder in accordance with Articles 370 and 300-34 of the National Electrical Code. In particular, size boxes so that after final installation, the bending radius is not less than twelve (12) times the overall diameter of the conductors. Size above Ground Pull Boxes that contain splices or taps, where approved in writing by the ENGINEER, in accordance with Article 370-6 and Tables 370-6 (A) and 370-6 (B) of the National Electrical Code.

2.4 CABLE TRAYS



- A. General:** Cable tray runs outline the general routing of raceways. Select actual routing in the field to follow Drawings as closely as possible and to avoid interfering with pipes, ducts, structural members, or other equipment. Deviations in routing from that shown on the Drawings must be approved by the ENGINEER, at no additional cost to the OWNER.
- B.** Furnish cable trays which are a NEMA VE 1 Class 20C ladder type tray. Provide trays that are aluminum finished to ASTM A123, hot – dip galvanized after fabrication. Fabricate inside width as indicated on the drawings. Furnish cable trays with a minimum width of 12 inches, or as shown on the drawings, with a 6 inch NEMA VE 1 nominal inside depth (load depth). Provide fittings with a minimum bending radius of 24 inches except where other dimensions are shown on the drawings. Ensure rung spacing is 9 inches on center. Furnish inside radius of fittings as indicated.
- C.** Provide the following fittings as shown or as required for a complete system: elbows, tees, crosses, risers, reducers, expansion joints, barrier strips with protector, bonding jumpers, hangers, supports, conduit clamps, cable clamps, box connectors, cable dropouts, and other accessories. Provide accessories which are 316 SS or Aluminum.
- 1. Wall Penetration Sleeves:** Provide pre-fabricated wall penetration sleeves for cable tray routed through wall and partition openings. Provide flanged penetration sleeves that are made from hot-dipped galvanized after fabrication steel. Provide all necessary mounting hardware. Provide hardware which is 316SS. Provide sleeves by PW-Industries Inc.; MPHusky; or equal.
 - 2. Bus Connector Boxes:** Provide entry bus connector boxes for routing cable tray cable at switchgear or other metal structures. Flanged boxes should be mounted to metal structures as recommended by the structure manufacturer. Provide all necessary mounting hardware. Provide boxes as manufactured by PW Industries Inc.; MPHusky; or equal.
 - 3. Through-Penetration FireStop Seals:** Provide firestop pillows or seals for cable tray penetration through walls and partition openings. Provide seals with fire ratings equal or greater than the wall material penetrated. Provide UL listed firestops that are removable for changes to the cabling system. Provide firestop material as manufactured by PW Industries; 3M; or equal.
- D.** Provide the NEMA class cable tray designation that is the next higher NEMA class designation for the proposed cable tray support span length. Calculate the cable tray working load as the maximum cable loading allowed by NEC plus a 200-lb concentrated static load applied between the side rails at midspan. Ensure a factor of safety of 1.5.
- E.** Provide a cable tray suitable for use as a grounding conductor in accordance with NEC and UL. Provide and install ground conductor clamps for each section, elbow, tee, cross, and reducer sized for the ground conductor.
- F. Warning Signs:** Provide permanent warning labels on all straight sections and fittings with the following wording: WARNING! DO NOT USE CABLE TRAY AS A



WALKWAY, LADDER OR SUPPORT. USE ONLY AS A MECHANICAL SUPPORT FOR CABLES AND TUBING.

2.5 WIRE AND CABLE

- A. Indoor Applications (600 Volt or Less):** Provide wire for lighting, receptacles, and other single phase circuits which is NEC Type THHN/THWN; 12 stranded minimum size. Provide wire for all three-phase power circuits which is NEC Type THW for conductors. Provide wire for control circuits which is NEC Type THHN/THWN No. 14 stranded.
- B. 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 multi-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.
- C. 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.
- D. Variable Frequency Drive (VFD) Cable:** Install 600 volt VFD cable between all variable frequency drives and motors. Provide wire which consists of 3 conductors, 90 degree C wet or dry rated, stranded, insulated with heat and moisture resistant cross-linked polyethylene, phase identified, cabled together with suitable fillers and 3 symmetrical #4 minimum bare copper ground conductors. Cover cable core with a 5-mil helical copper tape shield and an overall flame and sunlight resistant black PVC jacket. Ensure cable is rated for VFD applications. Furnish and install termination kits designed for the helical copper tape shield. Provide cable in accordance with UL 1277, IEEE 383, IEEE 1202, ICEA T-29-520, ICEA S-95-658, and NEMA WC-70.
- E. Instrumentation Cable:** Furnish instrumentation cable that is rated at 600 volts. Furnish individual conductors that are No. 16 AWG stranded, tinned copper. Provide insulation that is color coded polyethylene: black-clear for two-conductor cable and black-red-clear for three-conductor cable. Ensure instrumentation cables are composed of the individual conductors, an aluminum polyester foil shield, a No. 18 AWG stranded tinned copper drain wire, and a PVC outer jacket. Provide two conductor shielded cable which are UL 2106 Type as



manufactured by Belden, Alpha, or equal. Provide three conductor shielded cable which are UL 2107 type as manufactured by Belden, Carol Cable, or equal. Design terminal boxes on motors to accept the conduit sizes and quantities shown on the drawings. Otherwise, furnish and install a stainless steel junction box below the motor terminal box designed for accepting the conduits and connecting to the motor terminal boxes as allowed by the NEC.

- F. Medium Voltage Cable:** Furnish individual conductors which are copper, Class B, stranded. Furnish cable used in conduit or duct which is composed of a single conductor, ethylene-propylene rubber (EPR) insulation rated at 90 degrees C, shield, and black chlorosulfonated polyethylene (CPE). Ensure insulation level is 133%, 115 mil. Provide cable which is UL Type MV-90 in accordance with UL 1072 – UL Standard for Safety – Medium Voltage Power Cables, as manufactured by Okonite, or equal. For 4160 volt service, provide conductors which are rated 5 KV minimum. Provide conductor which is copper with a corona, ozone and moisture resisting 115 mils EPR insulation rated to withstand a copper temperature of 90 degrees C without deterioration. Furnish a shielding which is 5 mil copper tape. Employ a PVC jacket which is overall. Provide conductors which are 5 KV which are Okonite Okoguard-Okoseal Type MV90 or equal. Provide cable for 15 kV used in conduit or duct which is composed of a single conductor, ethylene-propylene rubber (EPR) insulation rated at 105 degrees C, shield and black chlorosulfonated polyethylene (CPE) outer jacket. Ensure the insulation level is 133%. Provide cable that is UL Type MV-105 in accordance with UL 1072 as manufactured by Okonite, or equal.
- G. 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 & 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.
- H. 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.

- I. **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.
- J. **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.
- K. **Fire – Proofing Tape:** Furnish fire - proofing tape which is Scotch No. 77 fire and electric arc proofing tape. To hold fire-proofing tape in place, band with two (2) overlapping laps of Scotch No. 69 glass cloth electrical tape.
- L. **Wall and Floor Slab Opening Seals:** Seal wall and floor slab openings with "Flame-Safe" as manufactured by Thomas & Betts Co. or equal.

2.6 WIRING DEVICES

- A. **Wall Switches:** Furnish wall switches that are heavy duty, specification grade, toggle action, flush mounting quiet type. Conform all switches to the latest revision of Federal Specification WS 896. Provide wall switches of the following types and manufacturer:
 - 1. Single pole, 20 Amp, 120/277 Volt - Arrow-Hart, Catalog No. 1991, similar to Harvey Hubbell, Inc.; Pass & Seymour, Inc. or equal.
 - 2. Double pole, 20 Amp, 120/277 Volt - Arrow-Hart, Catalog No. 1992, similar by Harvey Hubbell, Inc.; Pass & Seymour, Inc. or equal.
 - 3. Three way, 20 Amp, 120/277 Volt - Arrow-Hart, Catalog No. 1993, similar by Harvey Hubbell, Inc.; Pass & Seymour, Inc. or equal.
 - 4. Four way, 20 Amp, 120/277 Volt - Arrow-Hart, Catalog No. 1994, similar by Harvey Hubbell, Inc.; Pass & Seymour, Inc. or equal.
 - 5. Single pole, 20 Amp, 120/277 Volt - key operated, Arrow-Hart Catalog No. 1991-L, similar by Harvey Hubbell, Inc.; Pass & Seymour, Inc. or equal.
 - 6. Single pole, 20 Amp, 120 Volt - red pilot-lighted handle, Arrow-Hart, Catalog No. 1991PL, similar by Harvey Hubbell, Inc.; Pass & Seymour, Inc. or equal.
 - 7. Single pole, 20 Amp, 120 Volt, clear lighted handle, Arrow-Hart, Catalog No. 1991ILC, similar by Harvey Hubbell, Inc. or equal.
 - 8. Momentary contact, three position, 2 circuit, center off - Arrow-Hart, Catalog No. 1895, similar by Harvey Hubbell Inc.; Pass & Seymour, Inc. or equal.
- B. **Fluorescent Wall Dimmer Switch:** Fluorescent wall box dimmer switch for 120/277



Volt control of rapid start fluorescent lamps with a dimming range of 100 percent to .5 percent light for 120 Volt and 100 to 1 percent light for 277 Volt. Provide dimmer switch controls as manufactured by Lutron Electronics Co., Inc., similar by Lithonia Control Systems; Valmont Electric, Inc. or equal.

- C. Explosion Proof Single Pole Factory Sealed Switch:** Provide explosion - proof single pole factory sealed switches for 20 Amps, 120/277 volts, mounted in copper free aluminum or malleable iron cast boxes and be similar and equal to Crouse-Hinds EDS Series, similar by Appleton Electric Co.; Killark or equal.
- D. Receptacles:** Provide receptacles which are heavy duty, specification grade of the following types and manufacturer or equal. Conform receptacles to Fed Spec WC596-F.
1. Duplex, 20 Amp, 125 Volt, 2 Pole, 3 Wire; Arrow-Hart, Catalog No. 5362, similar by Harvey Hubbell, Inc.; Pass & Seymour, Inc. or equal.
 2. Weatherproof/corrosion resistant single, 20 Amp, 125 Volt, 2 Pole, 3 Wire, with cover; Crouse-Hinds Co., Catalog No. WLR5-5-20, similar by Appleton Electric or equal.
 3. Weatherproof/corrosion resistant duplex, 20 Amp, 125 Volt, 2 Pole, 3 Wire, with cover; Crouse-Hinds Co., Catalog No. WLRD-5-20, similar by Appleton Electric or equal.
 4. Ground fault interrupter, duplex, 20 Amp, 125 Volt, 2 Pole, 3 Wire, GFCI feed thru type with "test" and "reset" buttons. Arrow-Hart, Catalog No. GF5342, similar by Harvey Hubbell, Inc.; Pass & Seymour, Inc. or equal.
 5. Duplex, 20 Amp, 125 Volt, 2 Pole, 3 Wire, transient voltage surge suppressor and audio alarm or indicating light to indicate bad ground or failed MOV. Arrow-Hart, Catalog No. 5362S, similar by Harvey Hubbell, Inc.; Pass & Seymour, Inc. or equal.
 6. Clock hanger single, 15 Amp, 125 Volt, 2 Pole, 3 Wire, with hanging hook on device plate. Arrow-Hart, Catalog No. 452, similar by Harvey Hubbell, Inc.; Pass & Seymour Inc. or equal.
 7. Single, "power lock", 20 Amp, 125 Volt, 2 Pole, 3 Wire; Arrow-Hart, Catalog No. 23030 and plug Arrow-Hart, Catalog No. 23035N, similar by Harvey Hubbell, Inc.; Pass & Seymour, Inc. or equal.
 8. Single, 20 Amp, 250 Volt, 2 Pole, 3 Wire; Arrow-Hart, Catalog No. 5861, similar by Harvey Hubbell, Inc.; Pass & Seymour, Inc. or equal.
 9. Single twist-lock, 30 Amp, 125 Volt, 2 Pole, 3 Wire; Arrow-Hart, Catalog No. 6330; plug: Arrow-Hart, Catalog No. 6332, similar by Harvey Hubbell, Inc.; Pass & Seymour, Inc. or equal.
 10. Single twist-lock, 20 Amp, 250 Volt, 2 Pole, 3 Wire; Arrow-Hart, Catalog No. 6210; plug: Arrow-Hart, Catalog No. 6212, similar by Harvey Hubbell, Inc.; Pass & Seymour, Inc. or equal.



11. Single twist-lock, 30 Amp, 250 Volt, 2 Pole, 3 Wire; Arrow-Hart, Catalog No. 6340; plug: Arrow-Hart, Catalog No. 6342, similar by Harvey Hubbell, Inc.; Pass & Seymour, Inc. or equal.
12. Explosion-proof single, 20 Amp, 125 Volt, 2 Pole, 3 Wire; Appleton Electric, Catalog No. CPC1-2350 and plug, Appleton Electric Catalog No. CPP-2033 similar to Crouse-Hinds; Harvey Hubbell Inc or equal.
13. Explosion-proof duplex, 20 Amp, 125 Volt, 2 Pole, 3 Wire; Appleton Electric, Catalog No. CPC2-2350 and plug, Appleton Electric Catalog No. CPP-2023 similar by Crouse-Hinds; Harvey Hubbell, Inc. or equal.

E. Device Plates:

1. Furnish plates or indoor flush mounted devices which have the required number of gangs for the application involved and are as follows: Interior Administration type buildings: Smooth, high impact nylon of the same manufacturer and color as the device. Final color to be as selected by the Architect. Where permitted in other areas of the plant, provide flush mounted devices in cement block construction which are Type 302 high nickel (18-8) stainless steel of the same manufacturer as the devices.
2. Provide plates for indoor surface mounted device boxes which are cast metal of the same material as the box, Crouse-Hinds No. DS23G and DS32G, or equal.
3. Install oversized plates where standard plates do not fully cover the wall opening.
4. Provide gasketed, cast aluminum device plates for switches mounted outdoors or indicated as weatherproof with provisions for padlocking switches "On" and "Off", Crouse Hinds No. DS185, or equal.
5. Gang multiple surface mounted devices in a single, common box and provided with an adapter, if necessary, to allow mounting of single gang device plates on multigang cast boxes.
6. Provide engraved device plates where required.
7. Provide weatherproof, gasketed covers for GFI receptacle mounted in a FS/FD box which are Arrow-Hart, Catalog No. 4501-FS, similar by Harvey Hubbell, Inc.; Pass & Seymour, Inc. or equal.

F. Three Phase Power Receptacles: Provide three phase power receptacles and plugs which are rated for the voltage and current ratings of the connected load unless otherwise shown on the Drawings.

G. Interlocked Three Phase Power Receptacles: Ensure interlocked three phase power receptacles include a combination receptacle and a mechanically interlocked disconnect switch. Interlock the two units to prevent removal or insertion of the plug unless the switch is in the OFF position. Provide a matching plug for every unit furnished. Ensure the switch, power receptacle and mating plug are constructed of copper free aluminum. Furnish assemble as listed to UL



Standard 498 for watertight- construction. Provide stainless steel hardware. Ensure maximum working voltage is 600 volts RMS. Ensure dielectric withstand voltage is 3000 volts. Full load break capability at rated current. 5000 connect/disconnect cycles at rated voltage and current. Color code receptacles by voltage, including a one – piece housing with angled backbox, shrouded pins, a self – cleaning gasketed cover, watertight cable entrances and mating keys. Provide a disconnect switch which is fused with ratings as hereinbefore specified. Provide lockout provisions on the disconnect switch handle.

H. Multi – Outlet Assembly:

- 1.** Provide assembly enclosures which consist of two-piece, anodized aluminum raceways which allow for field installation of wiring and standard receptacles as shown on the Drawings. Provide an aluminum surface metal raceway system specified herein for branch circuit wiring and/or data network, voice, video and other low-voltage wiring which is the AL3300 System as manufactured by The Wiremold Company.
- 2.** Ensure the raceway and all system components are UL Listed in full compliance with their standard for surface metal raceways and fittings (UL-5). All extrusions are to be 6063-T5 aluminum alloy, with nominal wall thickness of 0.060-inch throughout. The surface finish is to be #204R1 heavy etched Architectural Class II clear anodized finish.
- 3.** Provide a raceway which is a two-piece design with a base and snap-on cover. Furnish the base sections in 10' lengths and the cover sections in 5' lengths. Ensure the overall dimensions of assembled raceway are 2 7/8-inch wide by 1 7/8-inch deep with a cross-sectional area of 4.40 square inches. Provide a field-installed divider to separate the 2 7/8-inch width into two equal (two 10 square inches) but separate wiring compartments to handle both power and communications wiring.
- 4.** Provide raceways which include all fittings, couplings, etc., for the complete installation of a finished system. Ensure a full complement of fittings for the raceway are available including, but not limited to, flat, internal and external elbows, tee and cross fittings, couplings for joining sections of raceway and transition connectors to 1/2-inch and 3/4-inch trade size conduit. Utilize receptacle cover plates and an offset divider bracket for mounting commercially available duplex devices in an in-line and offset configuration and, rectangular GFCI and Sentrex™ surge receptacles. Provide fittings which have a satin anodized finish to match the raceway.
- 5.** Ensure the raceway includes connectivity outlets and modular inserts for UTP (including Category 5), STP (150 ohm) Fiber Optic, Coaxial and other cabling types with face plates and bezels to facilitate mounting. Provide preprinted station and port identification labels, snap-in icon buttons as well as write-on station identification labels.

2.7 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. Disconnect Switches (Fused):

1. Provide fused 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. Provide fuses that are the rejection type, 600 Volts, 100,000 A.I.C., dual element, time delay, Bussman Fusetron, Class RK 5 or equal.
3. Furnish stainless steel NEMA 4 enclosures.
4. Furnish stainless steel NEMA 4X enclosures.
5. Furnish cast aluminum NEMA 7 enclosures.
6. Provide switches as manufactured by the Square D Co.; General Electric; Cutler-Hammer, or equal.

C. Horsepower Rated Toggle Switch Type Disconnect Switches:

1. Provide toggle type disconnect switches as manufactured of thermoplastic materials with screw-type terminals. Provide switches that are rated 600 VAC and 20A at 600 VAC.
2. Provide toggle type disconnect switches similar to a manual non-reversing starter without overloads and be 3 Pole, capable of “on-off” control of a 10 horsepower motor at 460 VAC.
3. Provide enclosure with lock off provisions.
4. Furnish die-cast zinc NEMA 4 enclosures.
5. Furnish cast aluminum NEMA 7 enclosures.
6. Furnish switches as manufactured by the Square D Co.; Siemens Electrical Products; Cutler-Hammer or equal.



D. Auxiliary Power Heavy – Duty Safety Switches:

1. Provide auxiliary power safety 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. Provide all current carrying parts are copper.
2. Provide safety switches which have an integral 120 Volt receptacle, fed from a 2 kVA transformer secondary, mounted inside the switch enclosure. Protect the transformer with a molded case circuit breaker (208 Volt or 240 Volt primaries) or a pull-out fuse block (480 Volt or 600 Volt primaries). Protect the receptacle with a 20 Amp fuse.
3. Provide a commercial-grade GFI type receptacle with 5mA rating with an in-use weatherproof cover.
4. Provide fuses which are rejection type, 600 Volts, 100,000 A.I.C., dual element, time delay, Bussman Fusetron, Class RK 5 or equal.
5. Furnish a switch which is UL Listed File No. E5239.
6. Furnish a switch which is suitable for channel iron mounting or wall mounting.
7. Furnish stainless steel NEMA 4 enclosures.
8. Furnish stainless steel NEMA 4X enclosures.
9. Furnish cast aluminum NEMA 7 enclosures.
10. Ensure all switches are as manufactured by Eaton/Cutler-Hammer, or equal.

E. Manual Motor Starters:

1. Provide manual starters which are suitable for the voltage and number of phases shown on the Drawings. Provide manual starters which are non-reversing, reversing or two speed type, as shown on the Drawings. Provide NEMA sizes as required for the horsepowers as shown on the Drawings. Provide manual starters with motor overload protection in each phase. Furnish built-in control stations as required or as shown on the Drawings. Furnish starter with lock off provisions.
2. Furnish stainless steel NEMA 4 enclosures.
3. Furnish stainless steel NEMA 4X enclosures.
4. Furnish cast aluminum NEMA 7 enclosures.
5. Provide manual motor starters as manufactured by the Square D Co.; General Electric; Cutler-Hammer, or equal.

F. Magnetic Motor Starters:

1. Provide motor starters that are 2 or 3 Pole, single or 3 Phase as required, 60



Hz, 600 Volt, magnetically operated, full voltage non reversing except as shown on the Drawings. Require NEMA sizes for the horsepower shown on the Drawings. NEMA size 1 is the minimum size.

2. Provide two speed starters for single or two winding motors as shown on the Drawings.
3. Ensure each motor starter has a 120 Volt operating coil, and control power transformer. Provide starters which have motor overload protection in each phase. Provide auxiliary contacts as shown on the Drawings. Provide a minimum of one N.O. and one N.C. auxiliary contacts in addition to the contacts shown on the Drawings.
4. Provide overload relays which are adjustable, ambient compensated and manually reset.
5. Size control power transformers for additional load where required. Equip transformer primaries and secondaries with time delay fuses.
6. Furnish built in control stations and indicating lights where shown on the drawings.
7. Furnish stainless steel NEMA 4 enclosures.
8. Furnish stainless steel NEMA 4X enclosures.
9. Furnish cast aluminum NEMA Type 7 enclosures.
10. Provide magnetic motor starters as manufactured by the Square D Co.; General Electric; Cutler-Hammer or equal.

G. Combination Magnetic Motor Starters:

1. Provide motor starters which have a combination motor circuit protector and contactor, 2 or 3 Pole, single or 3 Phase as required, 60 Hz, 600 Volt, magnetically operated, full voltage non reversing unless otherwise shown on the Drawings. Provide required NEMA sizes for the horsepowers shown on the Drawings. NEMA size 1 is the minimum size. Provide molded case motor circuit protectors with adjustable magnetic trip only. Ensure they are specifically designed for use with magnetic motor starters. Provide motor circuit protectors which are current limiting type, with additional current limiters if required. Provide fully rated combination motor starters for 65,000 Amps RMS symmetrical.
2. Ensure multi speed and reversing starters which include two motor rated contactors mechanically and electrically interlocked so that only one device may be energized at any time.
3. Reduced voltage starters: Auto transformer type with closed circuit transition. Provide auto transformers that are dry type with 50, 65 and 80 percent voltage taps and over temperature protection. Provide pneumatic, adjustable timing relays. Provide relay settings that are approximately 75



percent of relay range.

4. Reduced voltage starters: Solid state, six SCR, full wave type with adjustable current limit and voltage ramp to control starting torque, automatic load sensing circuit to minimize energy consumption, line and load side surge protection and noise suppression and controlled deceleration adjustment to reduce the effects of surges caused by centrifugal pump loads. Provide heat sinks and ventilation to remove heat from the structure. Ensure each starter includes a motor horsepower rated isolation contactor to positively disconnect the line voltage when the SCR control is off.
5. Ensure each motor starter has a 120 Volt operating coil and control power transformer. Equip transformer primaries and secondaries with time-delay fuses. Provide three phase starters which have three overload relays. Provide one normally open and one normally closed auxiliary contact as spares in addition to contacts shown on the Drawings.
6. Provide adjustable, ambient compensated and manually reset overload relays.
7. Furnish built in control stations and indicating lights where shown on the Drawings.
8. Furnish stainless steel NEMA 4 enclosures.
9. Furnish stainless steel NEMA 4X enclosures.
10. Furnish cast aluminum NEMA 7 enclosures.
11. Furnish combination magnetic motor starters as manufactured by the Square D Co.; General Electric; Cutler-Hammer, or equal.

H. Unit Heater Combination Contactors:

1. RESERVED FOR FUTURE

I. Control Stations:

1. Provide heavy duty type control stations with full size (30mm) operators. Provide stop buttons with a lockout latch that can be padlocked in the open position.
2. Furnish stainless steel NEMA 4 enclosures.
3. Furnish stainless steel NEMA 4X enclosures.
4. Furnish cast aluminum NEMA 7 enclosures.
5. Furnish control stations which are Square D Class 9001, similar by Cutler-Hammer; General Electric Co., or equal.

J. General Purpose Dry Type Transformers:



1. Provide transformers which are dry type, two winding with kVA and voltage ratings as shown on the Drawings. Provide transformers which incorporate a 220 degree C insulation system and be designed not to exceed 115 degrees C temperature rise above a 40 degree C ambient full load.
2. Furnish four full capacity taps, two 2 1/2 percent above and two 2 1/2 percent below rated primary voltage.
3. Provide copper windings.
4. Build transformers in accordance with ANSI C89.2 and NEMA ST 20 that are UL.
5. Provide transformers, other than K-rated units, which meet the efficiency levels contained in Tables 4.1 and 4.2 of NEMA Standard TP1-1996 and contain an EPA "Energy Star" label. Test efficiency in accordance with TP1-1996.
6. Furnish transformers in NEMA 1 enclosures unless otherwise noted on the Drawings or as otherwise required. Areas where a NEMA 4X and/or stainless steel enclosure is required, provide transformers of the TENV type.
7. Furnish transformers with hot-dipped galvanized mounting hardware. In NEMA 4X areas or where stainless-steel enclosures are required, provide Type 316 stainless steel hardware.
8. Provide transformers which have a common core construction with low hysteresis and eddy current losses. Ensure the core flux density is below the saturation point to prevent overheating caused by harmonic distortion.
9. Ensure transformer impedance is at a minimum of 3 percent and a maximum of 5 percent.
10. Provide vibration isolators for transformers rated 112.5 kVA and higher.
11. Provide ground lug on frame and strap ground core assembly to frame of enclosure.
12. Provide transformers manufactured by Square D Co.; General Electric Co.; Cutler-Hammer, or equal.

K. Drive Isolation Transformers:

1. Provide transformers that are dry type, two winding with kVA and voltage ratings as shown on the Drawings.
2. Provide transformers specifically designed for drive isolation service.
3. Furnish a minimum of two full capacity taps; one 5 percent above and one 5 percent below rated primary voltage.
4. Place taps symmetrically and furnish additional coil bracing.



5. Ensure the maximum temperature rise is 115 degrees C and provide copper windings.
6. Furnish transformers with hot-dipped galvanized steel mounting hardware.
7. Provide transformers that are General Electric; Square D Co.; Cutler-Hammer, or equal.

L. Noise Isolation Transformers:

1. Provide transformers which are dry type, two winding with kVA and voltage ratings as shown on the Drawings.
2. Furnish a minimum of four full capacity taps; two 2 1/2 percent above and two 2 1/2 percent below rated primary voltage.
3. Furnish electrostatic shielding and "spike" suppression.
4. Ensure maximum temperature rise is 115 degrees C and provide copper windings.
5. Furnish transformers with hot-dipped galvanized steel mounting hardware.
6. Provide transformers which are General Electric Company's "Guard II"; Square D Co. "Ultra Isolator" or equal.

M. Transformer Panel Assembly:

1. **Ratings:** Provide kVA and voltage ratings as shown on the drawings. Provide units designed for continuous operation at rated kVA, for 24 hours a day, 365 days a year operation, with normal life expectancy as defined in ANSI C57.96
2. **Construction:** Ensure each TPA includes a main primary breaker, an encapsulated dry type transformer, and a secondary panelboard with main breaker. Enclose main primary, secondary, and feeder breakers with a padlockable hinged door.
3. **Buses:** Provide Panel Panelboard bus which is copper sized to NEMA 65 degrees C rise.
4. **Wiring/Terminations:** Factory install all interconnecting wiring between the primary breaker and transformer, secondary main breaker and transformer, and distribution section. Equip all transformers with a wiring compartment suitable for conduit entry and large enough to allow convenient wiring.
5. **Main Devices:** Ensure each TPA includes a main primary breaker with an interrupting rating of 65 kA at 480 Volts; and a secondary panelboard with main breaker rated 10 kA interrupting rating at 240 Volts.
6. **Feeder Devices:** Ensure the secondary distribution section accommodates one inch, plug in breakers with 10 kA interrupting capacity.



7. Enclosure: Provide an enclosure made of heavy gauge steel in which the maximum temperature does not exceed 90 degrees C. Ensure the enclosure is totally enclosed, non-ventilated, NEMA Type 3R, with lifting eyes.

N. Transient Voltage Surge Suppression: Provide a TVSS or SPD unit that is a hybrid device utilizing a linear array of balanced MOV (Metal Oxide Varistors) and a series assembly of silicon avalanche diodes. Test and label the TVSS or SPD unit in accordance with the following standards: ANSI/IEEE C62.41, Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits, Category C; ANSI/IEEE C62.45, Guide on Surge Testing for Equipment Connected to Low-Voltage AC Power Circuits; NEMA LS-1 (1992), Low-Voltage Surge Protective Devices; UL 1449 Current Edition; UL 1283 for noise attenuation devices and NEC Article 285. Provide TVSS or SPD as manufactured by United Power Corporation; Transtector Systems; Current Technology or equal. Ensure each unit has:

1. Line Neutral, Line Ground and Neutral Ground connection configuration.
2. One Nanosecond or less response time.
3. Extend noise filtration with a 10 kHz to 100 MHz range.
4. Fused internal disconnect switch with 60 Amps, 300,000 AIC rating.
5. Surge current rating as required per manufacturer recommendation.
6. LED indications.
7. Six digit surge counter.
8. Form C output contacts.
9. Ensure the system voltage is 120/240 grounded neutral, 120/208 grounded wye, 277/480 grounded wye, 240 delta, or 480 delta as indicated on the Drawings.
10. NEMA 12 enclosure (steel type).
11. Ensure the Maximum Continuous Operating Voltage (MCOV) for all voltage configurations is 125 percent of nominal or greater.
12. Furnish a fusing system capable of allowing the rated maximum surge current to pass through without fuse operation.
13. Ensure the TVSS or SPD devices at distribution panels or switchboards are mounted integral to the equipment with leads as short as possible (not to exceed 24-in) and the lead size be a minimum of 6 AWG or larger. Ensure the TVSS or SPD includes an integral disconnect switch which has been tested to the surge current rating of the TVSS or SPD and matches or exceeds the fault current rating of the board. Provide a disconnect switch which switches the phases and neutral.
14. Furnish TVSS or SPD devices at branch panels which are direct bus-to-bus connected with leads as short as possible (not to exceed 24-in) and in which



the lead size is a minimum of 6 AWG or larger.

O. Lightning Arrestor and Surge Capacitor:

1. Provide a lightning arrester that is 650 Volt, 3 Phase, "Tranquell" type; General Electric Co., Catalog No. 9L15ECC001; Square D Co., No. J9200; Cutler-Hammer, Type MW, or equal.
2. Provide a Surge Capacitor that is 650 Volt, 3 Phase, non toxic liquid insulated, General Electric Co., Catalog No. 9L18BAB301; Square D Co.; Cutler-Hammer, or equal.

P. Wireway:

1. Furnish NEMA 1 wireway that is painted steel with screw covers.
2. Furnish stainless steel with gasketed screw covers and stainless steel screws for NEMA 4 and 4X wireways.
3. Provide a NEMA 1 wireway that is Square Duct as manufactured by the Square D Co.; NEMA 4 and 4X that is Bulletin F 22 as manufactured by the Hoffman Engineering Co.; Appleton; Killark, or equal

Q. 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.

R. Control Relays:

1. Provide heavy duty machine tool type control relays, with 10 Amp, 300 Volt convertible contacts. Furnish the number of contacts and coil voltage as shown on the Drawings. Provide general use relays which are General Electric Co., Catalog No. CR120B; similar by Square D Co.; Allen Bradley Co., or equal. Furnish latching relays which are General Electric Co., Catalog No. CR120BL; similar by Square D Co.; Allen Bradley Co. or equal.
2. Furnish time delay relays which are pneumatic, 600 Volt, 20 Amp contacts, with calibrated knob operated adjustment. Furnish on delay and off delay types and timing ranges as shown on the Drawings. Provide relays which are Agastat Model 7012 or 7022; similar by Square D Co.; Cutler-Hammer, or



equal.

S. Power Factor Correction Capacitors:

1. Provide capacitors which are 460 Volt, 3 Phase, 60 Hz, with kVAr ratings as shown on the Drawings.
2. Mount capacitors in indoor dustproof enclosures.
3. Provide capacitors and discharge resistors which are nontoxic liquid insulated and hermetically sealed in steel enclosures.
4. Furnish each capacitor unit with high interrupting capacity current limiting fuses. Equip fuses with "blown fuse" indicators.
5. Provide capacitors as manufactured by the General Electric Co.; Commonwealth Sprague; ABB Controls Inc., or equal.

T. 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.

U. Terminal Blocks:

1. Furnish terminal blocks which are NEMA type rated at 20 amperes minimum, 600 Volt, channel mounted, with tubular screw and pressure plate.
2. Furnish terminal blocks which are Bulletin 1492 as manufactured by the Allen Bradley Co.; ABB; Kukla, or equal.

V. 480 Volt Power Receptacles:

1. Provide 480 Volt power receptacles which are 3 Pole, 4 Wire, grounding pin and sleeve type, NEMA 4 with circuit breaking capability. Follow ampere ratings shown on the Drawings.
2. Provide 480 Volt receptacles that are Cooper/Crouse Hinds, Arktite Series; Thomas & Betts, Russellstoll J-line Series; Hubbell Wiring Devices Twist - Lock



Series, or equal.

3. Furnish and install one matching plug for each receptacle shown on the Drawings.

W. Portable Generator Input Receptacle:

1. Provide portable generator input receptacles which are weatherproof, rated for 600 Volts, 3 Phase, 4 Wire grounding pin and sleeve type with a 15 degree mounting adapter, spring door cover and have ampere ratings as shown on the Drawings.
2. Ensure both receptacle and plug have reversed contacts.
3. Provide receptacle and plug which are Cooper/Crouse Hinds, Arktite Series; Hubbell Wiring Devices, Twist - Lock Series; Thomas Betts Russellstoll J-Line Series, or equal.

X. Pedestal Cabinet:

1. Provide a pedestal cabinet which is outdoor weatherproof type suitable for mounting on a concrete pad as shown on the Drawings. Ensure dimensions are as shown on the Drawings.
2. Construct the pedestal cabinet of heavy gauge sheet steel and adhere to NEMA 3R.
3. Provide a cabinet which has a full size backboard of powder coat steel.
4. Select an interior and exterior finish which is baked enamel (color selected by ENGINEER) over a rust resistant primer.
5. Ensure each door has a three-point latch and pin tumbler type door lock and provisions for padlocking. Furnish six keys.
6. Furnish a pedestal cabinet that has an internally mounted fan with thermostat control and door mounted baffled louvers.
7. Furnish pedestals complete with all mounting hardware and accessories required for installation as shown on the Drawings. Ensure the center post for double door cabinets is removable.
8. Furnish pedestal cabinets with a thermostatically controlled electric heater. Furnish a heater which is 120V, single phase, 100W, with protective cover and integral thermostat. Furnish a heater that is Model D-AH1001A as manufactured by Hoffmann Co.; Chromalox; Berko, or equal.
9. Select a pedestal cabinet as manufactured by Erpel, Inc; Tri-County Enclosures, Inc; Bison ProFab Engineering & Fabrication, or equal.

Y. Intrinsically Safe Relays:

1. Provide intrinsically safe relays which are solid state type with 5 Amp output



contacts, suitable for use on a 120 Volt, 60 Hz power supply and are FM approved for pilot devices in Class I, Division 1, Group D hazardous atmospheres.

2. Provide intrinsically safe relays which are Gems Solid State Safe Pak as manufactured by Gems Sensors, Division of Transamerica Delaval, Inc.; R. Stahl, Inc; MTL Inc., or equal.

Z. Heat Tracing:

1. Furnish heat trace tape which is temperature self-limiting type rated 5 watts per foot at 50 degrees F, 120 Volt, 60 Hz and select a Chemelex, Catalog No. 5BTV1 with stainless steel overbraid and fluoropolymer outer jacket; Nelson; Chromalox, or equal.
2. Ensure ambient air temperature sensing thermostat is adjustable from 15 to 150 degrees F, mounted in NEMA 4X enclosure, and is Chemelex, Catalog No. AMC 1A; Nelson; Chromalox, or equal.
3. Furnish aluminum heat transfer tape which is 2 mil thickness, 2 1/2 in wide and is Chemelex, Catalog No. AT 150; Nelson; Chromalox, or equal.

AA. Emergency Shower Alarm Horn and Light:

1. Provide a vibrating type emergency shower alarm horn for 120 Volts, 60 Hz and that is Federal Signal Corp., Catalog No. 350+WB for surface mounting, Catalog No. 350+FG+FB for flush mounting; Edwards Co., Catalog No. 876-N5 for surface mounting, Catalog No. 870-N5 for flush mounting; Benjamin, Catalog No. ABX for surface mounting, Catalog No. ABY for flush mounting, or equal.
2. Provide a flashing strobe emergency shower alarm light with red fresnel globe, for use on a 120 Volts, 60 Hz power supply, and which is Benjamin Catalog No. KL 4011 120; similar by Federal Signal, Catalog No. 371 DSTLWMB2; Edwards Co., Catalog No. 90R-N5, or equal.

BB. Break – Glass Emergency Stations:

1. Provide Break Glass Emergency Stations of the break glass design with a cast metal outer case finished in fire red and have an attached chain hung "Hammer". Mount a weatherproof glass panel in front of the push button operator. Ensure switch contacts be 1 open, 1 closed, rated 10 Amp, 600 Volts.
2. Fasten a black phenolic nameplate with engraved white lettering to read: [As indicated on Drawings] (28 characters maximum) to the outer case front. Provide a station equal to Key Systems, Inc., Catalog No. 561 S (Surface mounting), 561 (semi flush mounting), similar by Crouse Hinds; Killark or equal

CC. 24 Hour Programmable Timers:

1. Unless otherwise specified, provide time switches of the programmable type capable of being programmed at the intervals as noted on the Drawings



over a 24-hour day. Ensure program tabs are easily set by hand without having to obtain tools or change the desired programming schedule. Maintain the switching condition when adjacent tabs are set alike.

2. Provide a unit powered by a self-starting, enclosed, 120 Volt, synchronous motor capable of continuous accurate operation. Integrally mount a reserve power, precision wound spring and associated escapement device to maintain time settings during power failures of up to 24 hours.
3. Provide a switch mechanism which is a self-contained unit rated at not less than 20 Amps, 120 Volts, single pole, double throw and which is readily replaceable in the field.
4. Furnish an omitting device as an integral part of the time switching operation to be skipped for any pre-selected day or days of the week.
5. Unless otherwise specified, provide time switches as manufactured by Intermatic; TORK; Paragon or equal.

DD. On – Delay, Off – Delay Timers (Solid State): Provide microprocessor based, solid state type on and off delay timers. Ensure timers are Bulletin 651 Multirange, solid state as manufactured by Tenor Co., Inc.; Eagle Signal, CS 300 Series or equal. Furnish timers with the following features:

1. Adjustable timing ranges from 0.1 seconds to 99 hours, 59 minutes minimum.
2. Setpoints entered by pressing membrane covered keyboard on unit.
3. LCD readout of timing progress and setpoint.
4. Adjustable for on delay or off delay modes.
5. Standard sized plug in case.
6. Totally sealed face plate.
7. Sealed battery backup power to retain memory for up to 30 days.
8. Accuracy plus or minus 0.01 second.
9. DPDT isolated instantaneous and timed output contacts rated 6 Amps minimum at 120 Volt.

EE. 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.



FF. 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).

GG. Equipment Mounting Stands: Provide all equipment mounting stands which are custom fabricated from 1/4 in steel plate and 4 in steel channel, as shown on the Drawings. For NEMA 4X areas or where stainless-steel enclosures are required mounting stands and Type 316 stainless steel channels. Ensure hot dip galvanizing conforms to the requirements of Division 5.

HH. Occupancy Sensors:

1. Provide occupancy sensors in areas as shown on the Drawings. Provide sensors which are low voltage, microprocessor based ultrasonic and infrared unit with adjustable sensitivity and time delay functions, LED indicators lamps and relay contacts. Provide control module with low voltage transformer and 20A relay for switching the lighting load. Provide sensors which are OMNI-DT500/1000 Series with MP sensor power pack as manufactured by MYTECH Corporation, similar by Watt Stopper; Leviton Manufacturing Co., or equal.
2. Furnish ceiling mounted occupancy sensors which are wired into the 120 Volt lighting circuits ahead of the area switch controls so that the occupancy sensor activates lights in their "as-left" switched state.

II. Digital Lighting Control Time Switches:

1. Provide time switches for lighting control which have astronomic ON/Timed OFF and Timed ON/astronomic OFF; pulse switching for mechanically held contactors or low voltage latching relay; LCD digital display for basic setting; manual ON/OFF override and 72 hour rechargeable 9 Volt Nickel Cadmium battery back-up and NEMA III indoor/ outdoor enclosure. Furnish time switches which are Tork, Catalog No. DZS 200/120 Volt, by Intermatic; Paragon Electric, or equal.
2. Time switches for control of lighting with photocell ON/time OFF/time ON/photocell OFF (selected days); photocell ON / photocell OFF (every day); remote photocell; 9 Volt lithium battery back-up; manual override; photocell light level control adjustment; LCD digital display and NEMA III indoor/outdoor enclosures. Furnish time switches which are Tork, Catalog No. DGLC-120 Volt similar by Intermatic; Paragon Electric, or equal.

JJ. Momentary Contact Adaptor:

1. Furnish momentary contact adaptors which convert a SPST, 120 VAC input to momentary (2 second ON and OFF) operations. Input connections are made to a two-position terminal strip. Ensure there are two sets of SPDT terminals for connecting to dry contacts (unpowered) - one set for "ON" pulse and one set for "OFF" pulse. Furnish momentary contacts which have



30 Amp inrush capacity for 120, 240, 277 VAC and 30 VDC. Provide a general purpose (NEMA III) non-metallic enclosure and complete assembly that is Tork, Catalog SMC-D similar by Intermatic; Paragon Electric, or equal.

KK. Beacon Alarm Light:

1. Provide a beacon alarm light for building exterior mounting that is flush mounted, weatherproof construction and have a 750,000 candlepower xenon strobe tube and red polycarbonate lens. Provide a beacon alarm light that is Federal Signal, Model 371 DST; similar by Edwards; Wheelock, or equal.

LL. Enclosed Main Circuit Breakers:

1. **Molded case circuit breaker:** 600 Volt, 3 Pole fully rated, insulated case, with integral fully adjustable solid state trip device. Furnish a trip device that is temperature insensitive and has the following characteristics and functions: independently adjustable long time pick up and delay; adjustable instantaneous; independently adjustable short time pick up and delay with i²t in and out switch; independently adjustable ground fault pick up and delay; trip mode targets for over load; short circuit and ground fault; and long time pick up light.
2. Furnish circuit breakers which are housed in an enclosure and which have a short circuit rating of 65,000 amps RMS symmetrical at 480 volts.
3. Furnish Type 304 stainless steel NEMA 4 and NEMA 12 enclosures.
4. Furnish Type 304 stainless steel NEMA 4X enclosures.
5. Furnish cast aluminum NEMA 7 enclosures.
6. Furnish service entrance rated circuit breakers.
7. Furnish circuit breakers with solid neutral and solid ground assemblies.
8. Furnish circuit breaker as manufactured by Square D Co.; General Electric Co.; Cutler- Hammer, or equal.

MM. Gas Detection/Ventilation Failure Alarm System

1. Provide a GD/VF Alarm panel which is electronically operated, double supervised, control panel consisting of control unit, standby battery unit and charger, with a minimum of two zones of initiation. Ensure all components are new, manufacturer's current model, and UL Listed for fire alarm signaling use. Provide a microprocessor based control unit which is 24 VDC, with alarm silence and trouble silence switches, transient voltage surge suppression (TVSS) protection and ground fault detection. Surface mount control unit enclosures. Provide a minimum of two 2-wire class B power limited initiating circuits/zones. Provide a minimum of two 2-wire class B power limited signaling circuits; however, provide extra capacity to accommodate the quantity and type of signaling devices shown on the Drawings. Ensure that the alarm silencer silences the signal horns, but keeps



the alarm strobes lit until the Reset switch is depressed. Provide the panel with status LEDs for: AC Power on, system alarm, and supervisory system trouble. Provide batteries which are sized to provide 24 hours of supervision followed by 5 minutes of alarm, minimum. Furnish a GD/VF Alarm Panel which is Edwards Signaling Co. Model EFS-302 Three Zone Fire Alarm Control Panel, Notifier Series SGL, or equal.

2. Install combination alarm horn/strobe units in unclassified locations as shown on the Drawings. Provide a unit which is electronic, diode polarized type, rated 24 VDC for operation from the alarm panel supervised signal circuit, low current draw, high dB output, 75-110 candela strobe with amber or white lens, with gasketed, weatherproof back box. Furnish a unit that is UL 1638 and UL 464 and in which the strobe and horn operate independently. Furnish a unit which is Edwards Signaling Co. Model 2452 THS with 2459-WPB back box; AMSECO Model SHB 24-75C, or equal.
3. Provide alarm indicating units installed in Hazardous locations which are UL listed for use in Class I, Division 1, Groups C&D locations. Provide visual units which are 24 VDC, diode polarized type, bracket mounted rotating light, with blue glass dome and dome guard, Edwards Signaling Co. Model 116 DEXSTM-FJ Series or equal having a current draw of 0.9 Amps at 24 VDC or less. Provide a horn unit which is corrosion resistant, low current draw, heavy-duty, high decibel (95dBA), vibrating horn, Edwards Signaling Co. Model 889D-AW or equal having a current draw of 0.2 Amps at 24 VDC, diode polarized type.
4. Provide a red nameplate with 1/2-in high white letters indicating "GAS DETECTION/ VENTILATION FAILURE ALARM" for each horn/strobe unit. Permanently secure nameplate to the wall directly beneath the horn/strobe unit with stainless steel fasteners. Ensure the nameplates for the alarm signaling devices reads as follows based on the initiating device:

Initiating Device	Nameplate
Combustible Gas Detector	COMBUSTIBLE GAS DETECTION ALARM
Continuous Ventilation System Flow Switch	CONTINUOUS VENTILATION SYSTEM FAILURE ALARM
Both Combustible Gas Detector & Continuous Ventilation System Flow Switch	COMBUSTIBLE GAS DETECTION/ CONTINUOUS VENTILATION SYSTEM FAILURE ALARM

5. Provide non-audible dual light signaling units which are located where indicated on the Drawings. Ensure each dual light signaling unit consists of one "green" LED type light fixture and one "red" LED type light fixture. Ensure the green lamp is illuminated when its respective combustible gas detector or ventilation failure alarm system is not in alarm. Ensure the red lamp illuminates when its respective combustible gas detector or ventilation failure alarm system is in alarm. Provide visual units which are 24 volt DC, bracket mounted Steady-On LED type, with red/ green lens with lens guard, Edwards Signaling Co. Model 103 Series LED multi-status indicator or equal having a current draw of 0.062 amperes or less at 24 VDC. In addition to providing



the nameplate indicated above below the two fixtures; provide a red nameplate with 1/2 -in high white letters below each lamp. Furnish a nameplate below the GREEN lamp which reads "Go" and a nameplate below the RED lamp which reads "NO GO". Permanently secure the nameplates to the wall with stainless steel fasteners, directly beneath the visual units but above the nameplate indicated specified in item 4 above.

NN. Terminal Cabinets:

1. Furnish each cabinet with a minimum of 50 spare terminals.
2. Completely factory assemble all interiors with terminal blocks and insulating barriers. Isolate all 120-volt AC and DC terminal blocks from each other by insulating barriers or separate enclosures. Design interiors so that terminal blocks or control relays can be replaced or added without disturbing adjacent units.
3. Group together all wiring within the cabinets in harnesses and secure to the structure.
4. Terminate all shielded cables in separate cabinets. Provide a third terminal for each twisted shield pair and the shield for each connected thereto, unless otherwise noted on manufacturer's shop drawings.
5. Provide terminal blocks which are molded plastic, tubular screw type with pressure plates and which are rated 600 volts. Provide double sided terminals which are supplied with removable covers. Furnish terminal blocks which are Allen Bradley; ABB; Kukla, or equal.
6. Provide boxes made from 14-gauge galvanized steel which are of sufficient size to provide a minimum of 6-in of wiring space on all sides and between adjacent terminal blocks. Provide a minimum of four mounting studs on each cabinet. Furnish cabinets without knockouts. Drill holes for raceways on the job.
7. Furnish a single hinged door to cover the front of each terminal cabinet. Furnish doors which have a neoprene gasket, vault type handle, three-point hatch and lock. Supply two keys for each lock. Ensure all locks are keyed alike. Provide a terminal block schedule with each terminal point numbered and identified (typewritten) as to function.
8. Properly clean and finish all exterior and interior steel surfaces of the cabinets in white over a rust-inhibiting phosphatized coating conforming to ANSI A55.1. Ensure that the finish paint is of a type to which field applied paint will adhere.
9. Furnish cabinets as manufactured by Hoffman Engineering Company; Hennessy Products; Lee, or equal, with latch kit hardware.
10. Provide boxes in wet, damp, corrosive and all outdoor locations which are NEMA 4X, Type 316 stainless steel.

OO. Rubber Floor Mats: Furnish and install a non-conductive elastomer compound



rubber floor mat extending the full length and placed in front of and in back of each 15 kV switchgear, each 480 volt switchgear/transformer and load break switch, and in front of each motor control center panelboards and separately mounted motor starters mounted 6-ft above finished floor or below. Select mats in accordance with ASTM D178, Type II, Class 2, 1/4-in thick minimum, 36-in wide with corrugated surface and which are branded continuously on the back. Install mats in one continuous piece. Where equipment faces each other and is less than 6-ft apart, provide one width of mat. Store mats without distortion, free from direct sun light or sources of ozone and at a temperature not to exceed 95 degrees F (35 degrees C). Furnish mats which have the following ratings:

1. Voltage phase to phase 17,000 V RMS
2. AC Proof Test Voltage 20,000 V RMS
3. DC Proof Test Voltage 50,000 V Average

PP. 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.

QQ. Electric Warning Sign:

1. Provide and install using stainless steel fasteners a total of 4 restrictive signs that conform with OSHA regulations for accident prevention. Size of sign: 10-in high by 14-in wide. Furnish signs which state "DANGER HIGH VOLTAGE". Furnish signs constructed of High Performance Plastic (HPP) by the Seton Name Plate Corp.; Global Equipment Co.; World-wide Sign Co., or equal.

RR. Call – for – Help Devices:

1. Provide toilet room call-for-help devices where shown on the Drawings.
2. Provide pull-cord stations which have emergency call activation with a reset lever. Provide pull-cord stations which have a stainless steel faceplate and a DPST switch.
3. Furnish buzzer/strobe devices rated 120 VAC and which are designed for installation in a 2-in by 4-in gang box.
4. Flush mount devices installed in finished spaces.
5. Furnish devices which are manufactured by Edwards, Catalog Series 7008, or equal.



2.8 PAD MOUNTED TRANSFORMERS

- A. General:** Provide transformer(s) which are designed, built and tested in accordance with the following standards:
1. ANSI C57.12.00 - Standard General Requirements for Liquid Immersed Distribution, Power and Regulating Transformers.
 2. Western Underground Committee Guide 2.13 for vandal resistance.
 3. NEMA Standard TRI Transformers, Regulators and Reactors.
 4. IEEE Sta. 462A, B 1978 "Short Circuit Requirements Supplement to ANSI C57.12.00 1973."
- B.** Provide transformer(s) self cooled kVA rating(s) as shown on the Drawings. Do not allow winding temperature rise to exceed 65 degrees C above a 30 degree C average ambient temperature, with a maximum ambient not to exceed 40 degrees C, operating at full rated kVA load.
- C.** Provide primary windings which have the following ratings:
1. Voltage: 13,200 Volts, 3 Phase, 60 Hz
 2. Connection: Delta
 3. Basic Impulse Level (BIL): 95 kV
- D.** Provide secondary windings which have the following ratings:
1. Voltage: As shown on the Drawings
 2. Connection: Grounded wye
 3. Basic Impulse Level (BIL): 30 kV
- E.** Ensure transformer impedance ranges between 2.6 and 5.4 percent for 500 kVA units and smaller. Ensure impedance of 750 kVA units and above is 5.75 percent, subject to ANSI tolerance of plus/minus 7.5 percent.
- F.** Furnish compartmental type transformer(s) which are liquid filled, self cooled, tamper resistant, weatherproof and suitable for mounting on a concrete pad.
- G.** Provide transformer tank(s) which utilize welded steel construction, are sealed to withstand an internal pressure of up to 7 psi without distortion, and top oil temperatures ranging from 50 to 105 degrees C. Provide a tank cover designed to permit access to internal components for inspection or repair. Provide heavy duty, non-removable lifting lugs and jacking pads. When required, provide welded cooling panels or radiators on the back and sides of the tank.
- H.** Locate the high and low voltage compartments side by side and separated by a steel barrier. When facing the transformer, install the low voltage compartment on the right. Furnish full height, air filled terminal compartments with individual



doors. Ensure the high voltage door fastenings are not accessible until the low voltage door has been opened. Ensure the low voltage door has a 3 point latching mechanism with vault type handle having provisions for a single padlock. Equip the doors with lift off type stainless steel hinges and door stops to hold the doors open when working in the compartments. Ensure the front sill of the compartment is removable to allow the transformer to be rolled or skidded into position over conduit stubs. Furnish ANSI tank grounding provisions in each compartment.

- I. Provide a five legged core. Provide copper windings and internal leads which are insulated and braced to prevent phase flashovers during fault conditions. Furnish transformers with wye connected primary and secondary windings which have the primary neutral insulated from the secondary neutral and brought out into the primary compartment through a separate bushing. Externally connect both neutral bushings to the tank with removable copper straps.
- J. Select transformer insulating oil that is a silicone based fluid, Envirotemp FR3 Fluid; ABB BIOTEMP; or approved equal. Furnish insulating oil free of P.C.B. contamination or any E.P.A. listed toxic chemical. Require the transformer manufacturer test the insulating oil for P.C.B. after filling the tank.
- K. Furnish a no load, externally operated, lockable, five position primary winding tap changer located in the secondary terminal compartment. Tap setting must be clearly visible with the compartment door in the open position. Furnish tap adjustments as follows:
 - 1. For 480Y/277 Volt secondary: (2) 2.5 percent taps above and below rated primary voltage.

L. Terminations

- 1. Arrange high voltage primary terminations for live front loop feed and ensure conformance to ANSI C57.12.22 requirements. Provide high voltage bushings that are electrical grade wet process porcelain with blade type terminals arranged for vertical takeoff. Externally clamp to allow external replacement.
 - 2. Provide tie connections between primary loop feed bushings which are rated for 600 Amps.
 - 3. Provide low voltage secondary bushings which are externally clamped, molded epoxy, spade type with NEMA standard four or six hole arrangement. Require neutral to be brought out through an insulated bushing and grounded to the tank wall with a removable grounding strap.
- M.** Furnish an oil immersed, three phase, gang operated, four position loop feed, load break primary switch, mounted inside the transformer tank. Mount an external, hook stick type switch operator and index plate in the high voltage primary terminal compartment. Clearly mark switch positions. Follow the below minimum switch ratings:
- 1. 15 kV, 600 Amps continuous.



2. Momentary and fault close: 10,000 Amps symmetrical.

N. Primary Fuse Arrangement

1. Provide oil immersed partial range current limiting fuses in series with externally removable Bay-O-Net type expulsion fuses. Provide fuse mounts which are dead front, externally removable, hot stick operated, load break, individual fused disconnect devices, located in the high voltage compartment above the primary bushings to permit fuse replacement without opening the tank.
2. Properly coordinate the CLF and expulsion fuses so that the CLF protects for fault values above the expulsion fuse interrupting rating, the expulsion fuse protects the CLF for current values below the CLF interrupting capability and the CLF will not operate for low side faults beyond secondary terminals.

O. Lightning Arresters

1. Furnish three 15 kV distribution class lightning arresters mounted in the high voltage primary compartment for surge protection.

P. Furnish each transformer with the following accessories:

1. Nameplate in the low voltage compartment.
2. 1 in drain plug (75 to 500 kVA) or 1 in drain valve with sampling device (750 to 5000 KVA).
3. 1 in upper filter press and filling plug.
4. Dial type thermometer with maximum temperature indicator, mounted in a sealed drywell in the low voltage compartment.
5. Auxiliary, sealed, dry contact in thermometer for remote indication of high temperature alarm.
6. Pressure vacuum gauge mounted in the low voltage compartment.
7. Pressure relief valve.
8. Pressure relief diaphragm.
9. Sudden pressure relay.
10. Magnetic liquid level gauge located in the low voltage compartment at the 25 degree C level mark.
11. Auxiliary, sealed, dry contact in the level gauge for remote indication of low oil level alarm.
12. Mounting provision for voltage and current metering transformers.

- Q. Ground smooth all welds and clean all metal surfaces of oil, grease and weld spatter using a hot phosphate chemical treatment. Apply a zinc rich, heat



cured epoxy primer to inhibit rust. Give the equipment an intermediate coat of heat cured epoxy finish color, followed by an air dried finish coat of Outdoor green, Munsell No. 7GY3.29/1.5. After finish painting, protect all bottom surfaces, and sides up to a minimum of 1 in above the ground against corrosion with an epoxy tar coating.

R. Shop Testing: Perform manufacturer's standard production testing and inspection in accordance with ANSI Test Code C57.12.90 and/or NEMA TR1. Require the manufacturer to certify compliance with transformer coating performance per ANSI C57.12.28. Submit results of the above tests including no load loss data along with final Drawings in the form of certified test reports. Ensure testing includes the following, as a minimum:

1. Resistance measurements of all windings on the rated voltage connection of each unit and at the tap extremes of one unit only of a given rating on this project.
2. Ratio tests on the rated voltage connection and on all tap connections.
3. Polarity and phase relation tests on the rated voltage connections.
4. No load loss at rated voltage on the rated voltage connection.
5. Exciting current at rated voltage on the rated voltage connection.
6. Impedance and load loss at rated current on the rated voltage connection of each unit and on the tap extremes of one unit only of a given rating on this project.
7. Furnish Temperature Test or tests made on one unit only of a project covering one or more units of given rating. Tests are not required when there is an available record of a temperature test on an essentially duplicate unit.
8. Applied potential test.
9. Induced potential tests.
10. Toxic chemical (e.g., P.C.B.) test.
11. Short circuit capability of transformer design.

2.9 LOW VOLTAGE SWITCHGEAR

- A. Ensure low voltage metal-enclosed switchgear assembly and all components is designed, manufactured, and tested in accordance with the following latest applicable standards:
- B. Ensure the manufacturer of the assembly is the same manufacturer of the low voltage power circuit breaker installed within the assembly. Furnish low voltage switchgear which bears a UL 1558 label.
- C. **Ratings:** Follow voltage ratings as indicated on the drawings. Ensure the entire assembly is suitable for 600 volts maximum AC service. Ensure the assembly is



rated to withstand mechanical forces exerted during short-circuit conditions when connected directly to a power source having available fault current of 100,000 amperes symmetrical at rated voltage. Ensure all circuit breakers have a minimum symmetrical interrupting capacity of 100,000 amperes. To ensure a fully selective system, ensure all circuit breakers have a 30 cycle short-time withstand ratings equal to their symmetrical interrupting ratings through 85,000 amperes, regardless of whether equipped with instantaneous trip protection or not. Test all ratings to the requirements of ANSI C37.20.1, C37.50 and C37.51 and UL witnessed and approved.

- D. Construction:** Furnish switchgear which consists of the required number of vertical sections bolted together to form a rigid assembly. Cover the sides with removable bolt-on covers. Ensure all edges of front covers or hinged front panels are formed. Provide ventilators located on the top of the switchgear over the breaker and bus compartments to ensure adequate ventilation within the enclosure. Fabricate the rear covers in two (2) pieces for ease of handling and mount using captive hardware. Provide the assembly with adequate lifting means and ensure it is capable of being moved into installation position and bolted directly to CONTRACTOR supplied floor sills set level in concrete per manufacturer's recommendations. Make provisions for jacking of shipping groups, for removal of skids or insertion of equipment rollers. Ensure the base of assembly is suitable for rolling directly on pipes without skids. Equip the base with slots in the base frame members to accommodate the use of pry bars for moving the equipment to its final position. Ensure each vertical steel unit forming part of the switchgear line-up is a self-contained housing having one or more individual breaker or instrument compartments, a centralized bus compartment and a rear cable compartment. Segregate each individual circuit breaker compartment, or cell, from adjacent compartments and sections by means of steel barriers to the maximum extent possible. Equip with drawout rails and primary and secondary disconnecting contacts. Provide removable hinge pins on the breaker compartment door hinges. Locate current transformers for feeder instrumentation, where shown on the plans, within the appropriate breaker cells and be front accessible and removable. Breaker mount the stationary part of the primary disconnecting devices for each power circuit breaker and ensure it consists of a set of contacts extending to the rear through a glass polyester insulating support barrier; furnish corresponding moving finger contacts, suitably spaced, on the power circuit breaker studs which engage in only the connected position. Provide an assembly which has multiple silver-to-silver full floating high pressure point contacts with uniform pressure on each finger maintained by springs. Ensure each circuit includes the necessary three-phase bus connections between the section bus and the breaker line side studs. Equip load studs with insulated copper load extension buses terminating in solderless type terminals in the rear cable compartment of each structure. Provide silver-plated bus extensions where outgoing terminals are attached. Design the circuit breaker door design so that the following functions may be performed without the need to open the circuit breaker door: lever circuit breaker between positions, operate manual charging system, close and open circuit breaker, examine and adjust trip unit, and read circuit breaker rating nameplate. Ensure the secondary disconnecting devices consists of floating terminals mounted on the stationary unit and engaging mating contacts at the front of the breaker. Furnish secondary disconnecting devices which are gold-plated and which maintain engagement in the "connected" and "test" positions. Mount an insulating flash



shield above each circuit breaker to prevent flashover from the arc chutes to ground. Provide a rear compartment barrier between the cable compartment and the main bus to protect against inadvertent contact with main or vertical bus bars. Provide in the cell when the circuit breaker is withdrawn, a safety shutter which automatically covers the line and load stabs and protects against incidental contact. Provide a metal barrier full height and depth between adjacent vertical structures in the cable compartment. Provide switchgear which is service entrance rated with ground fault trip on each incoming main breaker.

- E. Buses:** Ensure all bars are silver-plated copper. Mount main horizontal bus bars with all three phases arranged in the same vertical plane. Base bus sizing on ANSI standard temperature rise criteria of 65 degrees C over a 40 degrees C ambient (outside the enclosure). In addition to full UL air clearances, insulate the phase bus with a minimum of 5 mil thickness of epoxy resin coating. Provide removable boots to give access to the cross bus joints for inspection and maintenance. Provide a full capacity neutral bus where a neutral bus is indicated on the drawings. Furnish a firmly secured copper ground bus to each vertical section structure and ensure it extends the entire length of the switchgear. Ensure the ground bus short-time withstand rating meets that of the largest circuit breaker within the assembly. Ensure all hardware used on conductors is high-tensile strength and zinc-plated. Provide all bus joints with Belleville-type washers.
- F. Wiring/Terminations:** Furnish small wiring, necessary fuse blocks and terminal blocks within the switchgear as required. Suitably mark control components mounted within the assembly for identification corresponding to the appropriate designations on manufacturer's wiring diagrams. Provide a front accessible, isolated vertical wireway for routing of factory and field wiring. Make factory provisions for securing field wiring without the need for adhesive wire anchors. Provide front access to all circuit breaker secondary connection points for ease of troubleshooting and connection to external field connections without the need of removing the circuit breaker for access. Provide only type SIS control wire. Furnish control wiring which is 14 ga for control circuits and 14 ga for shunt trip and current transformer circuits. Secure wire bundles with nylon ties and anchor to the assembly with the use of pre-punched wire lances or nylon non-adhesive anchors. First connect all current transformer secondary leads to conveniently accessible shorting terminal blocks before connecting to any other device. Provide shorting screws with provisions for storage. Provide all groups of control wires leaving the switchgear with terminal blocks with suitable numbering strips and provisions for #10 AWG field connections. Mark each control to the origin zone/wire name/destination zone over the entire length of the wire using a UV cured ink process. Provide wire markers at each end of all control wiring. Provide plug-in terminal blocks for all shipping split wires. Ensure terminal connections to remote devices or sources are front accessible via doors above each circuit breaker. Provide NEMA 2-hole mechanical-type lugs for all line and load terminations suitable for copper or aluminum cable rated for 75 degrees C of the size indicated on the drawings. Provide lugs in the incoming line section for connection of the main grounding conductor. Provide additional lugs for connection of other grounding conductors as indicated on the drawings. Provide reusable insulating boots to cover all power cable terminations.

- G. Circuit Breakers:** Ensure all protective devices are low voltage power circuit



breakers, Cutler-Hammer type Magnum DS or approved equal. Ensure all breakers are UL listed for application in their intended enclosures for 100% of their continuous ampere rating. Construct and test all power circuit breakers in accordance with ANSI C37.13, C37.16, C37.17, C37.50, UL 1066 and NEMA SG-3 standard. Provide a breaker which carries a UL label. Provide all in drawout configuration. Provide the 800, 1600, 2000 and 3200 ampere frame power circuit breakers in the same physical frame size. Provide 4000 and 5000 ampere frame power circuit breakers in a second physical frame size. Ensure both physical frame sizes have a common height and depth. Provide a locking cover to prevent tampering with the trip settings. Ensure power circuit breakers utilize a two-step stored-energy mechanism to charge the closing springs. Ensure the closing of the breaker contacts automatically charges the opening springs to ensure quick-break operation.

- H. Trip Units:** Equip each low voltage power circuit breaker with a solid-state tripping system consisting of three current sensors, microprocessor-based trip device and flux-transfer shunt trip. Ensure current sensors provide operation and signal function. Furnish a trip unit which uses microprocessor-based technology to provide the basic adjustable time-current protection functions. Achieve true rms sensing circuit protection by analyzing the secondary current signals received from the circuit breaker current sensors and initiating trip signals to the circuit breaker trip actuators when predetermined trip levels and time delay settings are reached. Ensure interchangeable current sensors with their associated rating plug establish the continuous trip rating of each circuit breaker. Furnish a trip unit which has an information system that provides LEDs to indicate mode of trip following an automatic trip operation. Ensure the indication of the mode of trip is retained after an automatic trip. Provide a reset button to turn off the LED indication after an automatic trip. Provide the trip unit with a display panel, including a representation of the time/current curve that will indicate the protection functions. Furnish a unit which is continuously self-checking and provides a visual indication that the internal circuitry is being monitored and is fully operational. Provide the trip unit with a making-current release circuit. Furnish a circuit which remains armed for approximately two cycles after breaker closing and which operates for all peak fault levels above 25 times the ampere value of the rating plug. Ensure the trip unit has provisions for a single test kit to test each of the trip functions. Furnish a trip unit which is Cutler-Hammer type Digitrip 520m or approved equal.
- I. Enclosures:** Enclose switchgear in a NEMA 3R Painted Steel Walk-In enclosure conforming to all applicable requirements of UL and designed to withstand wind velocities of 130 MPH. Provide ventilating openings which are complete with replaceable fiberglass air filters which are removable from the exterior of the enclosure. Provide necessary space heaters thermostatically controlled for breaker, bus and cable compartments of adequate wattage to prevent the accumulation of moisture within the compartments. Provide the enclosure with undercoating applied to all members in contact with the foundation surface to retard corrosion. Obtain power for the space heaters, lights and receptacles as well as control power for operation of the circuit breakers from a 480-120v control power transformer within the switchgear.
- J. Nameplates:** Furnish engraved nameplates, mounted on the face of the assembly, for all main and feeder circuits as indicated on the drawings. Provide



nameplates which are laminated plastic, black characters on white background, and secured with screws. Ensure characters are 3/16-inch high at a minimum. Furnish master nameplate giving switchgear designation, voltage ampere rating, short-circuit rating, and manufacturer's name. Suitably mark control components mounted within the assembly, such as fuse blocks, relays, pushbuttons, switches, etc., for identification corresponding to appropriate designations on manufacturer's drawings.

- K. Finishes:** Properly clean all exterior and interior steel surfaces of the switchgear and provide with a rust-inhibiting phosphatized coating. Furnish the color and finish of the switchgear is ANSI 61.
- L. Transient Voltage Surge Suppression:** Furnish transient voltage surge suppression as specified elsewhere within this section.
- M. Automatic Transfer Controls Section:** Where indicated on the drawings, furnish a dual source, No Tie, Open Transition Automatic Transfer Control System as part of the equipment where indicated on the drawings to provide an automatic transfer control system for control of two circuit breakers. Provide the logic of the transfer control system functions via a microprocessor. Ensure the setpoints are field adjustable without the use of special tools. Ensure a digital readout displays each option as it is functioning. Ensure the readout displays actual line-to-line voltage, line frequency and timers. When timers are functioning, ensure the microprocessor displays the timer counting down. Ensure all set points are capable of being re-programmed from the front of the logic panel when the transfer control system is in the program mode. Include a test pushbutton as part of the microprocessor. Furnish a microprocessor which is compatible with a twisted pair communication over a network to a computer for control or printer.
1. Provide a transfer control system which includes the following features: Time delay (normal to alternate), adjustable; time delay (alternate to normal), adjustable; delayed transition time delay, adjustable from 0 to 120 seconds, to allow disconnection of the load during transfer in either direction to prevent excessive inrush currents due to out-of-phase switching of large inductive loads; LEDs to indicate normal and alternate position; LEDs marked Source 1 and Source 2 to indicate respective source voltages available; LEDs to indicate which source is preferred; LED to indicate the load energized; historical transfer information via the front panel; two position selector switch permitting two modes of transfer control system operation (automatic and manual); adjustable time delay engine startup; adjustable time delay engine stop; engine start contact; frequency and voltage relays for alternate source with frequency adjustable from 45 to 60 hertz and voltage fixed at 90% pickup, 70% dropout; and exerciser.
 2. In the automatic mode, ensure the sequence of operation is as follows: The transfer control system automatically transfers its load circuit to an emergency or alternate power supply upon failure of its normal or preferred power source. Upon loss of phase-to-phase voltage of the normal source to 80% of nominal, and after a time delay, adjustable from 0.5 to 15 seconds, to override momentary dips and/or outages, a 10-ampere, 30 volts dc contact closes to initiate starting of the emergency or standby source power plant. Transfer to the alternate source immediately upon attainment of 90% of



rated voltage and frequency of that source. When the normal source has been restored to 90% of rated voltage, and after a time delay, adjustable from 0.5 to 32 minutes (to ensure the integrity of the normal power source), retransfer the load to the normal source. Ensure a time delay, adjustable from 0.5 to 32 minutes, delays shutdown of the emergency or standby power source after retransfer to allow the generator to run unloaded for cooldown, after which the generator automatically shuts down. If the emergency or standby power should fail while carrying the load, ensure transfer to the normal power supply is instantaneous upon restoration of the normal source to satisfactory conditions.

3. In the manual mode, ensure the sequence of operation is as follows: While in manual mode, ensure breakers are capable of being opened and closed using control switches. Provide electrical interlocking to prevent the closing of both mains simultaneously.

- N. Accessories:** Provide a floor running portable circuit breaker transfer truck with manual lifting mechanism.

2.10 PROTECTIVE DEVICE STUDIES

- A. Qualifications:** Ensure short circuit studies, protective device evaluation studies, and protective device coordination studies are performed by a manufacturer who has been regularly engaged in short circuit and protective device coordination services for a period of at least 15 years. Ensure studies utilize proven computer programs for making three-phase fault duty calculations.

2.11 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, Blackburn, Burndy, or equal.

2.12 LIGHTING

- A. Fixtures – General:** Pre-wire all fixtures with leads of 18-AWG, minimum, for connection to building circuits.



- B. 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.
- C. Interior Fixtures:** Furnish interior fluorescent fixtures without diffusers with end plates. Where diffusers are required, ensure they are of high molecular strength acrylic. Ensure the minimum thickness of the acrylic is 0.125 inches for all diffusers, with the exception that those on 4-foot square fixtures be 0.187 inches thick.
- D. Lamps:** Provide lamps which are first-line General Electric, Cutler-Hammer, Sylvania, or equal. Provide fluorescent lamps which are cool/white unless otherwise indicated. Furnish frosted incandescent lamps unless a specified fixture lighting control system requires clear globe lamps. Provide high-pressure sodium lamps which are "color corrected". Unless otherwise indicated in the Contract Documents, ensure lamps suitable for operation in any burning position.
- E. Photo – Electric Cells:** Ensure photo - electric cells for control of multiple fixtures are self-contained, weatherproof type and have time-delay features.
- F. Lighting Contactor:**
1. Furnish a lighting contactor which is electrically operated, mechanically held type mounted in NEMA 1, enclosures (except where noted otherwise on the Drawings) with number of poles as noted on the Drawings. Provide operating coils rated for 120 Volts, unless otherwise indicated on the Drawings, and for momentary operation. Provide with "Hand Off-Auto" switch on cover where shown on the Drawings.
 2. Provide contactors rated for 20 Amps, 600 VAC and which are Automatic Switch Co., Bulletin 917 RC, similar by Square D Co.; Cutler-Hammer, or equal.
- G. Photo Cells:**
1. Furnish photocells suitable for power duty with individual fixtures or for pilot duty with contactors as detailed on the Drawings. 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.
- H. Light Fixture Control Relays:** Provide mechanically held relays for light fixtures control. Ensure such relays are base-mounted, single-purpose units, i.e., not attachments to a multi-purpose solenoid operator. If not indicated otherwise, provide coil voltage which is 115 volts ac with contacts rated at 20 amps. Furnish relays which are ASCO Series 166, Zenith Series MSC, or equal.
- I. Ballasts:** Provide ballasts for fluorescent fixtures in office areas that have a Class "A" sound rating and are of the low loss type. Ensure all ballasts are high power factor, Class P. Ensure primary ballast voltage is suitable for use in the branch circuits indicated in the Contract Documents.



2.13 PANELBOARDS

- A. General:** Provide panelboards which are dead front factory assembled. Furnish panelboards that comply with NEMA PB-1-Panelboards, as well as the provisions of UL 50 – Safety Enclosures for Electrical Equipment and UL 67 – Safety Panelboards. Ensure panelboards used for service equipment are UL labeled for such use. Provide lighting panelboards rated for 120/208-volt, 3-phase operation or 120/240-volt for single phase operation as indicated. Provide power panelboards rated for 480 volts, 3-phase, 3-wire option. Ensure that the manufacturer of the panelboard is the manufacturer of the major components within the assembly, including circuit breakers.
- B. Ratings:** Furnish panelboards rated 240 VAC or less which have short circuit ratings not less than 22,000 amperes RMS symmetrical or as indicated, whichever is greater. Furnish panelboards rated 480 VAC which have short circuit ratings not less than 25,000 amperes RMS symmetrical or as indicated, whichever is greater. Ensure panelboards are labeled with a UL short circuit rating. Series ratings are not acceptable.
- C. Construction:** Ensure all lighting and power distribution panels have copper busbars. Furnish breakers that are one, two, or three pole as indicated, with ampere trip ratings as required by the equipment. Furnish breakers that are quick-make and quick-break, inverse time trip characteristics, to trip free on overload or short circuit, and to indicate trip condition by the handle position. Furnish panels which have hinged doors with combination catch and latch. Arrange the front panels so that when the plates are removed, the gutters, terminals and wiring will be exposed and accessible. Furnish doors which have inner doors within the plates to have only the breaker operating mechanism exposed when they are opened. Conceal live conductors and terminals behind the plates. Ensure all panelboards are rated for the intended voltage. Ensure all circuit breakers are interchangeable and capable of being operated in a position as well as being removeable from the front of the panelboard without disturbing adjacent units. No plug-in circuit breakers will be acceptable. Mount lighting and power distribution panels which are not part of a motor control center in Type 304 stainless steel cabinets. Furnish panels which have the necessary barriers, supports, and liberal wiring gutters. Provide stainless steel trim screws. Ensure all panelboard parts of metal other than copper, aluminum, or stainless steel are cadmium plated. Furnish panelboards which are manufactured by General Electric or Cutler-Hammer. Provide panelboards that are UL listed except for special enclosures which are not available with UL listing. Provide panelboards that are suitable for use as service entrances as indicated or as otherwise required by the N.E.C.

2.14 LOW VOLTAGE MOTOR CONTROL CENTERS

- A. General:** Furnish motor control centers that are 600-volt class suitable for operation on a three-phase, 60-Hz system. Furnish the system operating voltage and number of wires as indicated. Ensure the motor control center receives power from a three phase, wye connected 277/480 volt transformer with a grounded neutral. Ensure the power distribution from the MCC is 480 volt, three-phase, three-wire or four-wire. Ensure the MCC includes provisions for termination of an incoming neutral conductor in conformance to NEC requirements. Furnish



enclosures which are NEMA Type 12 gasketed enclosure. Ensure compartment doors are interlocked with compartment circuit breakers. Ensure the interlock is fitted with a maintenance override.

- B. Size and Arrangement:** Arrange motor control centers into mechanical groupings of control center units, assembled into a lineup of control center sections. Ensure each control section is nominally 90 inches tall by minimum 20 inches deep. Design MCC's to not exceed the space requirements as indicated on the Contract Drawings, including spaces, spares and future compartments. MCC's can be rejected for exceeding the lengths shown where allotted space is critical. Equipment within the MCC may be rearranged at the discretion of the manufacturer, providing that MCC provides the spares, space and future provisions indicated.
- C. Busses:** Provide a continuous copper bus with full width of the motor control center line-up. Provide a main horizontal bus made of copper, tin, or silver-plated copper located within an isolated compartment. Ensure the bus is rated 600 amperes minimum, but in no instance less than the main lug or main breaker frame size. Ensure the vertical bus in each section consists of a single silver-plated copper conductor per phase with a current capacity of not less than 300 amps. Ensure the vertical bus is completely isolated and insulated, and extends the full height of the section wherever possible. Provide a fully rated continuous copper neutral bus through the control center. Furnish lugs of appropriate capacity. Brace all power buses to withstand 65,000 amperes.
- D. Wireways:** Provide a separate vertical wireway adjacent to each vertical unit, and ensure it is covered by a hinged door. Provide each individual unit compartment with a side barrier to permit pulling wire in the vertical wireway without disturbing adjacent unit components.
- E. Cabinets:** Ensure structural members are fabricated of not less than 12 gauge steel and side and top panels and doors are not less than 14 gauge steel. Ensure spaces designated as "SPACE" or "BLANK" include blank hinged doors and vertical bus bars. Clearly identify control units inside compartments with tags or stencil markings. Utilize engraved nameplates to identify each control unit including spares, spaces, and blanks, lights and devices. Ensure identification includes circuit numbers, as indicated. Fit each motor control center with the manufacturer's nameplate and include the NEMA Standard electric rating and other pertinent data, including sales order number, date of manufacturer, and place of manufacture. Where "L" or "U" shaped MCC layouts are indicated, ensure corner compartments have similar current and short circuit ratings as functions compartments. Finish motor control centers in light grey, ANSI 61. Give the panels two coats of primer inside and out and two coats of enamel finish. External colors other than ANSI 61 will not be acceptable.
- F. Motor Starters:** Provide motor starters per the instrumentation and controls sections.
- G. Variable Frequency Drives:** Provide variable frequency drives per the instrumentation and controls sections.
- H. Main and Feeder Circuit Breakers:** Ensure circuit breakers having a frame size of



150 amperes or less are molded-case type with thermal magnetic non-interchangeable, trip-free, sealed trip units. Ensure circuit breakers with a frame size of 225 amperes to 1,200 amperes are molded case with interchangeable thermal, and adjustable magnetic trip elements. Ensure the interrupting capacity of all main, and feeder branch circuit breakers is a minimum of 65,000 RMS symmetrical amperes. Furnish circuit breaker disconnect operators which are capable of accommodating three padlocks for locking in the "open position.

- I. **Control Devices:** Ensure all control devices are the electro-mechanical type (solid state type not acceptable) and conform to the requirements of the instrumentation and controls sections. Provide switchboard analog type metering. Include CT's and PT's of ratios as indicated and/or required.
- J. **Phase Failure Protection:** Supply a Three Phase Power Monitor as part of each combination motor starter. Provide monitors which have adjustable trip, restart delay, and selectable automatic or manual reset
- K. **Factory Tests:** Give all motor control centers and their components Manufacturer's standard electrical and mechanical production tests and inspections. Ensure the tests include electrical continuity checks, dielectric tests for each circuit, and inspections for proper functioning of all proper functioning of all components including controls, protective devices, metering and alarm devices.
- L. **Spare Parts:** Furnish the following for each MCC:
 - 1. One unit control transformer of each size furnished in magnetic starters installed
 - 2. Three bezels of each color installed for pilot indicators
 - 3. One dozen panel lamps
 - 4. One dozen control fuses of each size installed

2.15 DIESEL GENERATOR SETS

- A. **General:** Furnish electric generator sets which are standby emergency generating systems rated for continuous standby service at the conditions indicated on the drawings. Furnish voltage, phase, and frequency as indicated on the drawings. Provide generating sets that are a package of new and current equipment and consist of a diesel fueled electric plant complete with engine, generator, exhaust, and engine mounted radiator coolant systems. Furnish the system from a single supplier. Require the entire generator set be UL – listed. Procure the electric generator set and components from a manufacturer who is regularly engaged in manufacturing this product. Select a manufacturer who has printed literature & brochures describing the standard series offered (not a one of a kind fabrication). Require the manufacturer to furnish schematic & wiring diagrams for the engine-alternator sets. Sets not factory assembled, as a standard model with all controls, alternator, & engine tested together will not be acceptable. Require the manufacturer to furnish (with submittals) a list of, at least, five successful installations in operation in the local area for a minimum of five years, with the same type & rating of equipment including the ATS. Provide



the ratings if not the same as that specified. Ensure the performance test of the generating set series is in accordance with procedures certified by an independent testing laboratory. Procure from a manufacturer who has successfully tested a prototype of the generating set series offered, per NFPA-110, which will include:

1. Maximum power level;
2. Maximum motor starting capacity;
3. Structural soundness torsion graph analysis per MIL-STD-905B;
4. Fuel consumption;
5. Engine alternator temperature rise per NEMA MG-1-22.40;
6. Single step load pickup;
7. Harmonic analysis and voltage waveform deviation per MIL-STD-705B, Method 601.4;
8. Three phase short circuit test for mechanical and electrical strength.

B. Engines: Provide engines which are diesel fueled turbocharged, four cycle, water-cooled with mounted radiator, fan, and water pump. Provide engines which have replaceable wet liners and an engine and alternator operating speed of 1800 RPM. Provide intake and exhaust valves which are heat resisting alloy steel, free rotating. Provide exhaust valve seat inserts. Supply full pressure lubrication by a positive displacement lube oil pump. Ensure the engine has air cleaner, fuel and oil filters with replaceable elements and lube oil cooler. Govern the engine speed by an electronic isochronous governor to maintain alternator frequency within 0.5% from no-load to full-load alternator output. Ensure the engine has a minimum 45 AMP battery charging DC alternator with a transistorized voltage regulator. Provide remote, 2 wire starting by a solenoid shift electric starter. Provide a governor which is electronic – isochronous.

C. Engine Instruments: Ensure the engine instrument panel contains an oil pressure gauge, coolant temperature gauge, battery charge rate ammeter, engine monitoring system and on diesel fueled units, and an electronic fuel gage, if diesel fired.

D. Engine Controls: Ensure the generating set contains a complete engine start-stop control system which starts engine on closing contact and stops engine on opening contact. Provide a cranking limiter to open the starting circuit in approximately 45 to 90 seconds if the engine is not started within that time. Provide engine controls which also include a 3-position selector switch with the following positions: RUN-STOP-REMOTE. Provide an engine which has the following additional equipment: single phase, 240V, single phase water jacket heater, safety shutdown system including low oil pressure, high engine temperature, low coolant level, over-speed, and over crank.

E. Brushless Alternator: Provide an alternator that is a PMG 4 pole, revolving field design with temperature compensated solid state voltage regulator and



brushless rotating rectifier exciter system. Brushes are prohibited. Directly connect the stator to the engine flywheel housing, and drive the rotor through a semi-flexible driving flange to insure permanent alignment. Provide insulation which is Class H defined by NEMA MG1.65. Do not allow the maximum hot spot temperature rise to exceed 105 degrees Celsius at 40 degrees Celsius ambient. Ensure the generator design prevents potentially damaging shaft currents. Provide manufacturers certified motor starting capability curves to substantiate specified starting capabilities and manufacturer's verifications of temperature rise compliance. Furnish a 120 volt, generator space heater.

F. Alternator Instrument Panel: Provide an alternator instrument panel that is wired, tested, and shock mounted on the generating set by the manufacturer of the alternator. Furnish one that is microprocessor based, password protected and NFPA 110 compliant. Ensure it contains panel lighting, manual reset field circuit breaker, main breaker, frequency meter, running time meter, voltage adjusting rheostat, AC voltmeter, AC ammeter, volt/ammeter phase selector with OFF position, and fine speed control potentiometer. Supply alternator main breaker(s) with an interrupting rating suitable for alternator maximum fault currents. Furnish main breakers on this project which are rated for continuous operation at maximum generator output. Ensure the generator has a 100% rated main breaker. Digital metering is acceptable.

G. Safety Shutdown Monitoring System: Provide the electric generating plant with automatic safety shutdowns including individual alarm terminals plus individual indicating lights revealing which safety caused shutdown. Ensure this monitoring system includes the following safeties and indications:

1. Run;
2. Pre – warning low oil pressure;
3. Low oil pressure;
4. Pre – warning high engine temperature;
5. High engine temperature;
6. Overspeed;
7. Low engine temperature;
8. Plant failed to start ("over-crank");
9. Switch off;
10. Low fuel;
11. Fuel tank leak;
12. Temperature;
13. One (1) extra fault light.



14. Single "General Alarm" output dry contact that will close when items 2-12 occur.

- H. **Unit Performance:** Do not permit frequency regulation to exceed 0.3 hertz from no load to rated load. Ensure voltage regulation is within plus or minus 2% of rated voltage, from no load to full rated load. Ensure the recovery testable operation occurs within 2 seconds. Stable or steady state operation is defined as operation with terminal voltage remaining constant within plus or minus 1% of rated voltage. Provide a rheostat with a minimum of plus or minus 5% voltage adjustment from rated value. Ensure the temperature rise within NEMA MG1-22.40 definition. The generator set & regulator must sustain at least 90% of no load voltage for ten seconds with 250% of rated load at near zero power factor connected to its terminals. Ensure that the alternator, exciter and voltage regulator are designed & manufactured by the generator set manufacturer so that the characteristics are matched to the torque curve of the prime mover. This design allows the prime mover to utilize its fullest power producing capacity.
- I. **Electric Plant Mounting:** Mount the electric plant on a rigid base. Provide isolation isolators for installation beneath skid.
- J. **Housing:** Enclose the complete generating set in a weather protected welded and bolted reinforced metal housing with hinged lockable metal panel doors. Furnish it with louvered air openings as required. Construct housing of powder-coated steel painted in accordance with UL 2200 paint standard and with hinged doors. House to have a louvered air intake. Provide a minimum of two (2) battery-powered lights inside of the outdoor enclosure. Furnish vapor proof D.C. LED lights on a 2 hour timer switch operable from the normal point of entry into the enclosure., As indicated above, special lighting applies to units 180 KW and above. Provide a breaker panel of sufficient size to connect to the various auxiliary devices such as block heater, generator space heater, battery charger etc. such that only one single phase 120/240 volt auxiliary power circuit to the gen-set will be required. Provide a GFI receptacle for the battery heater. Wire the entire system at the factory. If heaters are other than the specified voltage, provide a buck boost or other type of transformer mounted in the enclosure of sufficient capacity to obtain the correct voltage. Procure housing designed for a wind load of 150 MPH. Provide factory documentation to verify this requirement.
- K. **Silencer:** Provide an internally mounted silencer.
- L. **Batteries:** Furnish starting batteries with cables and racks inside of housing along with manufacturers recommended battery float charger with a minimum 10 amp output. Provide battery heaters that will maintain batteries at a minimum of 50 degrees F and a maximum of 90 degrees F per NFPA 110 article 3-3.1.
- M. **Fuel Storage Tank:** Furnish and mount a double wall sub-base diesel storage tank of 24 hour full generator set rated load minimum capacity under the generator set unless an exact fuel capacity is indicated elsewhere. Ensure it has the structural integrity to support the generator set with its accessories and be furnished with all mounting hardware and fuel connections. Furnish with a low fuel level alarm switch, and leak detection alarm switch, both wired to annunciator lights on the generator control panel. Tank to be U.L. labeled with



required emergency vent and lockable fill cap. After the unit has been tested, require the installation CONTRACTOR to fill the tank with fuel.

- N. Generator Running Contact:** Furnish the run signal to SCADA via an oil pressure switch contact or other approved dry contact from the controller.
- O. Access Steps:** Ensure the generator set manufacturer/vendor provides access steps, if necessary, to allow the operator to easily access the control panel, controls, instruments, main circuit breaker and panel-board.

2.16 AUTOMATIC TRANSFER SWITCHES

- A. General:** Furnish and install automatic transfer switches where indicated on the drawings. The Automatic Transfer switch will be a non-fused fully rated enclosed switch which complies to NEMA ICS2-447, NFPA 70, NFPA 99, NFPA 110, and UL 1008. Ensure it has front access to all control panels and contacts. Provide main contact material which consists of silver (87% min) and cadmium. Furnish Plexiglas covers which shield electronic controls and main contact connections. Number wiring for easy identification. Require the Break before Make transfer action for no more than 3 cycles and ensure the mechanism incorporates lifetime lubrication within a temperature range of -29 degrees C to 60 degrees C (-20 degrees F to 140 degrees F). Incorporate solid state programmable logic, be assembled and tested, and include:

1. Sheet steel NEMA 4X Stainless Steel enclosure with hinged, gasketed, key - lockable door.
2. Operating transfer switch consisting of single solenoid, electrically operated, mechanically held.
3. Solderless connectors for normal source cables, emergency source cables, load cables, and solid neutral bar.
4. High fault withstanding capacity;
5. Voltage monitoring of each phase of normal source (full protection), adjustable 70 to 90 percent.
6. Voltage of emergency at transfer, 70 to 90 percent (factory set 90 percent).
7. Frequency of emergency at transfer, 70 to 90 percent (factory set 90 percent).
8. Voltage and frequency monitoring of one phase of emergency source.
9. Time delay, engine starting, adjustable 0.1 to 10 seconds, set at 3 seconds.
10. Engine minimum run minimum run (5 to 30 minutes) (factory set 20 minutes).
11. Engine Cool down timer factory set 5 minutes.
12. Time delay, normal to emergency (0.1 to 6 second adjustable).



13. Time delay emergency to normal (1 to 30 minutes) (factory set 5 minutes).
14. Programmed transition whereby the switch will switch to center off position for and adjustable period of time before re-transferring to normal power.
15. Three position mode selector switch in the face of the enclosure, marked auto, test and fast test.
16. Exerciser (7 days from initial command).
17. Transfer when exercising (on/off switch)
18. Pilot lights in face of enclosure which the ATS is connected
19. Auxiliary C-form contacts for normal and emergency
20. All lugs as required to receive the incoming and outgoing.
21. Internal cabling, terminal boards, fuses, fuse nameplates, and miscellaneous hardware as needed.
22. Software consisting of dimensional drawing, drawing, electrical schematics, and parts list.

2.17 LIGHTNING PROTECTION SYSTEMS

- A. Provide and install a complete lightning protection system as indicated on the drawings.
- B. The lightning protection system is designed and installed by a firm actively engaged in the design and installation UL Master Labeled Lightning Protection Systems and be so listed by Underwriters Laboratories Inc. Ensure the completed system complies with the latest editions of Underwriters Laboratories Inc. "Installation Requirements for Lightning Protection Systems, UL96A" and of the National Fire Protection Association's "NFPA 780, Standard for the Installation of Lightning Protection Systems".
- C. Require the installer applies for inspection of the completed system by UL field representatives. The system is to be inspected by Underwriters Laboratories Inc, or other ANSI certified testing agency for compliance with NFPA 780. Furnish the system without deviation and the UL field representative will issue a UL Master Label Certificate of Inspection for Lightning Protection Systems or Letter of Findings at completion of the installation as specified herein.
- D. Ensure all materials used in the installation are new and that they comply in weight, size and composition as required by UL 96A and NFPA 780 and are labeled or listed by Underwriters Laboratories Inc. for use in lightning protection systems. Procure the system furnished under this specification is the standard product of a manufacturer regularly engaged in the production of lightning protection equipment. Procure a manufacturer listed by UL as a manufacturer of lightning protection components.
- E. Utilize Class I materials on structures or portions of structures that do not exceed



75 feet in height above grade level. Utilize Class II materials on structures that exceed 75 feet in height above grade

- F. Do not mount copper materials on aluminum, galvanized steel, or zinc surfaces. This restriction includes materials that have been painted.
- G. Do not allow aluminum materials to come into contact with earth or where rapid deterioration is possible. Ensure aluminum materials do not come into contact with copper surfaces or where exposed to runoff from copper surfaces. Ensure aluminum materials are not attached to surfaces covered with alkaline-based paint, embedded in concrete or masonry, or installed in a location subject to excessive moisture.
- H. Extend air terminals a minimum of ten inches above the object or area they are to protect. Locate air terminals at intervals not exceeding 20'-0" along ridges of pitched roofs and along the perimeter of flat or gently sloping roofs (flat or gently sloping roofs include roofs that have a pitch less than 3:12). Provide flat or gently sloping roofs exceeding 50'-0" in width with additional air terminals located at intervals not exceeding 50'. Locate air terminals within two feet of the ends of ridges, roof edges and outside corners of protected areas.
- I. Install air terminals on stacks, flues, mechanical units and other objects not located within a zone of protection. Permanent metal objects on the structure having an exposed metal thickness 3/16" or greater may be substituted for air terminals and connect to the lightning protection system as required by the specified standards using main size conductor and bonding plates having a minimum of 3 square inches of surface contact area.
- J. Securely fasten air terminal bases to the structure in accordance with the specified standards. Fasteners may include stainless steel screws, bolts, nails, anchors or adhesive. Provide adhesive compatible with the surface on which it is used. Require the roofing CONTRACTOR to furnish and install any protective sheets or pads that may be required by the roofing manufacturer.
- K. Provide main conductors which are sized as Class I or Class II materials in accordance with the specified standards. Select conductors which provide a two way, horizontal or downward path from each strike or air terminal to connections to the lightning protection ground electrode system. Ensure conductors are free of excessive splices and that no bend of a conductor forms an included angle of less than 90 degrees nor have a radius of bend less than 8 inches.
- L. Securely fasten conductors to the structure on which they are placed at intervals not exceeding 3 feet. Furnish fasteners which are the same material or of a material equally resistant to corrosion as that of the conductor.
- M. Furnish connector fittings which are listed for the purpose and of the same material as the conductor or of electrolytically compatible materials.
- N. Size down conductors as Class I or Class II materials in accordance with the specified standards. Class II conductors from a higher portion of a structure which continues to connections to the lightning protection ground electrode



system. Space down conductors at intervals averaging not more than 100 feet around the perimeter of the structure. Ensure no structure has fewer than two down conductors. Where down conductors are installed exposed on the exterior of a structure and are subject to physical damage or displacement, utilize guards to protect the conductor a minimum of 6 feet above grade. Bond metallic guards at each end.

- O. In case of structural steel frame construction, down conductors may be omitted, and connect roof conductors to the structural steel frame at intervals not exceeding 100 feet along the perimeter of the structure.
- P. Terminate each down conductor at a ground electrode dedicated to the lightning protection system, or to a building or facility ground electrode system that consists of multiple ground electrodes that are interconnected with a ground ring conductor.
- Q. Furnish ground rod electrodes that are copper-clad steel, a minimum 5/8" diameter and 10 feet long. Connect the down conductor connected to the ground electrode using a bronze ground rod clamp having a minimum of 1½" contact between the ground rod electrode and the conductor measured parallel to the axis of the ground rod electrode, or by an Ultraweld exothermically welded connection. Locate ground rod electrodes a minimum of 2 feet below grade and install below the frost line where possible (excluding shallow topsoil conditions).
- R. Where it is not possible to drive ground rod electrodes because of bedrock or shallow topsoil conditions, ground plate electrodes, radial electrodes, ground ring electrodes, concrete-encased electrodes, or combinations of these may be used in accordance with NFPA 780.
- S. Where the structural steel framework is utilized as down conductors for the system, connect ground electrodes to columns around the perimeter of the structure at intervals averaging not more than 60 feet apart. Ground columns using either bonding plates having 8 square inches of surface contact area or by exothermically welded connections.
- T. Ensure by interconnecting common bonding of all grounded systems to the lightning protection system using main size conductor and fittings.
- U. For structures exceeding 60 feet in height, ensure the interconnection of the lightning protection system ground electrodes and other grounded systems is in the form of a ground loop conductor.
- V. Bond grounded metal bodies located within the required bonding distance as determined by the bonding distance formula in NFPA 780 to the lightning protection system using the required bonding conductors and connections.

PART 3 -- EXECUTION

3.1 ELECTRICAL POWER AND CONTROL SYSTEMS – DOCUMENTATION, REPAIR, AND CALIBRATION



- A. Provide documentation, calibration, testing, repair, and certification of new, existing and/or new systems connecting to existing electrical and control systems as shown on the drawings.
- B. Information for the existing systems when available can be accessed from the OWNER during construction to facilitate integration of the modifications into the existing monitoring systems. Any existing information was compiled from as built information supplied by previous construction contractors, or from contract drawings; therefore, the use of these previous drawings, when available, is intended to indicate the major components of existing power and controls and not intended to be an exact representation of all electrical components. The documentation and drawings that depict the existing conditions are neither complete nor always correct. All existing documentation will be made available. Verify all existing conditions, and be responsible for making all drawings and sketches of existing circuits necessary to insure that; the new controls are properly wired, work in accordance with the specifications, and have sufficient detail to provide for complete final system documentation. Carefully examine indicated controls and all components are to be included in the final documentation.

3.2 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. Core Drilling:** Perform core drilling required for installation of raceways through concrete walls and floors. Locations of floor penetrations are approximate. Verify all exact core drilling locations based on equipment actually furnished as well as exact field placement. To the extent possible, identify the existence and locations of encased raceways and other piping in existing walls and floors with the OWNER prior to any core drilling activities. Repair any damage incurred to any encased conduits, wiring, and piping at no extra cost to the OWNER. Ensure the core drilling does not compromise the integrity of the building's structure. A structural engineer must certify all core drilling and it must be presented for review by the OWNER's ENGINEER prior to the core drilling.
- F. Concrete Housekeeping Pads:** Provide concrete housekeeping pads for all indoor floor standing electrical equipment. Ensure housekeeping pads for all equipment, including future units, be 4 inches above surrounding finished floor or grade and 2 inches larger in both dimensions than the equipment, unless otherwise indicated. Provide concrete housekeeping curb for all conduit stub – up in indoor locations that are not concealed by equipment enclosures. Ensure the housekeeping curb is 3 inches above finished floor or grade.
- G. 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.
- H. 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.
- I. **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.
 - J. **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.
 - K. **Materials:** Comply with specifications and standards for each specific product involved.
 - L. **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.
 - M. **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.

N. 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.

O. 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.

P. 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.

Q. 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.

- R. 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 the structure.
- S. 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.
- T. 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.

3.3 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. In areas with chlorine or hydrofluosilic acid (HFS), utilize schedule 80 PVC for exposed conduit. In lime or ferric chloride areas, utilize Schedule 80 PVC for exposed conduit. In Class I, Div. I or Div. II hazardous locations, utilize rigid aluminum conduit for exposed 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. Furnish plastic sleeves for conduit passing through walls or floors. Perform core drilling as specified herein. Provide conduit seals in hazardous classified locations in strict accordance with the NEC and chlorine, ammonia, sulfur dioxide, and HFS areas to prevent passage of gases to other areas.

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 Galvanized 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 supply 120/240 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 3/4-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. Explosion Proof Seals: Locate explosion proof conduit seals as detailed on the Power and Instrumentation Plan Drawings in accordance with the NEC. Explosion proof conduit seals are required in all Class I areas. Seal all explosion-proof sealing and drain-sealing fittings as follows:

1. Dam fitting hubs with fiber to prevent sealing compound from leaking out.
2. Separate conductors and fiber pack between and around the conductors.
3. Utilize an approved sealing compound equal to Chico "A" to make the seal.
4. Provide a seal depth equal to the trade size of the conduit with a minimum depth of 5/8 inch.
5. Where seals are installed above explosion-proof enclosures, utilize seals of the self-draining type, Crouse-Hinds EZD, or equal.

F. 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.

G. 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.

H. 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 ENGINEER at the time of installation to provide uniformity of placement and ease of reading. Notify the ENGINEER 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.

3.4 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 overfills 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. Transition 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.

3.5 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 ensure 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. **Control Wire and Cable:** Splice or terminate control conductors only at the locations indicated and only on terminal strips or terminal lugs of vendor furnished equipment. In junction boxes, motor control centers, and control panels, terminate all control wire and spare wire to terminal strips.
2. **Instrumentation Wire and Cable:** Ground shielded instrumentation cables at one and only, preferably the receiving end on a 4-20 mA system. Two - and three-conductor shielded cables installed in conduit runs which exceed 2,000 feet may be spliced in pullboxes. Ensure such cable runs have only one splice per conductor.
3. **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.

3.6 LOW VOLTAGE SWITCHGEAR

A. Factory Testing: Completely assemble, wire, adjust and test the switchgear at the factory. After assembly, test the complete switchgear to ensure the accuracy of the wiring and the functioning of all equipment. Give the main bus system a dielectric test of 2200 volts for one minute between live parts and ground and between opposite polarities. Give the wiring and control circuits a dielectric test of 1500 volts for one minute, or 1800 volts for one second, between



live parts and ground, in accordance with ANSI C37.20.1. Ship a certified test report of all standard production tests with each assembly.

- B. Field Quality Control:** Provide the services of a qualified factory-trained manufacturer's representative to assist in installation and start-up of the equipment specified under this section as required. Ensure the manufacturer's representative provides technical direction and assistance in general assembly of the equipment, connections and adjustments, and testing of the assembly and components contained therein.
- C. Manufacturer's Certification:** Require a qualified factory-trained manufacturer's representative to certify in writing that the equipment has been installed, adjusted and tested in accordance with the manufacturer's recommendations.
- D. Training:** Provide a training session for up to five (5) OWNER's representatives for 1 normal workday at a jobsite location determined by the OWNER. Require a manufacturer's qualified representative conduct the training session. Ensure the training program consists of the instruction on the operation of the assembly, circuit breakers, and major components within the assembly.
- E. Installation:** Install all equipment per the manufacturer's recommendations and the contract drawings. Provide all necessary hardware to secure the assembly in place. Install and check the equipment in accordance with the manufacturer's recommendations. This includes but is not limited to:
 - 1. Checking to ensure that the pad location is level to within 0.125 inches per three foot of distance in any direction.
 - 2. Checking to ensure that all bus bars are torqued to the manufacturer's recommendations.
 - 3. Assembling all shipping sections, removing all shipping braces and connecting all shipping split mechanical and electrical connections.
 - 4. Securing assemblies to foundation or floor channels.
 - 5. Measuring and recording Megger readings phase-to-phase, phase-to-ground, and neutral-to-ground (four wire systems only).
 - 6. Inspecting and installing all circuit breakers in their proper compartments.

3.7 PROTECTIVE DEVICE STUDIES

- A. General:** Ensure the study includes single-line and impedance diagrams of the power system. Require the diagram to identify all components considered in the study and the ratings of all power devices, including transformers, circuit breakers, relays, fuses, busses, and cables. Identify the resistances, and reactances of all cables on the impedance diagram. Ensure the study contains all written data from the electric utility company regarding maximum available short circuit current, voltage, and X/R ratio of the utility power system.
- B. Short Circuit Study:** Perform the short circuit study with the aid of a digital



computer program, and in accordance with:

ANSI/IEEE 141	Recommended Practice for Electrical Power Distribution for Industrial Plants
ANSI/IEEE 242	Recommended Practice for Protection, and Coordination of Industrial, and Commercial Power Systems
ANSI/IEEE C37.010 Breakers	Application Guide for AC High-Voltage Circuit Rated on a Symmetrical Current Basis
ANSI/IEEE C37.13	Low - Voltage AC Power Circuit Breakers Used in Enclosures

- C. Protective Device Evaluation Study:** Perform a protective device evaluation study to determine the adequacy of circuit breakers, molded case switches, and fuses. Promptly bring any problem areas or inadequacies in the equipment due to prospective short-circuit currents to the ENGINEER's attention.
- D. Protective Device Coordination Study:** Perform a protective device coordination study to provide the necessary calculations required to select power fuse ratings, protective relay characteristics and settings, ratios and characteristics of associated current transformers, and low-voltage breaker trip characteristics and settings.
- E. Time/Current Coordination Curves:** As a minimum, ensure the time/current coordination curves for the power distribution system includes the following on 5-cycle log-log graph paper:
1. Time/ current curves for each protective relay, circuit breaker, or fuse showing graphically that the settings will provide protection and selectivity within industry standards. Identify each curve, and specify tap and time dial settings. Provide individual curves for each feeder unless identical to others.
 2. Position time/current curves for each device to provide the maximum selectivity to minimize system disturbances during fault clearing. Where selectivity cannot be achieved, notify the ENGINEER as to the cause. Include recommendations for alternate methods that would improve selectivity.
 3. Time/current curves and points for cable and equipment damage.
 4. Circuit interrupting device operating and interrupting times.
 5. Indicate maximum fault values on the graph.
 6. Sketch of bus and breaker arrangement.
 7. Magnetizing inrush points of transformers.
 8. Thermal limits of dry type and liquid insulated transformers. (ANSI damage curve)



9. Follow all restrictions of the ANSI and the National Electrical Code, and maintain proper coordination intervals and separation of characteristics curves.

F. Reports: Summarize the results of the power system studies in a final Report. Furnish a Report which includes information concerning the computer program used for the study and also includes a general discussion of the procedure, items, and data considered in preparing the study. Indicate in the Report suggested changes to the protection, items, and data considered in preparing the study. Include the following in the Report:

1. Single -line diagram
2. Impedance diagram
3. Tabulation of all protective devices, which are identified on the single line diagram
4. Time/current coordination curves
5. Computerized fault current calculations
6. Specific recommendations, if any
7. Test instrumentation, condition, and connections, as applicable, for each study

G. Protective Device Testing, Calibration, and Adjustment: Test, calibrate, and adjust the protective relays and circuit breaker trip devices as recommended in the power system coordination study and calibrate all MCP's as recommended in the power system study. Make all adjustments prior to energization of any electrical equipment.

3.8 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. Use 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. Shield Grounding:** Ground the shield on power cable at each termination in a manner recommended by the cable manufacturer. Ground the shielded instrumentation cable at one end only; typically the "receiving" end of the signal carried by the cable. Terminate each shield drain wire on its own terminal screw. Jumper all of these terminal screws in one rack with No. 16 solid tinned bare copper wire; accomplish connection to ground with a No. 12 green insulated conductor to the main ground bus.
- E. 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 ensure 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 3/4 inch x 10



foot copperweld grounding electrode. The ENGINEER will direct the location.

- F. **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.

3.9 LIGHTING

- A. **Lighting Fixtures:** Furnish complete lighting fixtures at each outlet in accordance with the Fixture Schedule. Unless otherwise indicated on the Drawings, suspend pendant fixtures with rigid stems such as conduit. The use of threaded rods is prohibited. Support fixtures over two feet long with a minimum of two stems. Provide each stem with a ball and socket type self-aligning hanger as manufactured by Appleton, Crouse-Hinds, or equal. Ground pendant fixtures by means of separate conductor connected to a grounding bus or lug in the outlet box. Install lighting fixtures plumb and square with building and wall intersections. Suspend pendant-mounted fixtures which are mounted from sloping ceilings by ball hangers. Locate fixtures installed in machinery rooms after machines have been installed. In all cases, coordinate fixture locations with work of other trades to prevent obstruction of light from the fixtures. Install fixtures in accordance with the architectural reflected ceiling Drawings. Unless otherwise indicated, support fixtures independently of the fixture outlet box. Install conduit run in areas with hung ceilings as close to the structure as possible. Support conduits from the structure. Install recessed fixtures light-tight to the ceiling and provide with auxiliary safety supports attached directly to the building structure. Ensure said safety supports consist of #12 AWG soft drawn galvanized wire or #10 Aluminum wire.
- B. **Fixture Poles:** Set fixture poles on anchor bolts and secure with double nuts on each bolt. After fixture has been leveled and plumbed, the dry-pack the fixture base with grout.

3.10 PANELBOARDS

- A. **Installation:** Install panelboards in accordance with the manufacturer's written recommendations and the general installation requirements of this section.

3.11 LOW VOLTAGE MOTOR CONTROL CENTERS

- A. **General:** Install motor control centers in accordance with Manufacturer's published instructions. Coordinate conduit installation with Manufacturer's-as-fabricated drawings so that all conduit stub-ups are within the area allotted for conduit. Stub conduit up in the section that contains the devices to which conductors are terminated. If stored at the site, store motor control centers in a clean, dry space. Maintain factory wrapping maintained or provide an additional heavy plastic cover to protect units from dirt, water, construction debris, and traffic. Heat storage space or energize MCC space heaters. Carefully handle motor control centers to avoid damage motor control center



components, enclosure, and finish. Repair damage before installation.

B. Installation: Install motor control centers on 4-inch concrete pads. After leveling and shimming, anchor motor control centers to concrete pads, and grout so that no space exists between the pad and support beams. Do the following:

1. Torque all bus bar bolts to Manufacturer's recommendations; tighten all sheet metal and structure assembly bolts.
2. Adjust all Motor Circuit Protector (MCP) devices to the instantaneous trip setting position recommended for the actual horsepower and full load amps of the motor. Verify that overload devices are proper for equipment installed; make necessary changes in overload devices as required for motors having power factor correcting capacitors.
3. After equipment is installed, touch up scratches, and verify that nameplate, and other identification is accurate.
4. Furnish and install high voltage switchboard matting in front of the MCC. Furnish a mat which is ¼ inch thick and 36 inches wide and is Model M36 as manufactured by W.H. Salisbury & Co., or equal.
5. Provide the required calibration as required by coordination studies.

C. Field Tests: Conduct visual and mechanical inspection after the installation of each MCC prior to energization:

1. Inspection for physical damage, proper anchorage and grounding
2. Verification that the ratings of the thermal overload heaters match the motor full-load current nameplate data
3. Verification of tightness of bolted connections

D. Electrical Tests: Following installation and field tests, conduct the following electrical tests:

1. Measurement of insulation resistance of each bus section phase to phase and phase to ground for one minute. Test voltage and minimum acceptable resistance in accordance with Manufacturer's recommendations.
2. Measurement of insulation resistance of each starter section phase to phase and phase to ground with the starter contacts closed and the protective device open. Test voltage and minimum acceptable resistance in accordance with the Manufacturer's recommendations.
3. Measurement of insulation resistance of each control circuit with respect to ground.
4. Verification of proper operation of control logic in all modes of control.

3.12 LOCAL CONTROL STATIONS AND MISCELLANEOUS ELECTRICAL DEVICES



- A. Installation:** Install stations in accordance with these specifications and in accordance with the Manufacturer's recommendations. Protect stations at the jobsite from loss, damage, and the effects of weather. Store stations in an indoor, dry location. Provide heating in areas subject to corrosion, and humidity. Clean station interiors, and exteriors, and touch up coatings to match original finish upon completion of the WORK. Install conduit, conductors, and terminations in accordance with the requirements specified of this section.
- B. Field Testing:** Test each station again for functional operation in the field after the connection of external conductors, and prior to equipment startup.

3.13 TRANSIENT VOLTAGE SURGE SUPPRESSION (TVSS)

- A.** Perform standard factory tests on the equipment under this section. Perform all tests in accordance with the latest version of NEMA and UL standards. Install all equipment per the manufacturer's recommendations and the contract drawings.

3.14 ELECTRICAL HEAT TRACING

- A. General:** Furnish all labor, materials, equipment and incidentals required to install electrical heat trace system on the piping as shown on the Drawings and as specified herein. Provide a heating system capable of maintaining the specified temperature during the extreme of ambient temperature. Ensure the manufacturer designs and supplies the entire heating system, including the schematic arrangements, heating cable, junction boxes, thermostats and other equipment necessary to complete the system as shown on the Drawings and Specifications described herein. Piping and equipment lists and insulation types and thicknesses are found in Division 15 of the Specifications and on the Drawings. Calculate heat losses using the manufacturer's standard procedure in conjunction with the Specification's insulation and equipment schedules. Ensure the design heat output of the tracing includes a 20 percent factor of safety. Suggest any changes in insulation thickness to optimize total system economy. Run heating cables parallel to the pipe only. Do not spiral wrap the heat cables around the pipes.
- B. Applications:** The term "Freeze Protection System" means that the heating system installed on equipment such as pipes, valves, pumps, gages, tanks and controls to prevent the fluid from freezing when the ambient or surrounding temperature falls below 32 degrees F. Provide freeze protection for all components of the piping system which are subject to freeze up, regardless of whether or not they are specifically mentioned in the Specifications or shown on the Drawings. Utilize parallel resistance self-limiting heat tracing cable for piping freeze protection system. Automatically control the temperature of the heating cables by bulb and capillary type thermostats. Ensure the thermostats switch a contactor to power the heating cables.
- C. Installation:** Install heat tracing system where shown on the Drawings and in accordance with manufacturer's shop drawings and recommendations. Run heating cables parallel to the pipe only. Do not spiral wrap the heat cables around the pipes.



3.15 LIGHTNING PROTECTION SYSTEMS

- A.** Ensure the installation of the lightning protection system is done in a neat and workmanlike manner.
- B.** Ensure the lightning protection system is installed by or under the supervision of a UL listed lightning protection installer.
- C.** Install the system in accordance with the reviewed shop drawings and the referenced lightning protection system installation standards.
- D.** Document all concealed portions of the lightning protection system as they are being installed. This includes lightning protection system grounding electrodes, connections to structural metal, connections to underground metal piping entering the structure, connections to electrical and electronic service grounds, ground rings, etc. This documentation should be authenticated by the OWNER or his representative. Maintain detailed record drawings throughout the installation of the system.
- E.** At completion of the installation of the lightning protection system, apply for inspection of the system by UL field representatives. The system is to be inspected for compliance with NFPA 780.
- F.** If the lightning protection system passes inspection, UL will issue a Master Label Certificate of Inspection for Lightning Protection System. Submit the certificate for distribution to the OWNER. Rectify all deficiencies at no additional cost to the OWNER until such time as certification is obtained.
- G.** At project closeout, provide the OWNER with accurate as-built drawings as well as recommended guidelines for maintenance of the system.

3.16 ELECTRIC GENERATING SETS

- A.** Install electric generating sets in accordance with the general requirements of this section and the manufacturer's written recommendations.
- B.** Start and place each unit in operation at the job site at full nameplate KW load using a portable load bank for two hours in the presence of the OWNER or his representatives. Require the supplier of the electric plant to furnish the necessary engine lubricating oil, load bank and optimum solution of ethylene glycol engine coolant and test run the unit. Ensure the supplier of the plant provides the services of a factory trained technician to assist in the testing and to instruct OWNER's personnel in proper maintenance and operation of the unit. Provide four (4) full Operation & Maintenance Manuals (including full engine manuals) and parts lists unless more than 4 is required in other sections of these specifications.
- C.** Warranty: ensure engine generating set is warranted for a period of Five (5) years from the date of initial start-up. Warranty to cover 100% parts, labor and travel of all parts and equipment supplied. Require the vendor to submit their comprehensive warranty documents as well as those from the manufacturer to ensure that these requirements are met.



3.17 AUTOMATIC TRANSFER SWITCHES

- A. Install automatic transfer switches in accordance with the general requirements of this section and the manufacturer's written recommendations.

3.18 MANUAL TRANSFER SWITCHES

- A. Install manual transfer switches installed in accordance with the general requirements of this section and the manufacturer's written recommendations.

3.19 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 the instrumentation and controls specifications, 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. Lighting witching, including remote control, if indicated. Circuitry is in accordance with panel schedules.
 - 2. **Power Instrumentation:** Demonstrate that voltmeter and ammeter switches are functional. Demonstrate that kilowatt meters are within catalog accuracy as installed.
 - 3. Demonstrate mechanical and/or electrical interlocking by attempting to subvert the intended sequence.
 - 4. Activate ground fault tripping by operating test features provided with ground current protective systems and by injecting a known and reasonable current in the ground current sensor circuit. In general, ground fault tripping should occur at a ground current equivalent to 20 percent of phase current. Current injection is not required of circuit 400 amperes or less.
 - 5. **Cable Testing:** Test 480-volt circuits for insulation resistance with a 1000- volt megohm meter. Implement testing after the 480-volt equipment is terminated. Perform phase-to-phase A-B, B-C, A-C and phase-to-ground insulation resistance tests on each cable prior to 5-kV and 25-kV cable termination at equipment but subsequent to stress cone makeup. 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.

6. Test ground interrupter (GFI) receptacles and circuit breakers for proper operation by methods sanctioned by the receptacle Manufacturer.
7. 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. Perform functional testing comprised of visual and physical check of cables, busswork, circuit breakers, transformers, and connections associated with all new and modified equipment, setting of protective relays in conformance with results of any required Short Circuit Study and testing of relays to assure that relays will trip at the current value and time required by the Study, and
8. Circuit breakers which have adjustable time or pick-up settings for ground current, instantaneous overcurrent, short-time overcurrent, or long-time overcurrent, are to be field adjusted by a representative of the circuit breaker Manufacturer. Ensure time and pickup settings correspond to the recommendations of the Short Circuit Study. Tabulate and prove settings for each circuit breaker in its installed position; require the tester to certify the test results and then transmit them to the ENGINEER (7 copies).
9. Complete ground testing of all grounding electrodes prior to operating the equipment.
10. Test the subsystem after the proper operation of alarm and status contacts has been demonstrated or otherwise accepted by the ENGINEER and after process control devices have been adjusted as accurately as possible. Adjust limit switches and level switches to their operating points prior to testing and will set pressure switches, flow switches, and timing relays as dictated by operating results.
11. After initial settings have been completed, operate each subsystem in the manual mode and demonstrate that the operation is in compliance with the Contract Documents. Once the manual mode of operation has been proven, demonstrate automatic operation to verify such items as proper start and stop sequence of pumps, proper operation of valves, proper speed control, etc.



- 12.** Test motor operated valves after having been phased and tested for correct motor rotation and after travel and torque limit switches have been adjusted by a representative of the valve Manufacturer. Ensure tests verify status indication, proper valve travel, and correct command control from local and remote devices.
 - 13.** 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.
 - 14.** Define subsystems as individual and groups of pumps, conveyor systems, chemical feeders, air conditioning units, ventilation fans, air compressors, etc.
 - 15.** General: Carry out tests specified herein for individual items of materials and equipment specified in other Sections
- E. Commissioning:** Do not attempt during the 7-day test in Section 01 75 00 – Equipment Testing and Startup until all subsystems have been found to operate satisfactorily; only attempt commissioning as a function of normal plant operation in which plant process flows and levels are routine and equipment operates automatically in response to flow and level parameters or computer command, as applicable. Provide a written request to ENGINEER for any consideration of simulated process parameters. Tabulate the motor current required which reflects the values occurring during commissioning. Record the indications of all switchboard ammeters and kilowattmeters every half-hour during commissioning.

- END OF SECTION -



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SECTION 26 32 13 – STANDBY POWER GENERATION

PART 1 -- GENERAL

1.1 THE SUMMARY

- A. Furnish and deliver an engine-driven standby electrical generating system, complete and operable, in accordance with the Contract Documents.

1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Ensure that all materials and components conform with applicable requirements of the National Electrical Code (NEC), and any other State or Municipal codes which apply. Provide generator system which meets applicable standards and codes, including IEEE, NEMA, ANSI, OSHA, and UL.

1.3 SELLER SUBMITTALS

- A. Furnish submittals in accordance with Section 01 33 00-Seller Submittals.
- B. Shop Drawings:
 - 1. Submit detailed, dimensioned Shop Drawings and data demonstrating adherence to the requirements of these specifications before fabrication, shipment, or other WORK under this Section begins. Include the manufacturer's certification that engine atmospheric emissions will comply with the limitations.
 - 2. Submit certified drawings and wiring diagrams of each component in the system and a master wiring diagram showing the entire system on one sheet. Include all AC and DC power control connections between the generator, engine, batteries, and circuit breakers for this specific installation. Provide a master drawing of the engine/generator, showing general dimensions, bill of materials, location and size of all connections for fuel, cooling, exhaust, direct current connections, conduit locations, and connections for control and power wiring. Include wire and terminal numbers for all diagrams. Furnish KW output curves, fuel consumption curves, and certified air emission data sheets.
 - 3. Provide outline drawings and connection diagrams sufficient to enable the installation to be designed completely, and connection diagrams showing both internal and external connections. Include foundation loading and clearances.
 - 4. Provide two hard copies along with one copy in Adobe portable document format (.pdf) of complete and detailed instructions for the operation, lubrication, and maintenance of equipment in the system. Provide manuals complete with wiring diagrams, lubrication schedules and recommended lubricants, drawings, cuts, parts lists, and other necessary data. Provide manuals which include clearly identified parts to facilitate ordering of replacements. Include all operational control devices and their functions within the manuals.



1.4 QUALITY ASSURANCE

- A. Provide engine/generator that is the product of a manufacturer who has been regularly engaged in the design and production of similar engine/generator sets for a minimum of 10 years.
- B. Provide engine/generator from a supplier who maintains a local parts and 24-hour service facility within the State of **Louisiana or Mississippi**. Provide engine/generator from a supplier who employs factory trained and authorized service representatives to furnish necessary installation, test, and start-up supervision as well as operation and maintenance training necessary for final approval and acceptance.

PART 2 -- PRODUCTS

2.1 SYSTEM COMPONENTS

- A. Provide one new natural gas engine-powered electric generator set, in an outdoor, waterproof, sound attenuated enclosure. Provide generator set having a nominal standby rating of not less than **350 KW**, 437.5 KVA, 1750 SKVA at 0.8 power factor, 480 volts, three phase, four wire, 60 Hertz. Include in general, and as applicable, engine and generator on a common vibration isolating base, with auxiliaries, accessories, and controls, including intake filters, discharge silencer, turbocharger, heat exchangers, foundation bolts, isolators, piping, flexible couplings, supports, complete exhaust piping, ring, and silencer, insulation, control panels, lubrication system, water jacket heaters, cooling system, and battery rack, battery charger, spare parts, and all materials necessary to permit installation, testing and placing the system in successful operation.
- B. Ensure that the generator-set, enclosure, and accessories are assembled and shipped to the Site as a complete, coordinated package, ready for installation. Provide engine generator base, cooling system, etc, that have been factory painted before installation in the enclosure.
- C. Provide Automatic Transfer Switch as a part of the scope of supply of this section.

2.2 SYSTEM OPERATION

- A. Provide system that operates as follows:
 - 1. **Automatic Control**
 - a. A maintained remote contact closure from the automatic transfer switch will cause the generator-set to start and run.
 - b. When the remote startup contact opens, the engine will continue to operate for an adjustable cool-down time (typically 5 to 30 minutes).
 - 2. **Local Control:** Provide generator set is capable of manual initiation or stopping from the locally mounted generator control panel. Provide the local generator control panel as a part of this Contract.



3. **Emergency Stop Control:** Provide an emergency stop pushbutton at the generator control panel that causes the unit to stop without any delay.

2.3 ENGINE

- A. Provide a complete engine-powered standby electrical generating system of the type and capacity indicated.
- B. Provide natural gas engine mounted on a common base with the generator and the direct connected radiator and is rated for standby service, continuously for the duration of the electric power interruption, with engine jacket water cooled by means of a direct mounted water-to-air radiator under SAE conditions at 85 degrees F, 30 feet above sea level.
- C. Provide engine with a dry type air cleaner with service indicator, fuel oil filter, full pressure positive pump lubrication with full-flow oil filters, thermostatic regulated oil cooling system, and crankcase drain with valving to be able to drain the crankcase oil without reaching under the engine.
- D. Provide engine equipped with two 120 volt, thermostatically controlled jacket water heaters. Include facilities to provide power to the battery charger, fuel oil transfer pumps if required, and other generator-related facilities.
- E. Provide engine equipped with an electric 24-volt dc starting system of sufficient capacity to crank at a speed which will start the engine under conditions indicated. Include a charging alternator with anti – condensation heater and relays for fully automatic operation from a remote signal.
- F. Provide engine equipped with a speed control.

2.4 BATTERIES AND BATTERY CHARGER

- A. Provide a lead-acid, lead-cadmium, nickel-cadmium or calcium/lead antimony type storage battery with sufficient capacity for three 30 second cranking cycles, allowing 10 seconds between cycles. Submit calculations verifying adequate capacity. Provide batteries mounted on a plastic rack as close as practical to the starter motor. Provide vented, nonmetallic protective covers or red and black plastic or rubber boots covering all terminals to protect against an accidental short circuit as might be caused by laying a metallic object on the battery. Metallic racks and covers are not acceptable.
- B. Provide a unit-mounted battery charger for 120 V, single phase, 60 Hz input be provided. Provide voltage regulated charger, with separate float and equalize charge voltage adjustment having a 10 amp rating. Provide charger which includes alarm relays to sense high and low dc voltage, zero current, and ac power failure, with individual output contacts wired to terminal strips for tie into remote alarms. Provide an ac “on” indicating pilot LED light and dc voltmeter and ammeter and annunciator.



2.5 EXHAUST SYSTEM

- A. Provide engine with an exhaust system consisting of flexible connection, exhaust silencer, steel piping, fittings, stainless steel hardware and supports, brackets, and rain collar.
- B. Provide flexible connection of the stainless-steel bellows type with flanged ends. Provide flexible elements of stainless steel suitable for exhaust temperatures recommended by the engine manufacturer and that are suitable for vibration isolation and for relieving stress caused by thermal expansion.
- C. Provide generator set with the silencer mounted and supported horizontally on the roof of the generator enclosure or within the enclosure.

2.6 COOLING SYSTEM

- A. Provide engine which is equipped a cooling system having sufficient capacity to effectively cool the engine when delivering full rated horsepower at the conditions stated above. Include radiator and engine-driven fan of a type and capacity recommended by the engine manufacturer.
- B. Provide radiator sized in accordance with the engine manufacturer's recommendation for use with 50 percent aqueous ethylene glycol, with airflow controlled by a power inlet damper and a gravity discharge damper, both provided as part of the outdoor enclosure. Utilize design ambient air temperature of 100 degrees F at sea level.
- C. Provide engine with an engine-driven, gear driven centrifugal type water circulating pump for circulating water through the cooling system.

2.7 GENERATOR

- A. Provide generator that is nominally rated not less than 350 KW at .8 PF, 480 Volt, 3- phase, 60 Hz, 4 wire, of a brushless design with solid state permanent magnet generator (PMG) exciter. Other excitation methods are not acceptable. Include solid state, generator mounted voltage regulator. Provide radio-interference suppression meeting commercial standards.
- B. Provide generator which will support 300 percent rated current for 10 seconds without externally mounted devices if a line to neutral short circuit occurs.
- C. **Voltage Regulation Tolerance:** Provide generator with voltage regulated to plus or minus 1 percent of any present value over the 3 phase load range. Instantaneous voltage dip or rise, when measured with an oscilloscope, may not exceed 25 percent upon full load application or rejection, and must return to preset value within 0.5 seconds.
- D. **Waveform:** Provide generator with deviation factor of output voltage not exceeding 5 percent and the value of any individual harmonic not exceeding 2 percent of the fundamental when operating with an unbalanced load.



- E. **Temperature Rise:** Provide generator with temperature rise of any component not exceeding the rise permitted by NEMA standards. Provide voltage regulator which is adjustable from minus 25 percent to plus 10 percent.
- F. **Bearing:** Provide double sealed ball bearing, lubricated for life.

2.8 LOCAL DISCONNECT CIRCUIT BREAKER

- A. Provide a generator set circuit breaker, electronic trip molded case breaker type with LSIA trip functionality, sized to carry the rated output current of the generator set. Provide breaker which incorporates an electronic trip unit that operates to protect the alternator under all overcurrent conditions. Submit time overcurrent characteristic curves and thermal damage curve for the alternator, demonstrating the effectiveness of the protection provided.

2.9 AUTOMATIC TRANSFER SWITCH

- A. **General:** Furnish automatic transfer switch that is compatible with the generator set supplied. The Automatic Transfer switch will be a non-fused fully rated enclosed switch which complies to NEMA ICS2-447, NFPA 70, NFPA 99, NFPA 110, and UL 1008. Ensure it has front access to all control panels and contacts. Provide main contact material which consists of silver (87% min) and cadmium. Furnish Plexiglas covers which shield electronic controls and main contact connections. Number wiring for easy identification. Require the Break before Make transfer action for no more than 3 cycles and ensure the mechanism incorporates lifetime lubrication within a temperature range of -29 degrees C to 60 degrees C (-20 degrees F to 140 degrees F). Incorporate solid state programmable logic, be assembled and tested, and include:
 1. Sheet steel NEMA 4X Stainless Steel enclosure with hinged, gasketed, key - lockable door.
 2. Operating transfer switch consisting of single solenoid, electrically operated, mechanically held.
 3. Solderless connectors for normal source cables, emergency source cables, load cables, and solid neutral bar.
 4. 65KAIC withstanding capacity
 5. Voltage monitoring of each phase of normal source (full protection), adjustable 70 to 90 percent.
 6. Voltage of emergency at transfer, 70 to 90 percent (factory set 90 percent).
 7. Frequency of emergency at transfer, 70 to 90 percent (factory set 90 percent).
 8. Voltage and frequency monitoring of one phase of emergency source.
 9. Time delay, engine starting, adjustable 0.1 to 10 seconds, set at 3 seconds.
 10. Engine minimum run minimum run (5 to 30 minutes) (factory set 20 minutes).



11. Engine Cool down timer factory set 5 minutes.
12. Time delay, normal to emergency (0.1 to 6 second adjustable).
13. Time delay emergency to normal (1 to 30 minutes) (factory set 5 minutes).
14. Programmed transition whereby the switch will switch to center off position for and adjustable period of time before re-transferring to normal power.
15. Three position mode selector switch in the face of the enclosure, marked auto, test and fast test.
16. Exerciser (7 days from initial command).
17. Transfer when exercising (on/off switch)
18. Pilot lights in face of enclosure which the ATS is connected
19. Auxiliary C-form contacts for normal and emergency
20. All lugs as required to receive the incoming and outgoing.
21. Internal cabling, terminal boards, fuses, fuse nameplates, and miscellaneous hardware as needed.
22. Software consisting of dimensional drawing, drawing, electrical schematics, and parts list.

2.10 VIBRATION ISOLATORS

- A. Provide generator set with engine and generator mounted on a common system base with vibration isolators of number and size as recommended by the engine supplier to support the engine, generator, radiator, and base. Provide isolation mountings consisting of steel or cast iron top and bottom housings incorporating steel springs or "donut" style isolators, located between the genset and the base, with built-in leveling bolts and built-in resilient chocks to control isolation and withstand lateral forces in all directions.

2.11 LUBRICATION AND COOLING FLUIDS

- A. Furnish the generator set engine fully charged with lubricating oil and grease as specified by the manufacturer for continuous service. Furnish the cooling system with a full charge of 50 percent ethylene glycol.

2.12 GENERATOR SYSTEM CONTROL PANEL

- A. Provide generator set with an integrally mounted instrument and control panel, vibration isolated, NEMA 12 compliant, dead front, constructed of 14-gauge steel and containing at least the following equipment:

Coolant temperature gauge



Oil pressure gauge
Four position selector switches marked for "auto," "manual," "stop," and "stop/reset."
Automatic starting controls (2 wire start/stop)
Coolant level pre-alarm
Coolant temperature pre-alarms (low and high)
Fuel pressure pre-alarm
Low dc voltage alarm to indicate loss of charge on battery
Electrical contacts and "push to test" pilot lights for shutting down the engine on low oil pressure, high oil temperature, overcrank, high coolant temperature, and overspeed condition
Individual electrical contacts for remote indication of any pre-alarm or alarm condition
Running Time Meter (Non Resettable)
Emergency stop switch
Voltmeter and switch, ammeter and switch, frequency meter

- B.** Provide controls and wiring to open the inlet air damper when the generator-set is running and close the damper when the generator-set is off. Provide damper of a "power close, spring open" type, utilizing 120 volt power.

2.13 GENERATOR ENCLOSURE

A. Generator Enclosure

1. Provide a weatherproof, sound attenuated type enclosure to house the engine/generator and accessories. Provide enclosure meeting following standards and codes at a minimum:
 - a. NEPA 70 (National Electric Code)
 - b. NFPA 30
 - c. NFPA 37
 - d. NFPA 110
 - e. UL 142



f. API 620

B. Provide enclosure conforming to the following design criteria, or equal.

Rigidity wind test equal to	150MPH
Roof load equal to	50 lbs. per sq. ft.
Floor load equal to	200 lbs. per sq. ft.
Rain test equal to	4-inches per hour
Enclosure certified to meet	BOCA base building and mechanical codes

C. Make test data on similar construction by the manufacturer to the ENGINEER upon request.

D. Provide enclosure consisting of a roof, steel floor, 2 side walls and 2 end walls of skin designed and sized as required to meet dimensional, sound attenuation, and code requirements for the actual generator provided.

E. Provide enclosure which includes a cooling and combustion air inlet silencer section, an equipment enclosure section, and a cooling air discharge silencer section. Provide enclosure which reduces source noise from the generator set to not greater than 75 dBA (decibels) at a distance of 7-meters from the enclosure. Provide enclosure which is bird- and rodent-proof with all openings screened.

F. Provide enclosure with roof and walls comprised of one-piece semi-monocoque construction with framing members of aluminum or aluminized steel. Provide enclosure with skin material with minimum 0.040-inch or minimum thickness 18-gauge aluminized steel. Other materials of construction may be acceptable where data is furnished verifying that the proposed system is equivalent. Provide enclosure with skin which is hard-riveted to framing members on 3-inch centers maximum. Pop rivets and bolts are not acceptable fasteners to attach exterior skin to framing. Provide enclosure with roof that is cambered to aid in rain runoff.

G. Provide enclosure with semi-rigid, thermo-acoustic insulation with thickness as required to meet the noise criteria. Provide lining with perforated mill finish aluminum. Self-adhesive foam and loose or batt-type insulating materials will not be accepted.

H. Provide enclosure inclusive of lifting provisions at the enclosure base, with capacity suitable for rigging the entire assembly.

I. Provide enclosure having a minimum of 4 single personnel access doors. Provide enclosure with doors consisting of an extruded frame with skin material matching enclosure and which are fully gasketed to form a weathertight perimeter seal and which are able to be pad – locked by the OWNER following installation. Provide hinges of stainless steel, and lock 3 point locking mechanisms.

J. Provide enclosure with air handling equipment which operates as follows:



1. Air enters the enclosure through a removable hood. Provide motor – operated dampers be provided, wired to be spring operated to open upon engine startup. Provide for air discharge through a gravity-operated damper and into a hood. Provide system designed such that it will not exceed 0.5-inch wg total external static pressure and which ensures more than adequate airflow for cooling and combustion.
- K. Provide enclosure inclusive of a bolt-in-place removable end wall panel for maintenance and/or equipment installation. Provide bolts, nuts, and washers as necessary, all fabricated of stainless steel.
- L. Provide all necessary hardware to externally mount the exhaust silencer and maintain the weatherproof integrity of the system. Provide a bird screen suitable for long term exposure to an outdoors environment, installed on exhaust outlet.

PART 3 -- EXECUTION

3.1 FACTORY TESTING

- A. Provide system which has been fully tested at the factory before shipment to the Point of Destination. Certify to the OWNER that the manufacturer's standard testing procedure has been followed, and in the event the system does not meet the test criteria or the requirements of this Section, that it has been repaired, modified, or replaced and then re – tested prior to shipment to the Point of Destination.

END OF SECTION



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SECTION 31 05 16 – 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 01 33 00 – Contractor Submittals and Section 01 45 00 – Quality Control.

1.3 REFERENCE STANDARDS

A. 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 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 aggregates 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 NON – PLASTIC EMBANKMENT

- A. **General:** Comply with the General Requirements for Aggregates. The maximum organic content is 4.0 percent when tested in accordance with DOTD TR 413.
- B. **Sand for Non – Plastic Embankment:** Use a non-plastic material with at least 75 percent passing the No. 4 sieve and not more than 15 percent passing the No. 200 sieve when tested in accordance with DOTD TR 112 and DOTD TR 113.
- C. **Stone for Non – Plastic Embankment:** Use a coarse stone from the Approved Materials List. The maximum dry-rodded unit weight is 95 pounds per cubic foot when tested in accordance with AASHTO T 19. Comply with the following gradation:

U.S. Sieve Size	Percent Passing by Weight
1-1/2 Inches	100
1 Inch	90-100
³ / ₄ Inch	70-100
No. 4	35-65
No. 40	12-32
No. 200	5-12

- D. **Blended Calcium Sulfate for Non – Plastic Embankment:** Comply with the following gradation:

U.S. Sieve Size	Percent Passing by Weight
1-1/2 Inches	100
1 Inch	90-100
³ / ₄ Inch	70-100
No. 4	35-65
No. 40	12-32
No. 200	5-12



2.3 AGGREGATES FOR BASE COURSES

- A. General:** Comply with the General Requirements for Aggregates.
- B. Stone for Base Course:** Use stone from the Approved Materials List, and comply with the following gradation:

U.S. Sieve Size	Percent Passing by Weight
1-1/2 Inches	100
1 Inch	90-100
¾ Inch	70-100
No. 4	35-65
No. 40	12-32
No. 200	5-12

For material passing the No. 40 sieve, comply with the following requirements:

Liquid Limit, Maximum	25
Plasticity Index, Maximum	5

- C. Recycled Portland Cement Concrete for Base Course:** Use material complying with the following gradation and with all material passing the No. 40 sieve non – plastic.

U.S. Sieve Size	Percent Passing by Weight
1-1/2 Inches	100
1 Inch	90-100
¾ Inch	70-100
No. 4	35-65
No. 40	12-32
No. 200	0-8



D. Blended Calcium Sulfate for Base Course: Comply with the following gradation:

U.S. Sieve Size	Percent Passing by Weight
2 Inches	100
1-1/2 Inches	85-100
1 Inch	80-100
³ / ₄ Inches	60-100
No. 4	10-40
No. 40	0-20
No. 200	0-15

E. Permeable Base: For permeable asphalt base and permeable concrete base, use 100 percent crushed stone from the Approved Materials List, and comply with the following:

U.S. Sieve Size	Percent Passing by Weight
1 Inch	100
³ / ₄ Inch	90-100
3/8 Inch	20-55
No. 4	0-10
No. 8	0-5

2.4 AGGREGATES FOR SUBGRADE LAYER

A. General: Comply with the General Requirements for Aggregates.

B. Stone for Subgrade Layer: Use stone from the Approved Materials List, and comply with the following gradation:

U.S. Sieve Size	Percent Passing by Weight
1-1/2 Inches	100
1 Inch	90-100



¾ Inch	70-100
No. 4	35-65
No. 40	12-32
No. 200	5-12

C. **Recycled Portland Cement Concrete for Subgrade Layer:** Comply with the following gradation:

U.S. Sieve Size	Percent Passing by Weight
1-1/2 Inches	100
1 Inch	90-100
¾ Inch	70-100
No. 4	35-65
No. 40	12-32
No. 200	0-8

D. **Blended Calcium Sulfate for Subgrade Layer:** Comply with the following gradation.

U.S. Sieve Size	Percent Passing by Weight
1 Inch	90-100
¾ Inch	70-100
No. 4	25-75
No. 200	0-25

2.5 AGGREGATES FOR SURFACE COURSE

A. **General:** Comply with the General Requirements for Aggregates.

B. **Stone for Surface Course:** Comply with the following gradation.



U.S. Sieve Size	Percent Passing by Weight
1-1/2 Inches	100
¾ Inch	50 – 100
No. 4	35-65
No. 40	10-32
No. 200	3-15

For material passing the No. 40 sieve, comply with the following requirements:

Liquid Limit, Maximum	25
Plasticity Index, Maximum	5

C. Stone for Surface Course: Comply with the following gradation.

U.S. Sieve Size	Percent Passing by Weight
1-1/2 Inches	100
¾ Inch	50 – 100
No. 4	35-65
No. 40	10-32
No. 200	3-15

For material passing the No. 40 sieve, comply with the following requirements:

Liquid Limit, Maximum	25
Plasticity Index, Maximum	5

D. Sand – Clay – Gravel for Surface Course: Use a mixture of sand, clay, and either siliceous gravel, stone, or recycled Portland cement concrete. Use material which is reasonably free from foreign matter as determined by visual inspection. Use material which complies with the following:

For material passing the No. 40 sieve, comply with the following after lime treatment:



Liquid Limit, Maximum	40
Plasticity Index, Maximum	4-15

- E. **Reclaimed Asphalt Pavement for Surface Course:** Use recycled asphalt concrete pavement complying with the following:

U.S. Sieve Size	Percent Passing by Weight
2 Inches	100
No. 4	35-75

2.6 AGGREGATES FOR ASPHALT MIXTURES

- A. **General:** Comply with the general requirements for aggregates. Use only stone, gravel, slag, lightweight aggregates, and coarse and manufactured sand sources from the LDOTD AML. RAP and fine natural sand are required to be from an approved Producer/Supplier. Use clean and durable crushed stone for all coarse aggregates for SMA mixtures. Use 100 percent crushed stone or manufactured sand for fine aggregates for SMA Mixtures. Coarse aggregate is all material retained on or above the No. 4 sieve. Fine aggregate is all material passing the No. 4 sieve. Additional requirements for aggregates for asphalt mixtures are included in the asphaltic mixture sections.
- B. **Coarse Aggregate for Asphalt Mixtures:** For coarse aggregate stockpiles, determine Coarse Aggregate Angularity in accordance with DOTD TR 306 (Double Face), and determine Flat and Elongated in accordance with ASTM D4791.
- C. **Fine Aggregate for Asphalt Mixtures:** For fine aggregate stockpiles, determine Fine Aggregate Angularity in accordance with DOTD TR 121, and Sand Equivalent (SE) in accordance with DOTD TR 120. SE is not required for manufactured sands (screenings), nor for fine aggregate stockpiles having 25 percent or more passing the No. 200 sieve.
- D. **Natural Sand for Asphalt Mixtures:** Natural sand is non-plastic material consisting of clean, hard, durable, siliceous grains graded from coarse to fine and reasonably free from vegetative matter, clay balls, clay lumps, or other deleterious materials as per the general requirements for aggregates. Use a material with a gradation with a maximum of 25 percent passing the No. 200 sieve. Clay lumps may not exceed 0.5 percent by weight when sampled from the stockpile and tested in accordance with DOTD TR 119.
- E. **Manufactured Sand for Asphalt Mixtures:** Manufactured sand (screenings) is the fine aggregate material generated during the crushing and processing of coarse aggregates. Sand Equivalent testing is not required; fine aggregate



angularity testing is required.

- F. Reclaimed Asphalt Pavement for Asphalt Mixtures:** Use RAP which is approved either at the time of removal from the roadway or in stockpiles. Make all stockpile quality control records available at the ENGINEER's request. Include RAP quantities and delivery date, quantities delivered to projects, daily moisture contents, weekly asphalt cement content, and weekly RAP Gse in all records. Before feeding RAP into the plant, crush or screen all pieces that are larger than 2 inches.
- G. Mineral Filler for Asphalt Mixtures:** Use material listed on the LDOTD AML which consists of limestone dust, pulverized hydrated lime, Portland cement, cement stack dust, or lime kiln dust. Mineral dust collected in bag houses or by other dust collectors at asphalt concrete plants is not classified as mineral filler. Cement stack dust must consist of material collected from waste rotary kiln gases discharged through a collector of a cement plant. Comply with the following:

U.S. Sieve Size	Percent Passing by Weight
No. 30	100
No. 80	95-100
No. 200	70-100
No. 270	60-100

- H. Lightweight Aggregate for Asphalt Mixtures:** Use a lightweight aggregate consisting of cubical fragments which are of uniform density and are free from an excess of foreign matter.

2.7 AGGREGATES FOR ASPHALT SURFACE TREATMENT

- A. General:** Use crushed gravel, crushed stone, or lightweight aggregate from the Approved Materials List. Comply with the General Requirements for Aggregates.
- B.** For crushed gravel Size 1 and Size 2 use a material with 60 percent minimum crushed retained on the No. 4 sieve. For crushed gravel Size 3 use a material with 75 percent crushed retained on the No. 4 sieve. Determine the percent crushed in accordance with DOTD TR 306.
- C.** Comply with the following gradations:

Gradation for Aggregates for Asphalt Surface Treatment				
U.S. Sieve Size	Percent Passing by Weight			
	Size 1	Size 1A	Size 2	Size 3



	Slag or Stone Aggregate, (Size No. 5)	Crushed Gravel or Lightweight Aggregate	Slag or Stone Aggregate	All Aggregate	All Aggregate
1 – ½ Inch	100	100	100	---	---
1 Inch	90-100	95-100	100	---	---
¾ Inch	20-55	60-90	85-100	100	---
½ Inch	0-10	---	25-40	95-100	100
3/8 Inch	0-5	0-15	5-15	60-80	95-100
No. 4	---	0-5	---	0-5	20-50
No. 8	---	---	---	0-2	0-2
No. 200	0-1	0-1	0-1	---	---

2.8 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.



2.9 GRANULAR MATERIAL

- A. Use a non-plastic siliceous material complying with the General Requirements for Aggregates and the following gradation:

U.S. Sieve Size	Percent Passing by Weight
½ Inch	100
No. 10	75-100
No. 270	0-10

2.10 AGGREGATES FOR BEDDING MATERIAL

- A. Comply with the General Requirements for Aggregates. Use stone, recycled portland cement concrete, or a mixture of either recycled portland cement concrete, gravel, crushed slag, or stone combined with granular material as specified herein.
- B. **Stone for Bedding Material:** Comply with the following gradation.

U.S. Sieve Size	Percent Passing by Weight
1-1/2 Inches	100
1 Inch	90-100
¾ Inch	70-100
No. 4	35-65
No. 40	12-32
No. 200	5-12

For material passing the No. 40 (425 µm) sieve, comply with the following requirements:

Liquid Limit, Maximum	25
Plasticity Index, Maximum	5



- C. **Recycled Portland Cement Concrete for Bedding Material:** Use material with the following gradation and will all material passing the No. 40 sieve being non – plastic.

U.S. Sieve Size	Percent Passing by Weight
1-1/2 Inches	100
1 Inch	90-100
³ / ₄ Inch	70-100
No. 4	35-65
No. 40	12-32
No. 200	0-8

- D. **Sand Aggregate for Bedding Material:** Use sand-aggregate material which is a natural or artificial mixture of sand and gravel, recycled portland cement concrete, or other approved aggregate listed in this subsection with all material passing the No. 40 sieve being non-plastic. Use a mixture free of foreign matter as determined by visual inspection. Comply with the following gradation prior to placement.

U.S. Sieve Size	Percent Passing by Weight
1-1/2 Inches	90-100
³ / ₄ Inch	70-85
3/8 Inch	40-60
No. 4	15-40
No. 16	3-15
No. 200	0-5

- E. **Mixtures:** Mix recycled Portland cement concrete, gravel, or stone with 35±5 percent granular material by volume. Verify the mixture quantities by proof of material deliveries

1. **Gravel for Mixture:** Comply with the following gradation.

U.S. Sieve Size	Percent Passing by Weight
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1-1/2 Inches	95-100
No. 4	0-15
No. 200	0-2

2. **Stone or Recycled Portland Cement Concrete for Bedding Mixture:** Comply with the following gradation:

U.S. Sieve Size	Percent Passing by Weight
1-1/2 Inches	95-100
¾ Inch	40-85
No. 4	0-15

3. Granular Material: Comply with the following gradation:

U.S. Sieve Size	Percent Passing by Weight
½ Inch	100
No. 10	75-100
No. 270	0-10

2.11 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.

2.12 BEDDING, HAUNGING AND BACKFILL MATERIAL FOR GRAVITY SEWER AND MANHOLES

- A. **General:** Use crushed stone for bedding, haunching, and initial backfill material for complying with the General Requirements for Aggregates for gravity sewer and manholes. Use be crushed concrete or stone of the #610 gradation or #57 gradation as indicated on the drawings. Comply with gradations below.
- B. **#610 Gradation:** Where #610 material is required, use stone or recycled concrete



complying with the following gradation:

US Sieve Size	Percent Passing
1-1/2"	100
1"	90-100
3/4"	70-100
1/2"	60-90
3/8"	50-80
#4	35-65
#40	12-32
#200	5-12

- C. **#57 Gradation:** Where #57 material is required, use stone or recycled concrete complying with the following gradation:

US Sieve Size	Percent Passing
1-1/2"	100
1"	95-100
1/2"	25-60
#4	0-10
#8	0-5

- D. Use granular material (pumped river sand) as indicated on the drawings and as specified herein for final backfill.

2.13 BEDDING, HAUNGING AND BACKFILL MATERIAL FOR SEWER FORCE MAINS

- A. Use compacted sand complying with ASTM 2321 Class II (SW or SP) and the general requirements for aggregates for the bedding, haunching, and initial backfill material for sewer force mains.
- B. Use select material for non-paved areas as specified elsewhere for final backfill. Use pumped river sand for final backfill in paved areas.



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 -



SECTION 31 10 00 - 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 01 33 00 – Contractor Submittals.

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 31 30 00 – 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 a licensed and permitted landfill 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 01 57 19 – Temporary Environmental Controls 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 the engineer.
- 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 31 30 00 – 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 pavement in accordance with accepted horticultural and tree surgery practices published by AAN

- END OF SECTION -



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SECTION 31 13 00 – SELECTIVE TREE AND BRUSH REMOVAL AND TRIMMING

PART 1 -- GENERAL

1.1 THE REQUIREMENT

- A. Perform tree and brush removal and trimming from right of way line to right of way line or other widths and locations shown on the plans. Ensure trees, shrubs, and other landscape features that are to remain are not damaged. Dispose of debris within 48 hr. of cutting, off the right of way, in accordance with federal, state, and local regulations unless otherwise approved. When approved, chip debris and spread in a thin layer on the right of way.

PART 2 -- PRODUCTS

2.1 GENERAL

- A. Use tools and products which are routinely utilized and designed for the removal of trees, limbs and brush and which will not be injurious in any way to trees, shrubs and brush to remain.

PART 3 -- EXECUTION

3.1 TREE REMOVAL

- A. Remove trees of various diameters as shown on the plans, or as directed. Remove tree stumps to at least 12 in. below the surrounding terrain unless otherwise shown on the plans, or as directed. Backfill holes with acceptable material and compact flush with surrounding area.

3.2 TREE TRMMING

- A. Remove dead tree limbs. Remove tree limbs to the limits shown on the plans or as directed. Prune trees in accordance with Class IV National Arborist Association Pruning Standards for shade trees. Make cuts as close as possible to the trunk or parent limb without cutting into the branch collar or leaving a protruding stub. Remove suckers to the height of the lowest main branch.
- B. When removing limbs 2 inches in diameter or smaller, comply with the following requirements.
 1. Undercut 1/3 way through the limb 8 to 12 in. from the main stem.
 2. Remove limb 4 to 6 inches outside the first cut
 3. Remove stub with an even flush cut so that a trace (collar) protrudes approximately 1/2 in.
 4. Do not allow limb to fall free and damage other limbs or items.
 5. Treat exposed cuts on oak trees with wound dressing within 20 min. of the cut.



- C. Disinfect tools with 70% methyl alcohol, benzalkonium chloride, chlorine solution, or other approved disinfectant when trimming oak trees and when shown on the plans before cutting and sterilize/sanitize again before cutting another tree. Avoid pruning between February 15 and June 15, the period for maximum insect and fungal activity.

3.3 BRUSH REMOVAL

- A. Remove brush including, but not limited to, bushes, small trees, and vines growing within the right of way by cutting parallel to and within 1 in. of the ground and to the limits shown on the plans. Remove brush from under bridges, around culverts, and in channels to the limits shown on the plans

3.4 CHANNEL WORK

- A. Trim trees and remove brush to the limits shown on the plans, including areas under bridges.

3.5 STRUMP REMOVAL

- A. Remove tree stumps at least 12 in. below the surrounding terrain unless otherwise shown on the plans, or as directed. Backfill holes with acceptable material and compact flush with surrounding area.

END OF SECTION



SECTION 31 30 00 - 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
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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 01 33 00 – Contractor Submittals and Section 01 45 00 – Quality Control.

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 LEVEE EMBANKMENT

- A.** Construct embankment for levee, berms, ramps and road crossings of earth materials naturally occurring or CONTRACTOR blended. Materials that are classified when tested in accordance with ASTM D 2487 as CL or CH with less than 35% sand content are suitable for use as levee embankment fill. Materials classified as ML are suitable if blended to produce a material that classifies as CH or CL according to ASTM D 2487. Use be free from masses of organic matter, sticks, branches, roots, and other debris including hazardous and regulated solid wastes. As earth from the designated excavation areas may contain excessive amounts of wood, isolated pieces of wood will not be considered objectionable in the embankment provided their length does not exceed 1 foot, their cross-sectional area is less than 4 square inches, and they are distributed throughout the fill. Do not place more than 1 percent (by volume) of objectionable material in the earth material placed in each cubic yard of the levee section. Do not place pockets and/or zones of wood in the embankment. Notify the ENGINEER whenever the in-place Plasticity Index of the material is 15 or less. Materials placed in the section must be at above the Plasticity Index of 10. Materials placed in the section must be at or below organic content of 9 percent by weight, as determined by ASTM D 2974, Method C. Materials placed in the section must contain less than 35 percent sand content by weight, as determined by ASTM D 1140.

2.3 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.

2.4 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.

2.5 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.



2.6 NON – PLASTIC EMBANKMENT

- A. Construct non – plastic embankments of aggregate material as specified in Section 31 05 16 – Aggregates.

2.7 TYPE “A” BACKFILL FOR DRAINAGE AND UTILITY PIPE

- A. Use aggregate material as specified in Section 31 05 16 – Aggregates or Flowable Fill as specified in Section 03 34 00 – Flowable Fill.

2.8 TYPE “B” BACKFILL FOR DRAINAGE AND UTILITY PIPE

- A. Use granular material as specified in Section 31 05 16 - Aggregates or Select Soil as specified herein. Type “A” backfill material may be substituted for Type “B” material.

2.9 GRANULAR MATERIAL FOR STRUCTURAL BACKFILL

- A. Use granular aggregate as specified in Section 31 05 16 – Aggregates.

2.10 BEDDING MATERIAL

- A. Use aggregate material as specified in Section 31 05 16 – Aggregates.

2.11 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.



2.12 GEOTEXTILE FABRIC

- A. Provide geotextile fabric composed of at least 85 percent by weight (mass) of polyolefins, polyesters, or polyamides. Provide fabric that is resistant to chemical attack, rot, and mildew and that has no tears or defects which adversely alter its physical properties. When required, provide fabric which has stabilizers and/or inhibitors added to the base materials to make filaments resistant to deterioration due to ultraviolet and heat exposure. Provide geotextiles with finished edges to prevent the outer yarn from pulling away from the fabric. Fibers of other composition may be woven into the geotextile fabric for reinforcing purposes.
- B. Furnish geotextile fabric rolls with an opaque, waterproof wrapping for protection against moisture and extended ultraviolet exposure prior to placement. Label each roll with the manufacturer's name, date of manufacture, lot number, and name of product.
- C. Provide geotextiles that are listed on the LDOTD AML as approved for the application that geotextile is to be used for at the time of incorporation into the WORK.
- D. Geotextile classes and materials requirements are defined in the table below:

Property	Test Method	Class and Requirements						
		A	B	C	D	S	F	G
AOS, Metric Sieve, μm, Max	ASTM D4751	300	300	212	600	850	850	850
Grab Tensile, N, Min.	ASTM D4632	330	400	580	800	800	400	400
% Elongation at Failure, Min.	ASTM D4632	--	--	50	50	--	--	--
% Elongation at 200N, Max.	ASTM D4632	--	--	--	--	--	--	50
Burst Strength, N, Min	ASTM D3787	440	620	930	1290	1390	--	--
Puncture, N, Min.	ASTM D4833	110	130	180	330	330	--	--
Trapezoid Tear Strength, N, Min.	ASTM D4533	110	130	180	220	220	--	--
Permittivity, Sec⁻¹, Min.	ASTM D4491	1.0	1.0	1.0	1.0	0.2	0.01	0.01



Grab Tensile Strength, Retained after Weathering 150H, UVA lamps, %, Min.	ASTM D4491	70	70	70	70	70	--	--
	ASTM G154							
Grab Tensile Strength, Retained after Weathering 500H, UVA lamps, %, Min	ASTM D4491	--	--	--	--	--	70	70
	ASTM G154							

2.13 GEOGRID

- A. General:** Provide a bi-axially oriented polymer grid structure composed of polypropylene or high-density polyethylene with apertures designed to interlock with the surrounding fill material. Weld or interweave joints at the crossover point in such a manner that the elements will not separate under handling and construction activities or under dynamic loads anticipated over the lifetime of the WORK. Use geogrid that is resistant to damage during construction, including ultraviolet light degradation, and that has long term resistance to chemical and biological degradation caused by the fill materials being reinforced.
- B.** Provide geogrid that complies the following minimum requirements. Numerical values represent minimum average roll values required in the designated direction:

Property	Test Method	Requirements
Aperture Size	I.D. Calipered	1.0 – 1.5 inch
Open Area, min	Corps of Engineers Method	70%
Flexural Rigidity, Minimum	ASTM D1388	0.018 lb – ft
Tensile Modulus at 2% Strain, Minimum	ASTM D6637	14,000 lb – ft
Junction Efficiency	GRI GG2	90%



2.14 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 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.

2.15 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. **Concrete Sheet Piles:** Use be pre – stressed, pre – cast concrete piles fabricated in accordance with Section 03 31 00 – Structural Concrete.
- C. **Steel Sheet Piles:** Use rolled steel sections meeting the design properties and lengths shown on the drawings. Use material meeting the requirements of ASTM A572, Grade 50 unless otherwise specified. Make splices in steel sheet piles by full penetration butt weld of the entire cross section. Do not make splices in the top 10 feet of the piles. Employ qualified welding operators for all welding.
- D. **Aluminum Sheet Piles:** Use aluminum sheet piles complying with ASTM B 221, Alloy 6061-T6 or Alloy 6063-T6, or ASTM B209 Alloy 3064-H34. Provide aluminum sheet piles with sand – tight interlocking joints and meeting the design properties and lengths shown on the drawings.
- E. **Vinyl Sheet Piles:** Use material manufacturerd entirely from a rigid, high impact, ultraviolet- (UV) inhibited, weatherable vinyl compound. Provide ultra – violet resistant material made of virgin material with a minimum ASTM D4216 Cell Classification of 1-42443-33. If mono-extrusion technology is used, the entire sheet pile must be comprised of virgin material with a minimum ASTM D4216 Cell Classification of 1-42443-33. All interlocks must incorporate reinforcement to resist lock separation and reduce seepage. Provide material meeting the design properties and lengths shown on the drawings.



F. Timber Sheet Piles: Use treated Douglas Fir or Southern Pine meeting the design properties and lengths shown on the drawings. Provide timber piles with tongues or grooves of suitable proportions, either cut from the solid material or made by building the piles with a minimum of three planks together. Drift sharpen piles at their lower ends to wedge adjacent piles tightly together during driving. Provide galvanized steel hardware. Provide timber piles meeting the following requirements:

1. Acceptable type preservatives to be used are as follows:
 - a. **Creosote:** Use creosote complying with AWPA P1/P3.
 - b. **Creosote Solutions:** Use creosote solutions complying with AWPA P2.
 - c. **Pentachlorophenol – Petroleum Solution:** Use Pentachlorophenol – Petroleum solutions complying with AWPA P8 and P9.
 - d. **Chromated Copper Arsenate:** Use Chromated Copper Arsenate complying with AWPA P5, Type B or C.
 - e. **Creosote for Field Repairs:** Use creosote for field repairs complying with AWPA M4.

2. **Treatment of Timber Piles:** Use piles that have been treated according to current AWPA Standard Specifications for Preservative Treatment by Pressure Process C1 and C3, modified as indicated herein. Where Kiln – dried timber is used, use material that has been steamed prior to treatment for a minimum of two hours. Provide timber treated with the amount of preservative as indicated in the Minimum Preservative Retention Table below. Determine the amount of preservative by assay as specified in the AWPA standards. Meet all penetration requirements of the AWPA standards. Forward treating reports to the ENGINEER upon request. Condition material treated with CCA by kiln – drying prior to treatment.

Minimum Preservative Retention Table for Timber Piles (Pounds per Cubic Foot of Wood)				
Material and Usage	Creosote	Creosote Solutions	Pentachlorophenol	Chromated Copper Arsenate
Non – Foundation Piles				
Land and Fresh Water, Southern Pine	16.0	16.0	N/A	0.80
Land and Fresh Water, Douglas Fir	17.0	17.0	N/A	1.00



Coastal Water, Southern Pine or Douglas Fir	20.0	20.0	N/A	2.50
Foundation Piles (Piles which are Embedded in the Ground and Capped with Concrete)				
Land and Fresh Water, Southern Pine	12.0	12.0	0.60	0.80
Land and Fresh Water, Douglas Fir	17.0	17.0	0.85	N/A
Coastal Water, Southern Pine or Douglas Fir	20.0	20.0	N/A	2.50

2.16 MECHANICALLY STABILIZED EARTH WALL (MSEW)

- A. RESERVED

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 LEVEE EMBANKMENT

- A. Where indicated on the drawings, or where directed by the ENGINEER, place and compact levee embankment as specified herein.
- B. The location and extent of the compacted fill is shown on the drawings. Construct all embankment, berms, ramps and road crossings of compacted fill. Do not place materials for compacted fill in water. Place or spread materials for compacted fill in layer, the first or bottom layer and the last two layers not more than 6 inches in thickness and all layers between the first and the last two layers not more than 12 inches in thickness prior to compaction. Start layers in full out to the slope stakes and carry substantially horizontal and parallel to the levee centerline with sufficient crown or slope to provide satisfactory drainage during construction. Dress and level areas on which geotextile is to be placed to the grade indicated on the drawings. When placing fill on the geotextile, do not



allow mechanical equipment to come into contact with geotextile in any way. Requirements for benching into the slope of the existing embankment are required in order to place and compact the material in horizontal layers as described on the drawings. Bench the existing levee embankment by excavating the existing levee embankment as shown on the drawings and described herein. Maintain a vertical face of the existing embankment resulting from the benching to a minimum of 1 foot in height but not more 2 feet in height as shown on the drawings. Use material excavated from the benching operations as compacted fill. When the surface of any compacted layer is too smooth to bond properly with the succeeding layer, adequately scarify the surface of the compacted layer before the next layer is placed thereon. Do not exceed the elevation of the berm embankment(s) by more than 2 feet.

- C. Compact the first and each successive layer of compacted fill material for embankments, berms, ramps, and road crossings to at least 90 percent of maximum dry density as determined by ASTM D 698 (Standard Proctor Compaction Test) at a moisture content within the limits of plus 5 to minus 3 percentage points of optimum moisture content determined from ASTM D 698. Compact the first and each successive layer of the sand drainage blanket to at least 95 percent of maximum dry density as determined by ASTM D 698 at moisture content within the limits of plus to minus 3 percentage points of optimum moisture content determined from ASTM D 698. For the first layer above the geotextile, use a tractor having a ground pressure no greater than 4.7 plus or minus 0.2 psi to spread and then compact the layer.
- D. Bring entire embankment, berms, ramps and road crossings to not less than the prescribed design cross section, within allowable tolerance, at all points. Dress out unreasonable roughness of the surface out to permit fertilizing, seeding and mulching operations.

3.7 EMBANKMENTS AND HEADERS

- A. Where indicated on the drawings, or where directed by the ENGINEER, place and compact embankment and headers as specified herein.
- B. Prior to beginning excavation, grading or embankment operations in an area, complete all necessary clearing and grubbing in that area. Prior to any embankment operations in an area, cut all corresponding roadside ditches to facilitate drainage in that area. Do not place or spread embankment materials on Portland cement concrete or asphaltic concrete pavements. Do not damage pavement surfaces, edges, and joints during embankment operations. Repair surfaces damaged by such operations as directed by the ENGINEER.
- C. Ensure that final excavation and embankment slope lines are be uniform in appearance. Take measurements as necessary to assure that the elevations at the top, bottom, and intermediate breaks in the slope are such that a minimum acceptable slope is achieved. Ensure that all sloped are straight without valleys or humps, as determined by visual inspection.
- D. Construct embankments of select soils and place soils in uniform layers not exceeding 12 inches of uncompacted thickness. Place each layer for the full width of embankment, blended as necessary to obtain a uniform material,



brought to a uniform moisture content, and compacted by approved methods to a minimum of 95.0 percent of maximum dry density before the next layer is placed. Maximum dry density will be determined in accordance with DOTD TR 415 or TR 418 and percent in-place density in accordance with DOTD TR 401. If base course or roadway is to be constructed on the embankment, compact the embankment to a density such that the required base course compaction can be met. Ensure that the moisture content at the time of compaction, tested in accordance with DOTD TR 403, is within a range of ± 2.0 percent of optimum moisture established in accordance with DOTD TR 415 or TR 418 or reprocess and re-compact the lifts until these requirements are met. Conduct operations such as to prevent lamination between lifts. Correct laminations between lifts prior to placing additional lifts. Ensure that surfaces of excavated areas and embankments are uniform. Do not disturb material outside construction limits.

- E. Assume full responsibility for the stability of embankments until final acceptance. Construction activities, which may lead to subsequent embankment damage will not be permitted.
- F. When embankments are constructed on a surface sloping more than 6:1 from the horizontal, cut the slope of the ground on which the embankment is to be placed into steps, as directed, before fill is placed.
- G. When an embankment is to be constructed to a height of less than 5 feet, remove heavy sod and objectionable vegetation from the area on which the embankment is to be placed. Scarify the area to a depth of approximately 9 inches. Recompact area to at least 95.0 percent of maximum dry density. Maximum dry density will be determined in accordance with DOTD TR 415 or TR 418 and percent in-place density in accordance with DOTD TR 401. When height of fill is 5 feet or more, removal of sod will not be required but disk the area on which embankment is to be placed to the satisfaction of the ENGINEER and recompact before construction of embankment.
- H. When embankment material is to be deposited only on one side of structures or culvert head walls, do not compact the area immediately adjacent to the structure to the extent that it will cause excessive pressure against the structure. Do not place fill adjacent to the end bent of a bridge higher than the top of the substructure until the superstructure is in place. When the embankment is to be deposited both sides of a concrete wall or similar structure, conduct operations so that the embankment is always at approximately the same elevation on both sides of the structure. Backfill structures as specified herein.
- I. When embankments are constructed in lakes, streams, swamps or other unstable areas and unstable material cannot be removed or the area drained, the requirement for placing material in layers as outlined above may be waived. When this requirement is waived, place the embankment by end dump or other approved methods to an elevation where normal construction methods can begin. Construct embankments placed above this elevation in layers as specified above. When a wave of unsuitable material is forced up in front of the end dumping operation, take possession of the material and remove and dispose of it. Do not allow such material to be trapped and be incorporated in the embankment except as part of plastic soil for slopes.



- J. **Cut Area Preparation:** If base course or roadway is to be constructed on the cut area, ensure that the density of the embankment is such that the required base course compaction can be met. When unstable soils are encountered, the ENGINEER will determine the limits to be undercut. Excavate to a stable foundation or to the depth required by the ENGINEER and backfill to existing grade. When stable foundation cannot be reached, "bridge in" the embankment materials and construct the remaining embankment to grade as specified.
- K. **Plastic Soil Blanket:** The outside layer of each roadway embankment and header will consist of a plastic soil blanket as specified. Place plastic soil blanket in a timely manner to prevent erosion.

3.8 NON – PLASTIC EMBANKMENTS

- A. Construct non – plastic embankments by mechanical methods.
- B. Unless otherwise shown on the plans, place material in lifts not exceeding 15 inches uncompacted thickness after establishing a working table as directed. Compact each lift to 95% of maximum dry density. Maximum dry density will be determined in accordance with DOTD TR 415 or TR 418 and percent in-place density in accordance with DOTD TR 401.

3.9 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.

3.10 DRAINAGE AND UTILITY PIPELINE 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. **Paved Areas:** Backfill cross and side drains in paved areas subject to traffic loads such as roadway travel lanes, shoulders, and turnouts with Type A material. Use Type B backfill material in all other paved areas including driveways, detour roads and similar installations. Selected soils will not be allowed as backfill material. Place and compact backfill as specified below.
- C. **Non – Paved Areas:** Use Type B material compacted as specified for non – paved areas except for plastic pipe. Backfill plastic pipe with granular material or Type A backfill Material.
- D. **Placement and Compaction:**
 1. When corrugated metal pipe is used, use backfill material with a resistivity greater than 1500 ohm-cm and a pH greater than 5 when tested in accordance with DOTD TR 429 and DOTD TR 430 respectively.
 2. 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.
 3. 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).
 4. 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.

- E. Backfill Methods:** Compaction of backfill for drainage pipe as indicated below. Compaction by flooding will not be allowed unless authorized by the ENGINEER.
1. **Selected Soils:** Place at or near optimum moisture content determined in accordance with DOTD TR 415 or TR 418 in layers not exceeding 8 inches (200 mm) compacted thickness. Thoroughly compact backfill material under the haunches of the pipe. Compact each layer by approved methods to at least 95 percent of maximum dry density prior to placement of a subsequent layer.
 2. **Granular Material:** 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. **Flowable Fill:** Install flowable fill in accordance with Section 03 34 00 – Flowable Fill.
 4. **Stone or Recycled Portland Cement Concrete:** Place backfill at or near optimum moisture content determined in accordance with DOTD TR 415 or TR 418. Thoroughly compact backfill material under the pipe haunches and then compact in layers not exceeding 8 inches (200 mm) compacted thickness. With approval of the ENGINEER, layer thickness may be increased to 12 inches (300 mm) with verification of satisfactory installation and performance. Compact each layer by approved methods to at least 95 percent of maximum dry density prior to placement of a subsequent layer. Control placement and compaction operations so as not to damage protective coatings on metal pipes. Repair damaged coatings at no additional cost to the OWNER.

3.11 BEDDING MATERIAL

- A. Placement of Bedding:** Unless otherwise noted on the drawings, place geotextile material in accordance with plan details prior to placing bedding material. Take care to prevent damage to geotextile fabric during placement of bedding material. Place materials in lifts not exceeding 12 inches. Shape the layers and uniformly compact.
- B. Compaction Requirements:** Compact material to 75% relative density as determined by ASTM D 4253 and D 4254. In place density will be determined in accordance with DOTD TR 401.
- C.** Adjacent rolls of fabric will be overlapped or sewn. When rolls are overlapped, overlap a minimum of 18 inches, including the ends of the rolls. Place the top layer of the fabric parallel with adjacent rolls and in the direction of bedding materials placement. When rolls are sewn, join adjacent rolls by sewing with



polyester, or Kevlar thread. Employ the “J” seam or “Butterfly” seam for field sewing with the two pieces of geotextile fabric mated together, turned in order to sew through 4 layers of fabric and sewn with 2 rows of Type 401, two-threaded locking chain stitch. Factory seams other than specified may be submitted to the ENGINEER for approval. When the ground is covered with water or supersaturated soil, sewing of the fabric will be required.

- D. Remove and replace damaged fabric with new fabric or cover with a second layer of fabric extending 2 feet in each direction from the damaged area.

3.12 EXCAVATION AND BACKFILL FOR STRUCTURES

- A. Except where otherwise indicated for a particular structure or where ordered by the ENGINEER, carry the excavation to an elevation 6-inches below the bottom of the footing or slab and brought back to grade with compacted materials acceptable for placement beneath structures. Where indicated or ordered, over – excavate beneath structures. When such over-excavation is indicated, perform both over-excavation and subsequent backfill to the required grade.
- B. Backfill excavations with granular material compacted in lifts. Place and spread backfill material evenly in approximately horizontal layers. Moisten or aerate each layer necessary. Unless otherwise approved by the ENGINEER, do not allow any layer to exceed 6-inches of compacted thickness. Compact backfill to a minimum of 95 percent of maximum dry density. Use equipment that is consistently capable of achieving the required degree of compaction and compact each layer over its entire area while the material is at the required moisture content.
- C. Do not deposit material on reservoir and structure roofs sooner than 30 Days after the concrete roof slab has been placed. Do not use equipment weighing more than 10,000 pounds when loaded on a roof.
- D. Do not use flooding, ponding, and jetting for fill on roofs, backfill around structures, backfill around reservoir walls, for final backfill materials, or aggregate base materials.
- E. Do not use equipment weighing more than 10,000 pounds closer to walls than a horizontal distance equal to the vertical depth of the fill above undisturbed soil at that time. Use hand operated power compaction equipment where use of heavier equipment is impractical or restricted due to weight limitations.

3.13 GEOTEXTILE FABRIC

- A. Unless noted otherwise, on the drawings or elsewhere in the Contract Documents, utilize geotextile fabric as indicated in the table below:

Application		Use Geotextile Class
Drainage Sewerage	or Underdrains	A, B, C, or D
	Pipe and Precast Manhole	A, B, C, or D



	Joints	
	Weepholes	A, B, C, or D
	Bedding Fabric	B, C, or D
	Geocomposite Drainage Systems	B, C, or D
Stabilization	Bulkheads	C or D
	Flexible Revetments	C or D
	Rip Rap	D
	Railroad Crossings	D
	Base Course	D
	Subgrade Layer	D
	Soil Stabilization	C, D, or S
Paving	Paving Fabric	B or C
Silt Fencing	Self Supported Silt Fencing	F
	Wire Supported Silt Fencing	G

- B.** Keep rolls of geotextile covered and protected from ultraviolet degradation at all times until use. Cover geotextile fabric that has been installed with embankment within 7 calendar days. When ultraviolet damage occurs, remove and replace the geotextile. Place fabric at the locations shown on the plans or as directed. Overlap or sew adjacent rolls of geotextile fabric. When rolls are overlapped, provide an overlap of a minimum of 18 inches (450 mm), or as specified in the plans, including the ends of the rolls. Place the top layer of the geotextile fabric parallel with adjacent rolls and in the direction of embankment placement. When rolls are sewn, join adjacent rolls by sewing with polyester or Kevlar thread. Employ the "J" seam or "Butterfly" seam for field sewing with the two pieces of geotextile fabric mated together, turned in order to sew through 4 layers of fabric and sewn with 2 rows of Type 401, two-thread chain stitch. Factory seams other than specified may be submitted to the ENGINEER for approval. Where the ground is covered with water or soil is saturated, sew the geotextile fabric.
- C.** Place geotextile fabric as smooth as possible with no wrinkles or folds, except in curved road sections. For curved road sections, fold the geotextile fabric to accommodate the curve. Fold in the direction of construction and pinned or



stapled. Fill and compact ruts that occur during construction prior to placement of geotextile fabric.

- D. Remove and replace damaged geotextile fabric with new geotextile fabric or covered with a second layer of geotextile fabric extending 2 feet in each direction from the damaged area

3.14 TOPSOIL

- A. Scarify areas to receive topsoil as directed. Spread topsoil uniformly over the areas to a depth of 6 inches and roll to a uniform surface with a cultipacker or other suitable equipment.

3.15 GEOGRID

- A. Place geogrid in continuous sheets parallel to the roadway or pipeline centerline. Ensure that geogrid sections do not separate during construction.
- B. Cut geogrid to ensure that placement is maintained parallel to the centerline of the roadway or the pipeline.
- C. Do not allow tracked equipment to operate directly on the geogrid. Remove and replace damaged geogrid with new geogrid or cover geogrid with new geogrid extending three (3) feet in each direction.

3.16 PERMANENT SHEET PILES

- A. A geotechnical engineering study has been performed for the site. The soil report is available at the ENGINEER's office. Understand and conform to all recommendations and criteria associated with sheet piles given in this report.
- B. Visit the site and thoroughly investigate all existing surface and subsurface conditions affecting the WORK. The information provided in the geotechnical engineering report is available to the CONTRACTOR to assist it, at its own risk, in its assessment of subsurface conditions at the site. Prior to bidding, bidding contractors may make their own subsurface investigations to satisfy themselves as to site and subsurface conditions, but perform such subsurface investigations only under time schedules and arrangements approved in advance by OWNER.
- C. **Driving:** Drive sheet piles with hammers adequate to drive the piles to required depth in satisfactory condition. To maintain satisfactory alignment, drive sheet piles in increments of penetration necessary to prevent distortion, twisting out of position or pulling apart at interlocks. If a vibratory hammer is used, assume full responsibility for any damage to adjacent structures or for embankment settlement caused by his operation.
- D. Use of jets will require written approval of the ENGINEER. When approved, jetting will be at no additional call to the OWNER.
- E. **Cutoffs:**



1. Cut off or drive tops of sheet piling to a straight line at the elevation indicated on the plans or as directed.
2. If heads of sheet piles are appreciably distorted or otherwise damaged below cut-off level, remove and replaced damaged portions at no additional cost to the OWNER.
3. Treat tops of timber sheet piles after cut-off with creosote for field repairs as specified herein. Bend down galvanized metal coverings at least 3 inches on each side and nailed to the vertical surface of sheet piles with large-headed galvanized roofing nails.
4. Withdraw and replace sheet piles damaged during driving, or that are driven out of proper position or below cut-off elevation, with new piles at no additional cost to the OWNER.

F. Protective Coatings: Temporary and construction sheeting will not require painting unless otherwise specified. Before driving, clean and coat surfaces of steel sheet piling from the top of the sheet pile to a point 10 feet below the ground or mud line. Use coatings for steel sheets as specified in Section 09 96 00 – Protective Coatings.

3.17 MECHANICALLY STABILIZED EARTH WALL (MSEW)

A. RESERVED

- END OF SECTION -



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SECTION 32 13 16 – WALKS, DRIVES, AND INCIDENTAL PAVING

PART 1 -- GENERAL

1.1 THE REQUIREMENT

- A. Furnish and construct portland cement concrete walks, handicapped curb ramps, drives and incidental paving slabs in accordance with these specifications and in conformity with lines, grades, and dimensions shown on the plans or established.
- B. Unless noted otherwise, provide 6" thick driveways and 4" thick incidental paving.

PART 2 -- PRODUCTS

2.1 PORTLAND CEMENT CONCRETE

- A. Use Class M Concrete complying with Section 03 10 10 – Portland Cement Concrete.

2.2 JOINT MATERIALS

- 1. Use preformed bituminous type ribbon. Comply with ASTM D994

2.3 REINFORCING STEEL

- A. Use reinforcing complying with Section 03 20 10 – Reinforcing.

2.4 CURING MATERIALS

- A. Liquid Membrane Forming Compounds: Use material complying ASTM C309 and listed on the Approved Materials List. Allowable types are Type 2 white-pigmented or Type 1-D, clear or translucent with a fugitive dye, as specified.
- B. Moist Cure Materials:
 - 1. Sheet Material: Use sheet materials for curing concrete meeting the physical and performance requirements of ASTM C171.
 - 2. Burlap Cloth: Use burlap cloth made from Jute or Kenaf complying with AASHTO M 182, Class 3.

PART 3 -- EXECUTION

3.1 EXCAVATION

- A. Excavate to required depth and width. Shape the top of the subgrade and compact to a firm, even surface conforming to the section shown on the plans. Remove unsuitable material and dispose of and replace with approved material at no direct pay.



3.2 FORMS

- A. Use forms of wood or metal that extend the full depth of concrete. Use forms that are straight, clean, and of sufficient strength to resist the pressure of concrete. Brace forms to ensure that forms remain in horizontal and vertical alignment until their removal.
- B. Concrete may be placed by slip-form methods. Place slip-formed concrete with an approved machine designed to spread, vibrate, consolidate, and finish concrete in one pass of the machine with a minimum of hand finishing. Rigidly hold sliding forms together to prevent spreading of forms. After the passing of the side forms, there must be no noticeable slumping of concrete.

3.3 SUBGRADE

- A. Thoroughly moisten the subgrade immediately prior to placing concrete.

3.4 PLACING AND FINISHING

- A. Place the concrete on the subgrade, strike-off to required thickness, and tamp sufficiently to bring the mortar to the surface. Finish the surface with a wood float or steel trowel followed by brushing to a slightly rough finish. Round joints and edges with an edging tool having a 1/4 inch radius.

3.5 JOINTS

- A. **Expansion Joints:** Fill expansion joints with 1/2 inch thick preformed expansion joint filler. Install expansion joints at maximum 100-foot intervals, and between intersecting paving and any fixed structure, such as a building, bridge, or curbing, and between intersecting paving and the handicapped curb ramps. Extend expansion joint material for the full width and depth of paving.
- B. **Weakened Plane:** Form weakened planes by a jointing tool or other acceptable means. Extend weakened planes into concrete for at least one-quarter of the depth. Form the weakened planes 1/8 inch wide.
- C. **Walk:** Space weakened planes for walks equal to the width of the walk.
- D. **Drives:** Form a longitudinal weakened plane along the centerline of drives more than 16 feet wide. Form transverse weakened planes at not more than 16-foot intervals.
- E. **Incidental Paving:** Form weakened planes for incidental paving at intervals not exceeding 30 times the thickness of the concrete in length or width. Construct joints in incidental paving placed adjacent to jointed concrete to match existing joints, with intermediate joints formed as necessary not to exceed the maximum joint spacing.
- F. **Construction Joints:** Form construction joints around manholes, utility poles, etc., extending into paving. Install 1/4 inch thick preformed expansion joint filler into these joints.
- G. Make tie-ins of existing concrete by full depth sawing at no additional cost to the



OWNER.

3.6 CURING

- A.** Immediately after completing the surface finishing, uniformly spray all exposed pavement surfaces with white pigmented curing compound as soon as surface bleed water evaporates, or within one-half hour if evaporation occurs quickly. Apply curing compound to exposed edges without spraying any exposed tie bars. Do not apply curing compound during rainfall or to surfaces with standing water. Maintain curing continuously for 72 hours. Apply curing compound under pressure by mechanical sprayers at the rate recommended by the manufacturer, but in no case less than 1 gallon per 100 square feet of surface area. Use the fully atomizing type of spraying equipment with a tank agitator. Immediately prior to and during application thoroughly mix the compound, stirring continuously by mechanical methods. Hand spraying is allowed on small irregular widths or shapes and on surfaces exposed by form removal. Thoroughly agitate the curing compound prior to placing in the sprayer. After application of curing compound, ensure the resulting pavement surfaces have a uniform appearance of a "blank white sheet of paper." Immediately reapply additional compound to all deficient areas during the curing period.

3.7 DETECTABLE WARNING SURFACE FOR HANDICAP RAMPS AND AT - GRADE SIDEWALK INTERSECTIONS

- A.** When sidewalks intersect with roadways, equip the sidewalk with a detectable warning system consisting of raised truncated domes as a transition between the sidewalk and the street as required by the Americans With Disabilities Act, 28 CFR § Part 36, ADA Standards for Accessible Design. Install detectable warnings (truncated domes) on the ramp surface over the full width of the ramp throat for a distance of 24 inches in the direction of travel from the back of the curb. Also install detectable warnings (truncated domes) on at-grade sidewalks intersecting with roadways for a distance of 36 inches in the direction of travel from the end of the sidewalk. Detectable warning surfaces may be added to at-grade sidewalks intersecting with driveways at the discretion of the design section or Project Engineer. Lay out truncated domes on a square grid in order to allow enough space for wheelchairs to roll between the domes. Ensure that reflectance of the truncated domes and the underlying surface meets the 70 percent contrast requirement of ADAAG.

- END OF SECTION -



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SECTION 32 15 00 – AGGREGATE SURFACE COURSE

PART 1 -- GENERAL

1.1 THE REQUIREMENT

- A. Furnish and construct aggregate surface courses for roadways, shoulders, drives, or other facilities in accordance with these specifications, and in conformity with the lines, grades, thicknesses, and typical sections shown on the plans or already established.

1.2 REFERENCE STANDARDS

- A. Louisiana Department of Transportation and Development (LDOTD)

AML Approved Materials List (formerly QPL)

TR 602 Measuring Thickness and Widths of Base and Subbase Courses and Aggregate Type Surface Courses

1.3 CONTRACTOR SUBMITTALS, SAMPLING, AND TESTING

- A. Provide submittals, samples for testing, and testing of materials in accordance with Section 01 33 00 – Contractor Submittals and Section 01 45 00 – Quality Control.

1.4 DELIVERY, STORAGE, AND HANDLING:

- A. Ensure that delivery, storage, and handling of materials is undertaken in such a way as to ensure compliance of the placed and compacted material with all requirements of the specifications.

PART 2 -- PRODUCTS

2.1 GENERAL

- A. Use uniformly blended aggregate surface course materials that have been sampled and approved prior to placement.
- B. Unless otherwise approved in writing, use the same type of material throughout the project.

2.2 STONE

- A. Use stone complying with the requirements of Section 31 05 16 – Aggregates.

2.3 SAND CLAY GRAVEL (LIME TREATED)

- A. Use sand – clay - gravelly complying with the requirements of Section 31 05 16 – Aggregates.

2.4 RECLAIMED PORTLAND CEMENT CONCRETE



- A. Use reclaimed Portland cement concrete complying with the requirements of Section 31 05 16 – Aggregates.

2.5 RECLAIMED ASPHALT PAVEMENT

- A. Use reclaimed asphalt pavement complying with the requirements of Section 31 05 16 – Aggregates.

2.6 WATER

- A. Use water which is suitable for human consumption, or which complies with the following when tested in accordance with AASHTO T26:

Component	Percent by Weight, Maximum
Alkali	0.1
Solids (Organic)	0.1
Solids (Inorganic)	0.4
Salt (NaCl)	0.5
Sugar, Oil, or Acid	0.0

2.7 LIME

- A. Use a product listed on the LDOTD AML.

PART 3 -- EXECUTION

3.1 EQUIPMENT

- A. Furnish and maintain equipment necessary to produce a finished product meeting the requirements of these specifications. Obtain approval of equipment prior to use.

3.2 GENERAL CONSTRUCTION REQUIREMENTS

- A. Obtain approval of the subgrade before placing aggregate surface course. Uniformly spread material removed from shoulders adjacent to the shoulder material.
- B. On existing surfaces, where only placing aggregate surface course, remove vegetation, shape, and satisfactorily compact the surface prior to placing aggregate surfacing. For new or reconstructed surfaces construct subgrade in accordance with the requirements of the earthwork specifications.



3.3 PLACING MATERIALS

- A. Place material directly on the prepared and approved subgrade. Do not place surface course on damaged subgrade until repairs have been completed and approved.
- B. Do not place or spread aggregate surfacing materials on adjacent portland cement concrete or asphalt concrete pavements. Conduct aggregate surfacing operations so that pavement surfaces, edges, and joints are not damaged. Repair damaged areas at no additional cost to the OWNER.

3.4 MIXING

- A. Uniformly mix sand-clay-gravel with 6 percent lime by volume; for central mixing, use 5 percent lime. The sand-clay-gravel will be sampled and approved prior to treatment with lime.
- B. Add moisture to adequately control compaction.

3.5 SHAPING AND COMPACTING AGGREGATE SURFACE COURSE

- A. **General:** Place material to required thickness, shape to the required section, and compact with an approved roller to a tight, uniform surface free from ruts and waves
- B. Stone and Recycled Portland Cement Concrete Pavement
- C. Reclaimed Asphalt Pavement: Compact with at least three passes of a roller approved by the ENGINEER.
- D. Lime Treated Sand – Clay – Gravel: Compact and finish lime treated sand-clay-gravel within 72 hours after initial mixing with lime. If not compacted and finished within 72 hours, due to contractor's operations, recut lime at half the specified rate at no additional cost to the Department.

3.6 DIMENSIONAL TOLERANCES

- A. When specifying net section measurement, the thickness and width of completed aggregate surface course will be checked for acceptance in accordance with DOTD TR 602. Correct to plan dimensions areas with deficiencies in excess of the following tolerances as required at no additional cost to the department.
- B. Thickness: Do not allow under-thickness to exceed 3/4 inch. Over-thickness may be waived at no additional cost to the OWNER.
- C. Width: Do not allow under widths to exceed 3 inches for shoulders and 6 inches for roadways. Over-width may be waived at no additional cost to the OWNER. When using vehicular measurement, the ENGINEER will take measurements to ensure the work's conformance to plan dimensions.



- END OF SECTION -



SECTION 32 31 13 – FENCES AND GATES

PART 1 -- GENERAL

1.1 THE REQUIREMENT

- A. Construct fences and gates in accordance with these specifications and in conformity with lines and grades shown on the plans or established by the engineer.

PART 2 -- PRODUCTS

2.1 PORTLAND CEMENT CONCRETE

- A. Furnish and place Class R concrete in accordance with the requirements of Section 03 31 10 – Portland Cement Concrete.

2.2 BARBED WIRE

- A. Provide steel or aluminum alloy wire, 12 and ½ gage.
- B. Steel Wire: Provide wire complying with ASTM A121.
- C. Aluminum Alloy Barbed Wire: Provide barbed wire complying with ASTM B211, Alloy 5052-O for line wire and Alloy 5052-H38 for barbs.

2.3 WOVEN WIRE

- A. Provide wire complying with one of the following Design Numbers and Grades of ASTM A116.

2.4 POST AND BRACES FOR FIELD AND LINE TYPE FENCES

- A. Provide steel posts or braces.
- B. Provide steel posts and braces equipped with corrugations, knobs, notches, holes, or studs so placed and constructed as to engage a substantial number of fence wires in proper position. Posts may be punched with holes in such a position and of such size as will not unduly impair the strength of the posts. Posts with punched tabs used for fastening wires are not acceptable. Supply corner, end, and bracing posts with necessary holes and with galvanized bolts of standard commercial quality or other satisfactory substitute, such as castings, for fastening braces to the posts.
- C. Provide line posts, anchor plates, and braces which comply with ASTM A702, except that a hardness test may not be substituted for the tensile test. Provide steel posts, anchor plates, and braces that have been galvanized in accordance with ASTM A123.



2.5 STAPLES AND NAILS

- A. Provide staples and nails made of galvanized steel wire. Provide galvanized coating weighing not less than 0.20 ounce per square foot when tested in accordance with ASTM A90.

2.6 METAL FASTENERS FOR STEEL POSTS

- A. Provide steel posts and braces equipped with corrugations, knobs, notches, holes, or studs so placed and constructed as to engage a substantial number of fence wires in proper position. Posts may be punched with holes in such a position and of such size as will not unduly impair the strength of the posts. Posts with punched tabs used for fastening wires are not acceptable. Supply corner, end, and bracing posts with necessary holes and with galvanized bolts of standard commercial quality or other satisfactory substitute, such as castings, for fastening braces to the posts.

2.7 GATES FOR FIELD AND LINE TYPE FENCE

- A. Gates: Provide steel galvanized in accordance with ASTM A653 Coating Designation G60.
- B. Posts: Provide metal posts made of galvanized steel pipe, standard weight, complying with ASTM A53.
- C. Gate Stops: Provide galvanized steel gate stops suitable for welding to gate posts.

2.8 CHAIN LINK FENCE, GATES, AND APPURTENANCES

- A. General: Comply with AASHTO M181 except that wire ties, fabric ties, hog rings, and tension wire for Type I, II, or III fencing may be aluminum alloy, galvanized ductile steel, or aluminum-coated ductile steel wire.
- B. Wire Ties: Provide wire ties, fabric ties, and hog rings having 20,000 psi minimum tensile strength, and 10 percent minimum elongation. Provide steel wire ties having at least 0.60 ounce of zinc or 0.40 ounce of aluminum alloy per square foot of uncoated wire surface. Provide AWG No. 9 wire ties. Provide AWG No. 12 fabric ties and hog rings.
- C. Tension Wire: Use galvanized and aluminum-coated steel tension AWG No. 9 wire having at least 75,000 psi tensile strength with at least 0.70 ounce of zinc or 0.40 ounce of aluminum alloy per square foot of uncoated wire surface. Aluminum alloy tension wire must be AWG No. 6 wire having at least 42,000 psi tensile strength, 35,000 psi yield strength, and 10 percent elongation.

2.9 GROUND ROD ASSEMBLIES

- A. **Ground Rods:** Provide ground rods with minimum 5/8 inch nominal diameter copper weld steel rod with a minimum length of 8 feet.



- B. Ground Wire:** Provide AWG No. 6 solid copper conductor firmly attached in such a manner that fence fabric, barbed wire, metal post and ground rod are electrically connected.
- C. Mechanical Connectors:** Mechanical connectors will only be allowed where exothermic welds cannot be achieved. Mechanical connectors for attaching ground wire to ground rods will not be allowed. Provide solid copper alloy UL approved mechanical connectors for attaching ground wire to fence fabric, barbed wire and metal posts. Coated steel hardware will not be permitted.

2.10 WOOD PRIVACY FENCES

- A. Hardware:** Use galvanized material for all metal parts and hardware.
- B. Fence Posts:** Provide fence posts that are a minimum of 3 in. O.D., schedule 40 galvanized steel pipe. Cap steel posts with an appropriate galvanized dome cap, as approved by the Engineer.
- C. Pickets and Rails:** Provide #2 or better grade cedar pickets with a minimum thickness of 1 in. and a length of 6 ft. Provide horizontal 2 in. X 4 in. cedar rails of #2 or better. Do not use pickets with open or loose knot holes, cracks, stains, warps or other visible defects. Do not use any warped or structurally unsuitable rails.

PART 3 -- EXECUTION (NOT USED)

3.1 GENERAL CONSTRUCTION REQUIREMENTS

- A.** Clear and grub areas for fence installation in accordance with the requirements of Section 31 10 00 – Site Preparation.
- B.** Confine operations to the area adjacent to right-of-way lines and within the right-of-way.
- C.** Where breaks in a run of fencing are required, and at intersections with existing fences, make appropriate adjustment in post spacing for the type closure indicated.
- D.** Place wood posts with small end up. When posts, braces, or anchors are to be embedded in concrete, install temporary braces as required to hold posts in proper position until concrete has set sufficiently to hold posts. Do not install fencing material on posts or place strain on bracing set in concrete for 72 hours after concrete has been placed. Set tops of posts to required grade and alignment. Cutting of wood post tops will be allowed only when approved. Treat cut ends with 2 applications of the same type preservative used for post treatment. Stretch wire taut.
- E.** Install ground rods along each segment of new or rebuilt fence, regardless of type fence post used, at maximum 500-foot intervals. Ensure that ground rods and connections conform to plan details.
- F.** When specified, take down, move back, and rebuild existing fence. Rebuild fence in the same manner as specified for new fence. Rebuild ornamental



fence, picket fence, or other special type fence equal in all respects to existing fence.

3.2 GATES

- A. Gates of a design different from that shown on the plans may be furnished with prior approval. Provide gates of rigid construction, and which show no sag or warp after erection.

3.3 CHAIN LINK FENCE AND GATES

- A. **Concrete Post Anchorage:** Anchor posts in Class R concrete footings. Portable mixing of concrete will be permitted for small quantities of concrete. Extend tops of footings slightly above ground and steel trowel to a smooth finish sloped to drain away from posts. Center posts, braces, and other units in footings. Perform concrete operations in accordance with Section 03 31 10 – Portland Cement Concrete. Consolidate concrete by tamping or vibrating. Satisfactorily dispose of excess excavation from footings.
- B. **Fence Erection:** Place pull posts no more than 200 feet apart in straight runs and at each vertical angle greater than 20 degrees. Place corner posts at each horizontal angle greater than 20 degrees. Provide corner and pull posts with a horizontal brace and tie rod on each side of posts. Connect the horizontal brace and tie rod to adjacent line posts. Before placing fabric, permanently position posts, firmly set anchorages, and satisfactorily secure top rail or tension wires to posts. Secure ends of fabric by stretcher bars threaded through loops of fabric and secure to posts by clamps with bolts and nuts. Place fabric by securing one end and applying sufficient tension to remove all slack before making attachments elsewhere. Assure that degree of tensioning is commensurate with air temperatures at time of installation to prevent undue sagging or tensioning of fabric due to changing temperatures. Fasten fabric to line posts at approximately equal spaces and to top rail (or top tension wire) and bottom tension wire with tie wires or bands as specified
- C. **Gate Erection:** Gate installation includes gate frames, stretcher bars, filler fabric, latches, stops, locking device, padlocks, hinges, gate posts with braces, tie rods, turnbuckles, caps, and other fittings as specified or required for complete installation. Tighten all clamps for attaching hardware. Construct gates so that the bottom of the gates clear the ground at least 3 inches at all points in its swing. Grade the area if necessary to meet this requirement. Provide stops with latches or other approved means for holding the gate open and place to prevent damage to gate or fence by over-swing. Unless otherwise directed, provide stops at the centerline of fence to arrest the swing of a closed gate.
- D. **Repair of Protective Coatings:** After completion of the fence and gate installation, satisfactorily repair all damaged protective coatings.

3.4 TIMBER FENCES

- A. Excavate post holes a minimum of 12 in. in diameter. Set posts upright and plumb and fill the holes with concrete to within 4 in. of the top of the ground, unless



otherwise directed by the Engineer. Place soil on top of the concrete to make the area level with the surrounding soil. Place posts at 8 ft. on center.

- B.** Make all splices at the posts, only. Screw pickets to rails with galvanized or epoxy coated wood screws of appropriate size, as approved by the Engineer. Fasten pickets with 2 screws at each rail. Make the fence so that the pickets form one continuous wall on the front side and posts and rails are visible only on the back side. Tighten all screws so that the heads are flush with the face of the picket.
- C.** Set finished height of posts slightly above the top rail so that they cannot be seen from the front side of the fence.
- D.** Construct fence so that it is plumb, vertically straight and the top of the pickets will form a continuous line with no dips or abrupt vertical changes.

END OF SECTION



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SECTION 33 05 23 – HORIZONTAL DIRECTIONAL DRILL

PART 1 -- GENERAL

1.1 THE REQUIREMENT

- A.** Install pipe or conduit by horizontal directional drilling where indicated. Horizontal directional drilling involves the controlled directional drilling of a pilot bore/hole, back reaming/hole, enlargement and pull back of the specified sewer pipe to line and grade as shown on the drawings. Use pipes, drill bits and reamers in conjunction with an engineered drilling fluid solution.
- B. Definitions:** The following terms are utilized in this section:
1. **Horizontal Directional Drilling:** A method of installing buried piping by controlled, (guided within specified limits) horizontal drilling.
 2. **Pilot Hole:** The initial controlled drilled horizontal shaft used to guide the enlargement to design size and eventual installation of the pipe
 3. **Reaming:** The back reaming hole opener is attached to the drill pipe and rotated and pulled back through the pilot hole to enlarge the bore in one or more passes to the size for pipe installation (the final bore diameter, in most cases is selected by the CONTRACTOR, consistent with his experience).
 4. **Pullback:** The pipe installation pulled back by a swivel/pulling head connected behind the reamer, which pulls the prepared pipe into place.
 5. **Drilling Fluids:** Fluids consisting of water, bentonite, and any approved additives such as environmentally safe polymers, lubricants, and viscosifiers
 6. **Bore Tracking Equipment:** Methods and systems generally defined as a walk over or non walkover. To be specified by the CONTRACTOR and used to measure the actual accuracy of the bore to the specific line and grade. The bore path is monitored during the pilot bore by taking periodic readings of the inclination and azimuth of the probe located within the drive bit.
 7. **Zone of Active Excavation:** Area located within a radial distance about a surface point immediately above the face of excavation equal to the depth to the bottom of the excavation.
 8. **Bore – Tracking Pit:** An excavated area for entry, exit, slurry sump pits or any other excavation. It will also be used to manage, control and track the progress of the bore.
 9. **Critical Structure:** Any pipeline, utility, building, structure, bridge, pier, or similar construction partially or entirely located within a zone of active excavation.



1.2 REFERENCE STANDARDS

A. American Water Works Association (AWWA)

AWWA C906

B. Code of Federal Regulations (CFR)

29 CFR 1910 Occupational Safety and Health Standards

29 CFR 1926 Safety and Health Regulations for Construction

1.3 CONTRACTOR SUBMITTALS, SAMPLING, AND TESTING

A. Provide submittals, samples for testing, and testing of materials in accordance with Section 01 33 00 – Contractor Submittals.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Handle pipe in accordance with manufacturer's instructions. Repair any cracks, gouges, scratches, distorted lengths, or other damage per the manufacturer's instructions.

B. Cover and protect plastic pipe from direct sunlight during storage.

PART 2 -- PRODUCTS

2.1 PRESSURE PIPE

A. Unless otherwise noted, use density polyethylene in complying with AWWA C906 as specified for the installed pull section. Select the wall thickness but no case use a wall thickness less than that of SDR 11. Fusion butt weld all pipe to pipe joints. Use fully restrained mechanical joint fittings with fusion welded adapters for pipe to fittings joints.

2.2 DRILLING FLUIDS

A. Use a mixture of bentonite clay, lubricants, polymers, and viscosifiers mixed with potable water with a minimum pH of 6.0 to create the drilling fluid for lubrication and soil stabilization. Design drilling fluid mix design accordance with component manufacturer instructions and based upon the soil conditions. Vary the fluid viscosity to best fit the soil conditions encountered. Do not use any other chemicals or polymer surfactants in the drilling fluid without written consent from the ENGINEER. Certify to the ENGINEER that any chemicals to be added are environmentally safe and not harmful or corrosive to the facility. Identify the source of water for mixing the drilling fluid. Approvals and permits are required for obtaining water from such sources as streams, rivers, ponds, or fire hydrants. Any water source used other than potable water must be pH tested, hardness tested, chlorine tested, and approved by the ENGINEER prior to use.



PART 3 -- EXECUTION

3.1 CONSTRUCTION OPERATIONS

- A.** Utilize methods for HDD operations that will minimize ground settlement. Select methods, which will control flow of water and prevent loss of soil into the bore and provide stability in all operating conditions. Assume full responsibility and pay all costs associated with damage due to settlement, and frac-outs due to any construction-induced activities.
- B.** Conduct all operations in accordance with applicable safety rules and regulations, 29 CFR 1910, 29 CFR 1926, and CONTRACTOR's safety plan. Employ methods, which include due regard for safety of workmen, adjacent structures, utilities, and the public.
- C.** Utilize a trailing stem (a drill rod on the trailing end of the reaming operation) during back-reaming of the bore hole.
- D.** Maintain clean working conditions.
- E.** If crossing under railroad embankments, highways, or streets, perform the installation to avoid interference with the operation of the railroads, highways, or streets, except as approved by the owner of the facility.
- F. Utility Crossings:**
 - 1. Field verify the location and depth of all existing utilities, including service connections, to be paralleled or crossed prior to the start of directional drilling operations in accordance with Louisiana law. With approval of the ENGINEER, modify alignment, depth or grade as necessary to avoid utilities and minimize the number of peaks and valleys along the alignment.
 - 2. Expose all utilities that will be crossed with horizontal directional drilling. All major utilities (high pressure gas, fiber optic, high voltage electric, major pipe lines, water and sewer lines, etc.) should be exposed every 100 feet at minimum, if parallel within 5 feet horizontally to verify depth and location of the utility. If the location is not accurate, contact the utility owner immediately.
- G.** Maintain entry and exit angles between 8 and 12 degrees. Once the CONTRACTOR has begun the HDD pipe installation process, operate without intermission, including 24- hour working, weekends and holidays, until pipe segment is completed. Immediately follow bore hole drilling, reaming, and swabbing with pipe pulling. Pipe pulling through collapsing bore hole is prohibited.
- H.** Allow the installed pipe to relax and cool following installation, for a minimum twelve (12) hours, prior to any reconnection of service lines or backfilling of the insertion pit. Where an HDPE bore terminates in a manhole, allow sufficient excess length of new pipe, not less than six (6) inches, to protrude into the manhole to provide for further length reduction with the use of electrofusion flex restraints. Following the relaxation period, seal HDPE terminating in a manhole



with electrofusion flex restraints and non – shrink grout.

3.2 TRENCH SAFETY

- A.** Assume full responsibility for design, installation, maintenance and removal of any construction sheeting necessary for the drilling operation, including fluid containment and permitted disposal practices.

3.3 GROUND WATER CONTROL

- A.** Control ground water in accordance with Section 31 30 00 – Earthwork.

3.4 EQUIPMENT

- A.** Provide the following equipment at a minimum:
 - 1. Horizontal directional drilling rig as selected by the CONTRACTOR.
 - 2. Drill pipe and tail stem as selected by the CONTRACTOR.
 - 3. Drill bits and reamers as selected by the CONTRACTOR.
 - 4. Drilling fluid mixing tanks, holding tanks, cleaning systems, recirculation containment, collection and disposal equipment as selected by the CONTRACTOR.
- B.** Use a dedicated pipe handler during any pipe pulling operations.
- C.** Full directional guidance of the pilot hole drilling operation to line and grade is a prerequisite of this method of construction. Wireline or wireline with grid is acceptable.
- D.** Assume full responsibility for the selection of all drilling and auxiliary equipment which, based on past experience, has proven to be satisfactory for excavation of the soils to be encountered.
- E.** Provide and maintain in place pumps and/or vacuum truck(s) of sufficient size convey excess drilling fluid from containment areas to storage facilities
- F.** Use pipe rollers of sufficient size, spacing, and in good working condition (as determined by the pipe manufacturer) to fully support the weight of the pipe while being hydro-tested and during pull-back operations. Use sufficient number of rollers to prevent sagging of pipe. Do not exceed pipe roller spacing of 20 feet. Do not allow pipe to come in contact with ground surface during pull back operations.
- G.** Provide drilling equipment of the size and power so that the pilot hole can be drilled along the path shown on the plan and profile drawings within specified tolerances.
- H.** Document and immediately bring to the attention of the ENGINEER deviations between the recorded position of the drill string and the plan and profile



drawings.

3.5 DIRECTIONAL DRILLING DATA

- A. Maintain shift logs of construction events and observation. Maintain HDD supervisory personnel (superintendent) on-site at all times any drilling operations are being conducted. Provide the ENGINEER access to the daily logs with regard to the following information:
1. Location of drill head and progress of drilling operation during shift;
 2. Hours worked per shift during drilling operations;
 3. List of crew names, including full and last names, title, and hours worked for each day;
 4. Completed forms or computer print outs for checking line and grade of the drilling operation, showing achieved tolerance relative to design alignment;
 5. Maximum pipe loads per pull back including but not limited to torque and fluid pressures.

3.6 CONTROL OF LINE AND GRADE

- A. **Construction Control:** Check baselines and benchmarks shown on the Contract Documents at the beginning of the Work and report any errors or discrepancies to the ENGINEER. Use the baselines and benchmarks to establish and maintain construction control points, reference lines and grades for locating, boring, reaming, and in relationship to existing pipelines, utilities and structures. Establish construction control points sufficiently far from the work to avoid being affected by any ground movements caused by HDD operations
- B. **Temporary Benchmark Control:** If settlement of the ground surface occurs during construction which affects the accuracy of the temporary benchmarks, detect and report to the ENGINEER such movement and reestablish temporary bench marks.
- C. **Line and Grade:**
1. Continuously check and record the survey control for the boring operations against an aboveground undisturbed reference as required to accurately guide and monitor the constructed length (± 20 feet).
 2. At a minimum of every drill rod connection or a maximum of every 5 feet, record the position of the drill bit, then make immediate corrections to alignment position before allowable tolerances are exceeded.
 3. When the drill is off line or grade make, ongoing alignment corrections to avoid major changes and keep within specified tolerances. For gravity pipe installations, a belly in the bore that will hold water and/or a reverse grade is not acceptable. Replace such pipe at no additional cost to the OWNER. Remove and replace the bellied pipe length by open cut or by re-drilling on



a parallel alignment as directed by ENGINEER.

4. **Vertical Tolerance:** A variation greater than plus (+) 0.0 feet or minus (-) 5 feet from vertical alignment designated on the Contract Documents may be allowed at the discretion of the ENGINEER and must be approved prior to installation.
5. **Horizontal Tolerance:** A variation greater than \pm 2 feet from horizontal alignment designated on the Contract Documents may be allowed at the discretion of the ENGINEER and must be approved prior to installation.
6. The outside edge of pipe must not deviate into a 2-foot space inside either edge of the servitude or right-of-way nor should it conflict with any above or below ground obstructions.
7. Fully grout and abandon or remove all pipe installed out of tolerance and all fill all voids filled as directed by the ENGINEER at no additional cost to the OWNER.

3.7 MONITORING

A. Monitoring Line and Grade:

1. Monitoring of bore, reamer and pipe may be accomplished by manually plotting reference points based on location and depth readings provided by the locating/tracking system. Alternately, computer generated bore logs which automatically map the bore path based on information provided by the locating/tracking system may be used. Make this information readily available upon request of the ENGINEER.
2. Before any direction drilling commences, calibrate the locating/tracking equipment.
3. Record readings or plot points on every drill rod. Take required readings every 3 to 5 feet.
4. Submit a pilot hole profile to the ENGINEER as specified in Part I.

B. Instrumentation Monitoring:

1. Provide and operate an instrumentation system to monitor and detect movement of the ground surface and adjacent structures. Establish reference vertical control points in safe locations at a distance away from the construction areas to avoid potential disturbance due to ground settlement.
2. Installation of the instrumentation will not preclude the ENGINEER, through an independent CONTRACTOR or consultant, from installing instrumentation in, on, near, or adjacent to the construction work. Provide access to the work for such independent installations.
3. Install and operate instrumentation in accordance with the Contract



Documents and the manufacturer's recommendations.

- C. Walkover, wire line, and wire line with surface grid verification, or any other system as approved by the ENGINEER, will be the accepted methods of tracking directional bores. Submit readings promptly to the ENGINEER as they are recorded.
- D. In any case the CONTRACTOR must use a locating and tracking system capable of ensuring that the proposed pipe is monitored and installed as intended. Consequently, if an area of radio signal interference is expected the ENGINEER may specify the use of a suitable tracking system. The locating and tracking system must provide information on the following:
 - 1. Clock and pitch information;
 - 2. Transmitter temperature;
 - 3. Battery status;
 - 4. Position (x,y,z)
 - 5. Azimuth, where direct overhead readings (walkover) are not possible (i.e. sub aqueous or limited access transportation facility).
- E. Maintain proper calibration of all equipment before commencing directional drilling operation. The ENGINEER may witness calibration.
- F. **Recording:** Take and record alignment readings or plot points so that elevations on top of and offset dimensions from the center of the pipe to a permanent fixed feature are provided. Each permanent fixed feature must have prior approval of the ENGINEER. Provide elevations and dimensions at all bore alignment corrections (vertical and horizontal) with a minimum distance between points of 100 feet. Provide a sufficient number of elevations and offset distances to accurately plot the vertical and horizontal alignment of the installed product. A minimum of three elevation and plot points are required.
- G. **Tracing:** Install all facilities so their location can be readily determined by electronic designation after installation. For non-conductive installations attach a minimum of two separate and continuous conductive tracking (tone wire) materials, externally or integral with the pipe. Use a continuous green sheathed solid conductor copper wire line (minimum #12 AWG) or a coated conductive tape. Conductors must be located on opposite sides when installed. Connect any break in the conductor line before construction with an electrical clamp, or solder, and coat the connection with a rubber or plastic insulator to maintain the integrity of the connection from corrosion. Clamp connections must be made of brass or copper and of the butt end type with wires secured by compression. Soldered connections must be made by tight spiral winding of each wire around the other with a finished length minimum of 3 inches overlap. Tracking conductors must extend 2 feet beyond bore termini. Test conductors for continuity. Each conductor that passes must be identified as such by removing the last 6 inches of the sheath. No deductions are allowed for failed tracking conductors. Failed conductor ends must be wound into a small coil and left



attached for future use.

H. Surface Settlement Monitoring: At a minimum:

1. Establish monitoring points on all critical structures;
2. Record location of settlement monitoring points with respect to construction baselines and elevations. Record elevations to an accuracy of 0.01 feet for each monitoring point location. Monitoring points should be established at locations and by methods that protect them from damage by construction operations, tampering, or other external influences.
3. Record ground surface elevations on the centerline ahead of the construction operations at a minimum of 100-foot intervals or at least three locations per installed section of pipe. For pipelines greater than 60-inch diameter, also record similar data at approximately 20 feet each side of the centerline. Settlement monitoring points must be clearly marked by studs or paint for ease of locating.
4. **Railroads:** Monitor ground settlement of track subbase at centerline of each track
5. **Utilities and Pipelines:** Monitor ground settlement directly above and 10 feet before and after a utility or pipeline intersection.

I. Reading Frequency and Reporting: Submit to the ENGINEER, records or readings from the various instruments and survey points.

1. Start instrumentation monitoring results to be read at the frequency specified and unless otherwise specified, prior to the zone of active excavation reaching that point, and continued after the zone of active excavation has passed and until no further detectable movement occurs.
2. Take surface settlement monitoring readings:
 - a. Prior to the zone of active excavation reaching that point;
 - b. When the installation operation reaches the monitoring point (in plan) and;
 - c. When the zone of active excavation has passed and no further movement is detected

J. Submit all monitoring results promptly to the ENGINEER.

K. Immediately report to the ENGINEER any movement, cracking, or settlement which is detected

L. Following substantial completion but prior to final completion, make a final survey of all monitoring points

3.8 PIPE BORE HOLE DIAMETER



- A. Minimize potential damage from soil displacement/settlement by limiting the ratio of the bore hole to the product size. The size of the back reamer bit or pilot bit for gravity sewer installations, if no back reaming is required, will be limited relative to the pipe diameter to be installed as follows:
- B. Use a size of the back reamer bit or pilot bit for installations over 24" that are a maximum of 1.25 times the pipe outside diameter to be installed.

3.9 DRILLING FLUIDS

- A. Promptly remove from the project site and properly dispose of all drilling fluids and associated cuttings in compliance with all environmental regulations, construction right-of-way and workspace agreements and permit requirements at an appropriate disposal site. Dispose of all drilling fluids and associated cuttings at no additional cost to the OWNER.
- B. In the event that a drilling fluid fracture (frac out), inadvertent returns or returns loss occurs during HDD operations, cease operations; notify ENGINEER and all appropriate regulatory agencies. Immediately contain and clean-up drilling fluid loss prior to continuing HDD operations. Prevent drilling fluids from entering streets, adjacent properties, streams or other water bodies and municipal storm or sanitary sewer lines. No additional payment will be made for cleanup costs required by OWNER, ENGINEER, or regulatory agencies due to loss of drilling fluid. If mud fracture or returns loss continues, CONTRACTOR will cease operations, notify ENGINEER to discuss additional options to control or minimize the loss and work will then proceed accordingly.

3.10 DISPOSAL OF EXCESS MATERIAL

- A. Remove of and dispose of soil in a licensed, permitted landfill facility.

3.11 ACCEPTANCE TESTING

- A. Acceptance testing for water pipelines will be as specified in Section 01 74 30 – Pressure Pipe Testing and Disinfection.

3.12 SITE RESTORATION

- A. Restore all surfaces affected by the WORK to their preconstruction conditions. Performance criteria for restoration work will be similar to those employed in traditional open excavation work

3.13 POST CONSTRUCTION EVALUATION

- A. Provide a set of Field Record Drawings including both alignment and profile to the ENGINEER. Drawings should be developed from actual field readings. Raw data should be available for submission at any time upon request. As part of the Field Record Drawing, specify the tracking equipment used, including method of confirmatory procedure used to ensure the data was captured. Provide Record Drawings having survey data that are stamped by a Professional Land Surveyor registered in the State of Louisiana.
- B. Locate all fittings, valves, manholes, connections, etc., including all critical



structure monitoring points as shown on the Contract Documents, by GPS and based on the Louisiana State Plane coordinate system as shown on Contract Documents and provide those locations on the Field Record Drawings. Do not use landmarks. Provide record drawings stamped by a registered land surveyor.

- END OF SECTION -



SECTION 33 31 00 – SANITARY SEWER SYSTEMS

PART 1 -- GENERAL

1.1 THE REQUIREMENT

- A. Provide and construct sanitary sewer system components as indicated on the drawings and specified herein.

1.2 MODIFICATION BY SPECIAL PROVISIONS

- A. The WORK of this section may be affected by requirements contained within the Special Provisions. Review, understand, and incorporate the requirements contained within the Special Provisions into the WORK of this Section.

1.3 REFERENCE STANDARDS

- A. American Association of State Highway and Transportation Officials (AASHTO)

AASHTO HS-20 Standard for Truck Live Loads

AASHTO M306 Standard Specification for Drainage, Sewer, Utility, and Related Castings

- B. ASTM International (ASTM)

ASTM A53 Standard Specification for Pipe, Steel, Black and Hot – Dipped, Zinc – Coated, Welded and Seamless

ASTM A240 Standard Specification for Chromium and Chromium – Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications

ASTM A536 Standard Specification for Ductile Iron Castings

ASTM C144
Mortar Standard Specification for Aggregate for Masonry

ASTM C150 Standard Specification for Portland Cement

ASTM C425 Standard Specification for Compression Joints for Vitrified Clay Pipe and Fittings

ASTM C443 Standard Specifications for Joints for Concrete Pipe and Manholes Using Rubber Gaskets

ASTM C478 Standard Specification for Circular Precast Concrete Manhole Sections

ASTM C877 Standard Specification for External Sealing Bands for Concrete Pipe, Manholes, and Precast Box Sections



ASTM C923	Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals
ASTM C990	Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Sealants
ASTM C1173	Standard Specification for Flexible Transition Couplings for Underground Piping Systems
ASTM D412	Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension
ASTM D903	Standard Test Method for Peel or Stripping Strength of Adhesive Bonds
ASTM D1004	Standard Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheeting
ASTM D1784	Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
ASTM D2412	Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading
ASTM D2444	Standard Test Method for Determination of the Impact Resistance of Thermoplastic Pipe and Fittings by Means of a Tup (Falling Weight)
ASTM D3350	Standard Specification for Polyethylene Plastics Pipe and Fittings Materials
ASTM D3034	Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings
ASTM D3212	Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
ASTM F477	Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
ASTM F679	Standard Specification for Poly(Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings
ASTM F1336	Standard Specification for Poly(Vinyl Chloride) (PVC) Gasketed Sewer Fittings
ASTM F1417	Standard Practice for Installation Acceptance of Plastic Non-pressure Sewer Lines Using Low-Pressure Air



C. American Water Works Association (AWWA)

AWWA C110	Ductile-Iron and Gray-Iron Fittings
AWWA C111	Rubber Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
AWWA C115	Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges
AWWA C150	American National Standard for Thickness Design of Ductile-Iron Pipe
AWWA C151	Ductile-Iron Pipe, Centrifugally Cast
AWWA C153	Ductile Iron-Pipe Compact Fittings
AWWA C200	Steel Water Pipe, 6-inches and Larger
AWWA C203	Coal – Tar Protective Coatings and Linings for Steel Water Pipes
AWWA C208	Dimensions for Fabricated Steel Water Pipe Fittings
AWWA C900	Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 60 In. (100 mm Through 1,500 mm)
AWWA C905	Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 In. through 48 In. (350 mm through 1,200 mm)
AWWA C906	Polyethylene (PE) Pressure Pipe and Fittings, 4 In. Through 65 In. (100 mm Through 1,650 mm), for Waterworks

1.4 **CONTRACTOR SUBMITTALS, SAMPLING, AND TESTING**

- A. Provide submittals, samples for testing, and testing of materials in accordance with Section 01 33 00 – Contractor Submittals.

1.5 **DELIVERY, STORAGE, AND HANDLING**

- A. RESERVED

1.6 **QUALITY CONTROL**

- A. RESERVED

PART 2 -- PRODUCTS

2.1 **GRAVITY SEWER PIPE**



- A. **General:** Provide gravity sewer pipes of the type and size indicated on the drawings and per Section 40 05 00 – Piping, General.

2.2 SEWER MANHOLES

- A. **General:** Provide sewer manholes of the type and dimensions indicated on the drawings in accordance with the Contract Documents. Furnish manhole walls, transitions, conical sections, and base which conform to the requirements of ASTM C 478 for the depths indicated on the Contract Documents. Design conical sections to support cast iron frames and covers under an AASHTO HS-20 loading. Select axial length of sections to provide the correct total height required with the fewest joints.
- B. **Precast Concrete Riser Rings:** New precast concrete riser rings free from cracks, voids and other defects and conform to ASTM C478. Utilize precast concrete riser rings of a nominal thickness of not less than four (4) inches and not more than six (6) inches for reconstruction and/or adjustment of the manhole frame and cover. Externally wrap with an external seal wrap.
- C. **Cast Iron Riser Rings:** Furnish new cast iron riser rings of domestic origin, which conform to the latest edition of AASHTO M306. Use cast iron riser rings for reconstruction and/or adjustment of the manhole frame and cover of less than 4 inches.
- D. **Stainless Steel Inserts:** Provide insert bodies which are manufactured of 304 stainless steel with a thickness of not less than 18 gauge. Provide dishes which have a handle of 3/16" plastic coated stainless steel cable installed on the body of the dish. Attach the handle with a #6 high grade stainless steel rivet. Furnish gaskets made of close cell neoprene, and with a pressure sensitive adhesive on one side. Furnish a gas relief valve designed to release at a pressure of .5 to 1.5 psi. Provide a valve made of Nitrile for prevention of corrosion from contact with hydrogen sulfide, diluted sulfuric acid and other gases associated with wastewater collection systems. Ensure each dish has a factory installed five foot long, 3/16" stainless steel cable retaining tether which passes through a water tight grommet in the bottom of the dish with a high grade stainless steel adjustable locking device located between the bottom of the dish and lift loop at the top end of tether. Furnish stainless steel cable terminal and eye end made of stainless steel.
- E. **Portland Cement Concrete:** Comply with Section 03 31 10 – Portland Cement Concrete.
- F. **Reinforcing Steel:** Comply with Section 03 20 10 – Reinforcement.
- G. **Iron Castings:**
- H. **Precast Concrete Manhole Units:** Provide precast reinforced concrete manhole sections, transitions, conical sections, and base which conform to ASTM C 478 and are designed for an AASHTO HS-20 loading. Provide frames and covers which conform to Section 05500 – Miscellaneous Metal. Embed lifting inserts in manhole walls; through-wall holes will not be permitted. Provide pipe connection openings that are 4"+1/2" larger than pipe O.D. Provide sewer manhole bases



which have paved inverts, and sewer manhole sections with rubber gasket joints conforming to ASTM C 990 or C 443. Externally seal sewer manholes with rubber seal wraps conforming to ASTM C 877 (Type III – Chemically-Bonded Adhesive Butyl Bands).

- I. **Joint Types:** Furnish manhole joint types which may either be tongue and groove, confined groove, or single offset joint, and are sealed accordingly with either a flexible soil-tight butyl mastic gasket or flexible watertight rubber gaskets conforming to ASTM C 990 or C 443 respectively.
- J. Prior to backfilling, apply rubber external seal wraps to each manhole section joint, riser rings and frame.
- K. Provide conical sections that are concentric, unless otherwise specified. Where the manhole barrel diameter is greater than 48 inches, a flat slab transition, concentric unless otherwise specified, may be used to transition to 48-inch diameter riser sections. Ensure the underside of the transition is at least 7 feet above the top of the bench.
- L. Seal sewer pipe to manhole barrel section connections with resilient connectors complying with ASTM C 923. Furnish stainless steel mechanical devices.
- M. Provide concrete manholes which include the following protective admixtures:
 1. Provide concrete waterproofing system of the crystalline type that chemically controls and permanently fixes a non-soluble crystalline structure throughout the capillary voids of the concrete. Ensure the system causes the concrete to become sealed against the penetration of liquids from any direction, and protects the concrete from deterioration due to harsh environmental conditions. Furnish crystalline waterproofing additive which includes an approved coloring that will tint the finished concrete as proof of additive. Coloring must be provided by the additive manufacturer. Require the manufacturer or manufacturer's representative to approved of the installer of crystalline waterproofing additive in writing. Add crystalline waterproofing additive to concrete mix at time of batching, and conduct dosage rates and installation in accordance with manufacturer's recommendations. Provide crystalline waterproofing additive manufactured by Xypex Chemical Corporation or approved equal.
 2. Utilize antimicrobial additive to provide long term prevention of bacterial corrosion if concrete in Microbial Induced Corrosive (MIC) sanitary sewer environments. Ensure it renders the concrete uninhabitable for bacteria growth. Provide an EPA registered material for liquid antibacterial additive. The product must include an approved coloring that will tint the finished concrete as proof of additive. Coloring must be provided by the additive manufacturer. Ensure the installer of anti-microbial additive is certified by the manufacturer or manufacturer's representative in writing. Add the additive to the concrete mix water to ensure even distribution throughout the concrete mixture. Use the amounts as recommended by the manufacturer of the antibacterial additive. Include the amount in the total water content of the concrete mix design. Ensure the anti-microbial additive has successfully demonstrated prevention of MIC in sanitary sewers for ten or



more years. Furnish anti-microbial additive as manufactured by Conshield Technologies or approved equal.

- N. Completely coat cast-iron frames, covers, and riser rings with an environmentally safe, water-based asphaltic coating which is non-toxic, non-flammable, colorless, and dries to a hard, black finish. Apply this coating to the casting prior to the installation of the external seal wrap.

2.3 SEWER FORCE MAINS

- A. **General:** Provide sewer force mains of the type as indicated on the drawings and with inside diameter as indicated on the drawings.
- B. **Valves:** Provide valves as specified in Division 46.

2.4 SEWER MANHOLE REHABILITATION

- A. **Cone Replacement:** Provide new precast concrete cones which are concentric, unless otherwise specified, and conform to ASTM C478 and as specified herein. Ensure concrete manhole cones include the protective admixtures in accordance with Section 803. Seal joints sealed with gaskets conforming to ASTM C990 or C443. Externally wrap joints with an external seal wrap as specified herein.
- B. **Manhole Frame and Cover:** Furnish new manhole and Air Release Valve vault frames and/or covers as specified herein. Completely coat frames and covers with an environmentally safe, water-base asphaltic coating which is nontoxic, nonflammable, colorless, and dries to a hard black finish. Externally wrap manhole frames with an external seal wrap as specified herein. Air Release Valve vault frames are not required to be wrapped with an external seal wrap.
- C. **Stainless Steel Inserts:** Manufacture the insert body of 304 stainless steel with a thickness of not less than 18 gauge. Provide a dish which has a handle of 3/16" plastic coated stainless steel cable installed on the body of the dish. Attach the handle with a #6 high grade stainless steel rivet. Provide gaskets made of close cell neoprene, and with a pressure sensitive adhesive on one side. Furnish a gas relief valve designed to release at a pressure of .5 to 1.5 psi. Furnish a gas relief valve made of Nitrile for prevention of corrosion from contact with hydrogen sulfide, diluted sulfuric acid and other gases associated with waste-water collection systems. Ensure each dish has a factory installed five-foot-long, 3/16" stainless steel cable retaining tether that passes through a water tight grommet in the bottom of the dish with a high grade stainless steel adjustable locking device located between the bottom of the dish and lift loop at the top end of tether. Furnish a stainless steel cable terminal and eye.
- D. **Cementitious Mortar:** Furnish mortar made of one part Portland cement and two parts clean sharp sand. Provide cement which is Type 1 and conforms to ASTM C 150. Furnish sand which meets the requirements of ASTM C 144.
- E. **Patching Material:** Utilize a quick setting fiber reinforced cementitious material as a patching material and is to be mixed and applied according to manufacturer's recommendations.



- F. **Hydraulic Cement:** Utilize a rapid setting, high-early-strength, cementitious product specifically formulated for leak control to stop water infiltration. Mix and apply the material according to the manufacturer's recommendations.
- G. **Chemical Grout:** Utilize a chemical grout for stopping very active infiltration and filling voids.
- H. **Internal Manhole Chimney Seal Material:** An aromatic urethane rubber material or flexible epoxy mastic used to prevent leakage of water into the manhole through the frame joint area and the area above the manhole cone and ensure it meets the following minimum requirements:
 - a. Elongation (ASTM D412): 600%
 - b. Tensile Strength (ASTM D412): 1,150 psi
 - c. Adhesive Strength (ASTM D903): 175 lb. l/in
 - d. Tear Resistance (ASTM D1004): 155 lb. l/in

Extend the seal from the inside of the manhole frame down to the cone or corbel of the manhole.

- I. **External Manhole Seal Wrap:** When work consists of adjusting manholes or cone replacements, install an external seal wrap to the outside of concrete risers, steel risers and joints of the precast manhole in order to eliminate infiltration. Furnish the external seal wrap as specified herein and install in accordance with the details of the Contract Documents and the manufacturer's recommendations.

PART 3 -- EXECUTION

3.1 GENERAL

- A. Install products in accordance with manufacturer's written instructions.

3.2 GRAVITY SEWER PIPE

- A. **Open Trench:** Trenching construction consists of trench excavation, bedding, laying of pipe on grade, backfill, compaction, grading and incidentals in accordance with Section 31 30 00 – Earthwork.
- B. **Pipe Laying:** Lay pipe in accordance with the manufacturer's instructions and as specified as follows:
 1. During pipe laying, keep trenches dry. After each day's operations, and at other times when pipe laying is discontinued for more than one (1) hour, cap or plug ends of the pipe until pipe laying is resumed.
 2. Do not advance pipe laying backfilling by more than 100 feet without approval by the ENGINEER.
 3. Begin pipe laying at downstream end of line. Place bell or groove ends of pipe facing upstream. Excavate bell holes to assure that only the pipe barrel is supported by the trench bedding material. No blocking under the pipe will



be permitted.

4. Utilize extreme care when handling and installing pipe and fittings. Do not drop pipe or fittings either into the trench or during unloading. Keep the interior of the pipe clean of oil, dirt, and foreign matter.
 5. When necessary to cut and machine all pipe in the field, use the appropriate tools as recommended by the pipe manufacturer. Provide a "full insertion mark" on each field cut pipe end. Bevel field-cut pipe with a beveling tool specifically made for the pipe material.
- C. **Pipe Jointing:** Joint the pipe in strict accordance with the pipe manufacturer's instructions and do so entirely in the trench. Furnish joints and gaskets as specified herein. Only allow workmen who are certified by the pipe manufacturer to join the pipe to perform pipe jointing. They should perform the work as follows:
1. Expend extreme care to keep the bells of the pipe free from dirt and rocks so joints may be properly assembled without overstressing the bells.
 2. Provide lubricant, place and drive home newly laid sections. Use of backhoes or similar powered equipment will not be allowed unless protective measures are provided and approved in advance by the ENGINEER.
 3. Install pipe to "full insertion mark" where provided.
- D. **Remove and/or Abandonment of Existing Gravity Sewer Pipe:** This section addresses the removal and/or abandonment of the existing gravity sewer pipe and all appurtenances which are being removed (or abandoned) as detailed on the Contract Documents.
1. **Abandon Sewer Pipe:** If an existing sewer pipe is shown to be abandoned in place on the Contract Documents, be responsible for evacuating or "swabbing" the existing sewer pipe of all sewage before it is abandoned. Treat this sewage as hazardous material and disposed of using the proper criteria from the La. Department of Environmental Quality. Subsequently, fill the entire length of the pipe with flowable fill and cap as noted on the Drawings or as directed by the ENGINEER.
 2. **Plug and Abandon Sewer Pipe:** If an existing sewer pipe is shown to be plugged and abandoned in place on the Contract Documents, be responsible for evacuating or "swabbing" the existing sewer pipe of all sewage before it is abandoned. Treat this sewage as hazardous material and disposed of using the proper criteria from the La. Department of Environmental Quality. Subsequently, plug the pipe approximately 18 inches into each end of the pipe and capped as noted as the Drawings or as directed by the ENGINEER.
 3. **Remove and/or Abandon Sewer Pipe:** If an existing sewer pipe is shown as remove and/or abandon in place on the Contract Documents, the CONTRACTOR has the option to either completely remove the sewer pipe or abandon the sewer pipe. Be responsible for evacuating or "swabbing" the existing sewer pipe of all sewage before it is abandoned or removed. Treat



this sewage as hazardous material and disposed of using the proper criteria from the La. Department of Environmental Quality. If removed, backfill the removal trench in accordance with the provisions of Section 801 or as directed by the ENGINEER. If abandoned, completely fill the entire length of the pipe with flowable fill.

- E. **New pipe-existing pipe connections:** Joint connections between existing and new pipe, with the exception of HDPE pipe, with non-shear repair couplings conforming to ASTM C425 and ASTM C1173. Ensure the stainless-steel shear rings and clamping bands used in conjunction with the molded rubber sleeve conform to ASTM A 240 Series. When using the non-shear repair coupling, do not allow the gap between the two pipes to be more than ¼". When non-shear repair couplings are not available for a particular size or material, connections between existing and joint new pipe using flexible elastomer couplings with a 300 stainless steel band for each end and adjusting screws capable of sustaining an applied torque in excess of 80 inch-pounds. When dissimilar pipe materials are joined, use flexible couplings that are resistant to the corrosive action of the soils and sewage, and that provide a permanent watertight joint. Joint connections between existing and new HDPE pipe with HDPE electrofusion couplings as specified herein. Prior to ordering materials, check existing pipe diameters and take care to provide matching pipe and coupling to make proper connection.
- F. **Pipe-manhole Connections:** Connect all sewer pipe to new manholes with either flexible rubber boot connectors or integrally cast flexible connectors installed in accordance with the manufacturer's integrally cast flexible connectors installed in accordance with the manufacturer's instructions. Then grout the opening on the inside and outside of the manhole (non-shrink) if necessary, to achieve a watertight seal. For existing manhole connections, connect pipe with a hydraulic cement material having a set time of no more than two (2) minutes; compressive strength of 600 psi at one (1) hour. 1,000 psi at twenty-four (24) hours; bond of 40 psi at one (1) hour, 80 psi at twenty-four (24) hours. These requirements apply whether it is a connection to an existing sanitary sewer manhole or connection through a storm water conflict manhole, junction box, or inlet. In the case of HDPE pipe, in addition to the flexible manhole connectors and non-shrink grout, permanently attach electrofusion flex restraints to the pipe to prevent movement. Furnish HDPE flex restraints as specified herein.
- G. **Service Lateral Connections:** Make connections between the existing service lateral and the new/rehabilitated sewer main line in accordance with the Contract Documents. Adjust existing sewer service lateral and house connections as required to avoid conflicts with the new Work. Furnish and install new pipe and fittings as necessary and in accordance with the Contract Documents.
1. Service lateral connections located within the limit of a rehabilitation method or repair are required to be replaced (regardless of construction method) in both directions up to the property line with a clean-out and pad installed at the property line. Ensure construction is in accordance with the appropriate typical drawings in the Contract Documents. The exception to this is with service lateral connections on the mainlines to be rehabilitated with CIPP lining. In this case. Unless a point repair or remove and replace repair is shown on the plans, service lateral connections on mainlines to be



CIPP lined will receive a lateral connection sealing and repair product (top hat) as specified herein.

2. Require service lateral vertical connection stacks in accordance with the Contract Documents.
3. Provide new service lateral terminations, required prior to private service connection and cleanout installation, in accordance with the Contract Documents and stubbed a minimum of 3 feet above ground and capped.

H. **Acceptance tests for new pipe:** Install sewer lines which pass one or more of the following tests performed by the CONTRACTOR as directed by the ENGINEER. Perform the test in the presence of the ENGINEER or his representative. Coordinate testing with surface restoration requirements of the Contract Documents. The OWNER will not bear any additional cost for removal or replacement of temporary or final surface restoration needed to investigate leaks. Test sewer for leakage as follows: Low Air Pressure Test for sewer pipe 24" in diameter and smaller; Infiltration Test for sewer pipe greater than 24" in diameter with groundwater equal to or greater than 2 feet above top of pipe; and an Exfiltration Test should be used for sewer pipe greater than 24" in diameter with groundwater less than 2 feet above top of pipe.

1. **Low Pressure Test:** This practice defines the proper procedures for acceptance testing of installed gravity sewer pipe using low-pressure air, to provide assurance that the pipe, as installed, is free from significant leaks. Included are requirements for equipment accuracy, safety precautions, line preparation, test method, and minimum holding times. Applicable sections of ASTM F1417 also apply.

For pipes 36" in Diameter and less (Manhole to Manhole Reach), only lines tested after backfilling to final grade will be considered for acceptability. Acceptance will be dependent on a passing test. However, the installer as a presumptive test to determine the condition of the line prior to backfilling may also use this test. During sewer construction, properly cap or plug all service laterals, stubs and fittings into the sewer test section to prevent air loss that could cause an erroneous air test result. It may be necessary and is always advisable for the CONTRACTOR to restrain gasketed caps, plugs, or short pipe lengths with bracing stakes, clamps, and tie-rods or wire harnesses over the pipe bells.

Unless otherwise specified, furnish all the necessary equipment and be responsible for conducting all low-pressure air tests. In addition, be responsible for any necessary repair work on sections that do not pass the test at no additional cost to the OWNER.

The ENGINEER will witness all low-pressure air tests and verify the accuracy and acceptability of the equipment utilized. The ENGINEER will inform the CONTRACTOR regarding acceptable methods of repair in the event one or more sections fail to pass the low-pressure air test.

Use mechanical or pneumatic plugs. Ensure all plugs are designed to resist internal testing pressures without the aid of external bracing or blocking.



However, internally restrain or brace the plugs to the manhole wall as an added safety precaution throughout the test.

Utilize laboratory-calibrated test gauges for air test gauges, and if required by the ENGINEER, get the air test gauge recalibrated by a certified laboratory prior to the leakage test. Ensure air gauges have a size and pressure range appropriate for the pipe being tested. Ensure all pressurizing equipment used for low-pressure air testing includes a regulator or relief valve set no higher than 9 psig to avoid over-pressurizing and displacing temporary or permanent plugs. As an added safety precaution, the pressure in the test section should be continuously monitored to make certain that it does not, at any time, exceed 9 psig. (It may be necessary to apply higher pressure at the control panel to overcome friction in the air supply hose during pressurization.)

To facilitate test verification by the ENGINEER, pass all air used through a single, above ground control panel. Utilize an above ground air control equipment which includes a shut-off valve, pressure relief valve, input pressure gauge, and a continuous monitoring pressure gauge having a pressure range from 0 to at least 10 psi. Utilize a continuous monitoring gauge which is no less than 4 inches in diameter with minimum divisions of 0.10 psi and an accuracy of plus or minus 0.04 psi. Utilize two separate hoses to: 1) connect the control panel to the sealed line for introducing low-pressure air, and 2) a separate hose connection for constant monitoring of air pressure build-up in the line. This requirement greatly diminishes any chance for over-pressurizing the line.

If pneumatic plugs are utilized, require a separate hose to inflate the pneumatic plugs from the above ground control panel.

After a manhole-to-manhole reach of pipe has been backfilled to final grade and compacted, prepared for testing, and a 24-hour waiting period has elapsed, the place the plugs in the line at each manhole and secured.

The CONTRACTOR is advised to seal test all plugs before use. Seal testing may be accomplished by laying one length of pipe on the ground and sealing it at both ends with the plugs to be checked. The sealed pipe should be pressurized to 9 psig. Ensure the plugs hold against this pressure without bracing and without any movements of the plugs out of the pipe. Do not allow any person in the alignment of the pipe during plug testing. It is advisable to plug the upstream end of the line first to prevent any upstream water from collecting in the test line. This is particularly important in high groundwater situations.

When plugs are being placed, visually inspect the pipe adjacent to the manhole to detect any evidence of shear in the pipe due to differential settlement between the pipe and the manhole. A probable point of leakage is at the junction of the manhole and the pipe, and this fault may be covered by the pipe plug, and thus not revealed by the air test.

Slowly introduce low-pressure air into the sealed line until the internal air pressure reaches 4.0 psig. If the groundwater table is above the sewer being



tested, increase the air pressure 0.43 psi for each foot that the water table is above the invert of the sewer, up to a maximum of 9.0 psig. After a constant pressure of 4.0 psig (greater than the average groundwater back pressure) is reached, throttle the air supply to maintain that internal pressure for at least 2 minutes. This time permits the temperature of the entering air to equalize with the temperature of the pipe wall.

When temperatures have been equalized and the pressure stabilized at 4.0 psig (greater than the average groundwater backpressure), shut off or disconnect the air hose from the control panel to the air supply. Observe the continuous monitoring pressure gauge while the pressure is decreased to no less than 3.5 psig (greater than the average backpressure of any groundwater over the pipe). At a reading of 3.5 psig, commence timing with a stopwatch.

If the time shown for the designated pipe size and length (see Table 8-1 1.0 PSIG Air Test Pressure Drop) elapses before the air pressure drops to 0.5 psig, find that the section undergoing time has passed. The test may be discontinued once the prescribed time has elapsed even though the 0.5 psig drop has not occurred. If the pressure drops 0.5 psig before the appropriate time shown in Table 1 has elapsed, consider the air loss rate excessive and the section of pipe has failed the test.

If the section fails to meet these requirements, determine at your own expense the source, or sources, of leakage, and repair or replace all defective materials or workmanship to the satisfaction of the ENGINEER. The extent and type of repair, which may be allowed, as well as results, are subject to the approval of the ENGINEER. Retest and require the completed pipe installation to meet the requirements of this test.

- 2. For Pipes Larger than 36" in Diameter (Individual Joint Testing):** Individually test each sewer pipe joint with an approved joint air testing apparatus to an air pressure of 4.0 psig. If the groundwater table is above the sewer being tested, increase the air pressure 0.43 psi for each foot that the water table is above the invert of the sewer, up to a maximum of 9.0 psig unless otherwise restricted by pipe manufacturer's recommendation.

Position the testing apparatus within the pipe in such a manner as to straddle the joint to be tested.

Expand the apparatus packer ends to isolate the joint from the remainder of the pipe and create a void area between the packer and the pipe joint. Expand the ends of the testing device against the pipe in accordance with the manufacturer's recommendations.

After void pressure is observed to be equal to or greater than the required test pressure, stop the air flow. If the void pressure drops by more than 1.0 psi within 15 seconds, the joint will have failed the test.

Upon completing the testing of each individual joint, deflate the packer with the void pressure meter continuing to display void pressure. Note and record the pressure display reading before each joint test. Should the void pressure



meter fail to drop to 0.0 (± 0.5) psig, and make necessary equipment repairs to provide for an accurate void pressure reading.

- I. **Infiltration Test:** Where the natural groundwater is 24 inches or more above the top of a section of pipe, measure the flow of water in the pipe and the rates of seepage and infiltration. Measure the flow rate by using a calibrated weir. Leave the weir in the line until the flow rate has stabilized. Be responsible for verifying the groundwater level by providing sight gauges in manholes or digging test holes at suitable locations.

Do not allow the total seepage and infiltration of groundwater as determined by the test to exceed 50 gallons per 24 hours per inch-mile of pipe.

Make infiltration tests on all sewer construction before placing the lines in service and before making any connections to other sewers.

If the amount of infiltration into the sewer(s) is in excess of the maximum quantity specified above, then repair the joints, relay the sewer (if necessary), or perform other remedial construction, at your expense, in order to reduce groundwater infiltration to within the specified limits.

- J. **Exfiltration Test:** Where the groundwater is not 24 inches or more above the top of the pipe section being tested, perform an exfiltration test. Bulkhead the pipe below the lower manhole of the section being tested with a pneumatic plug or other device. Insert a vent pipe 48 inches long in the stopper of the upper end of that section. Then fill the lower manhole with water, or add water until there is a minimum of 4 feet over the upper end; make certain that all air is forced out through the vent tube. Measure the drop in the level of the water in the manhole due to exfiltration over a specific time, and calculate the water loss due to exfiltration. Do not allow the total exfiltration to exceed that specified above for infiltration.
- K. **Mandrel Test (Plastic and Fiberglass Pipe):** Do not allow pipe to exceed a deflection of more than 5%. Unless otherwise directed by the ENGINEER, after pipe has been backfilled for at least 30 days, pull a mandrel sized at 95% of the inside pipe diameter pulled through the pipe.

3.3 GRAVITY SEWER PIPE REPAIRS

- A. **Point Repair:** A Point Repair is the task of excavating to a pipe and performing a corrective measure to repair a defect on a length of sewer pipe less than or equal to twenty (20) feet long. Allow point repairs to address, but not be limited to, cracked pipe, broken pipe, faulty tap, protruding tap, sheared joint, dropped joint, or other similar conditions.
- B. **Remove and Replace:** Remove and replace is the task of excavating to a pipe and performing a corrective measure to repair a defect on a length of sewer pipe as designated on the Contract Documents. Allow Remove and Replace operations to address, but not be limited to, cracked pipe, broken pipe, faulty tap, protruding tap, sheared joint, dropped joint, or other similar conditions.
- C. **Trenchless Point Repair:** A Trenchless Point Repair is the task of providing a localized trenchless sealing and structural repair to a defect on a length of sewer



pipe less than or equal to three (3) feet long with an internally installed stainless steel repair sleeve. Ensure Trenchless Point repairs address, but are not limited to, leaking joints, cracked pipe, broken pipe, deformed pipe, or other similar conditions where excavation is not practical due to surface conflicts.

- D. **Design:** Ensure the design of the stainless steel repair sleeves is in accordance with AWWA Manual 11 standards for design of Flexible Tunnel Liners. Structurally design the repair sleeve to carry 5 psi uniformly distributed hydraulic working load having a minimum factor of safety of 2.5 after 100-year chemical erosion of stainless steel material has been subtracted. Use corrosion tables based on Stainless Steel Industry reports for calculating general surface erosion of the stainless steel plate thickness over the required 100-year service life due to corrosion. Submit calculations prepared by a Licensed Professional Engineer containing structural design, calculated effect of ovality and calculated structural effect of a 100-year chemical erosion of the structural element.

Where repair sleeve is fully enclosed in the damaged host pipe, design the structural element of the sleeve for 5 psi hydraulic load with a minimum 2.5 factor of safety.

Where repair sleeve is expected to come in direct contact with the surrounding soil in excess of one third of the sleeve length, design the structural element of the sleeve for a hydraulic load of 10 psi using a minimum 2.5 factor of safety. In lieu of a single sleeve, it is permissible to use a double sleeve assembly consisting of two single sleeves with 5 psi capacity each joined together by a manufacturer approved resin matrix as a load transfer medium.

In case the host pipe has become oval, not exceeding 10 percent out of round, use the repair sleeve and wall thickness of next thicker gauge from the one specified for standard repair sleeves.

E. **Materials:**

1. **Sleeve:** Ensure the structural component of the repair device is 316 stainless steel in the form of sleeves of the required length to cover the repair. Do not permit the inner diameter reduction of the host pipe to exceed one (1) inch.
2. **Sealant:** Utilize only manufacturer specified resin with physical properties set out by the requirements of the structural design. The sealant must be appropriate for transmitting all external loads to the stainless steel structural core, providing adequate support for the structural core against buckling and bonding the device in place.
3. **Sealing Grout:** Utilize the sealant as specified by the manufacturer for sealing infiltration.
4. **Structural Grout:** Utilize the sealant as specified by the manufacturer and which is capable of transmitting all external loads to the structural core of the repair sleeve. If any infiltrating water is present, seal infiltration prior to installation of sleeve using structural grout.



F. Preparation:

1. Notify the ENGINEER prior to beginning cleaning activities and pre-construction CCTB inspection. Plan cleaning and pre-construction CCTV inspection activities far enough in advance of Trenchless Point Repair activities to allow ENGINEER time to review any Critical Damage Reports that may develop from the CCTV Inspection results
2. Experienced personnel trained in locating breaks, obstacles, and service connections by CCTV will perform CCTV of pipe in accordance with Section 815. The interior of the pipe should be carefully inspected to determine the location of any conditions that may prevent proper installation of the repair sleeve, such as protruding service taps, collapsed or crushed pipe, and reductions in the cross-sectional pipe area of more than 10%. The CONTRACTOR will notify the ENGINEER immediately if the inspection reveals an obstruction that cannot be removed by conventional sewer cleaning equipment or that will interfere with the proper installation an acceptable repair. This should be submitted to the ENGINEER as a Critical Damage Report (CDR). Ensure the CDR includes all adverse conditions for each pipe segment from manhole to manhole. Include the following in the CDR:
 - a. Two letters of transmittal.
 - b. A CDR standard form including screen capture of adverse condition and location footage.
 - c. A hardcopy printout of the video cut sheet (video report).
 - d. A DVD containing:
 - 1) Electronic pdf files of the video cut sheets
 - 2) Digital copy of the pipe video
 - e. Recommendation from the CONTRACTOR for each adverse condition.
3. Be responsible for the removal of all loose debris located within the sewer pipe in accordance with Section 812. This cleaning will be incidental to the cost of the Trenchless Point Repair. If an obstruction is encountered that cannot be cleared with conventional sewer cleaning equipment, the ENGINEER should be notified immediately.
4. Cut and remove any roots, protruding gaskets, or protruding laterals in the existing sewer pipe from the sewer pipe prior to the sewer liner installation. With the approval of the ENGINEER, this removal work associated with Trenchless Point Repairs will be paid for under the relative pay items in Section 808.

G. Installation:

1. Record the entire process of transporting and installing the sleeve on digital media and a copy provided to the Engineer at the completion of each



sewer section.

2. The sewer must remain in full operation during the repair process allowing for a maximum of 5 minutes of flow interruption.
3. In case of offset joints, bells, and deformed or irregular pipe with disarranged pipe pieces, open the pipe bore by application of a hydraulic expander.
4. Reverse back pipe deformation to the round configuration and repair sleeves installed capable of restoring the full structural capacity of the host pipe.
5. In case the host pipe has completely collapsed and re-rounding is not possible without complete removal of the damaged pipe parts, an opening at least equal to the inside diameter of the host pipe must be cleared through the debris and the repair devices capable of sustaining the full soil load extended throughout the collapsed area at least 12 inches into the undamaged pipe.
6. When a cracked host pipe has formed randomly directed elements the host pipe must be re-rounded with the repair sleeve, or the re-rounding must be completed before installing a sleeve, in the backfill is compacted too tight around the pipe. In this case re-rounding should be accomplished by using a hydraulic jack before the sleeve is inserted.
7. Rounding must be completed before installing a sleeve, in the backfill is compacted too tight around the pipe. In this case re-rounding should be accomplished by using a hydraulic jack before the sleeve is inserted.
8. The repair must extend at least 8" into undamaged pipe or joint adjacent to both extremities of the damage. If access to the line is limited such that shorter than specified sleeves must be used, or the length exceeds the manufacturer standard sleeve lengths, use two or more sleeves with an overlap where two adjacent sleeves meet following manufacturer specified standards for overlapped repair sleeves.
9. Upon completion of the repair, inspect the entire sewer section and record the inspection on digital media at no additional cost to the Owner. Submit this video inspection to the Engineer for verification of work quality and completion of repair.

H. **Acceptance:**

1. All stainless steel sleeve locks have been engaged.
2. All the pre-measured grout supplied by the manufacturer has been applied to each stainless steel sleeve as specified by the manufacturer.
3. All host pipe leaking joints, cracks and holes are fully covered by the repair sleeve.
4. The entire pipe damage has been repaired per these specifications.



3.4 SEWER MANHOLES

- A. Ensure excavation, bedding, backfill, and compaction required for the installation of manholes is in accordance with Section 31 30 00 as shown in the Contract Documents.
- B. **Precast Concrete Manholes:**
1. Bases for precast manholes may be either precast or cast-in-place. Use cast-in-place bases for manholes built over existing sewer lines only. If base is cast-in-place, set in place lowermost precast unit at the time base is poured; do not place additional precast units until 24 hours after base is poured; do not place additional precast units until 24 hours after base is poured. Construct cast-in-place reinforced concrete manhole bases in accordance with Section 03805 – Structural Concrete. Include admixtures for concrete for base and channel formation as specified herein. If required for the manhole, interior of cast-in-place base must be field coated in accordance with Section 09 96 00.
 2. Ensure precast manhole structures have a normal plant-run finish produced in forms that impart a smooth finish to concrete. Surface holes smaller than 1 inch caused by air bubbles, form joint marks, and minor chips are acceptable. Fill air holes greater than 1 inch in width or 1/4 inch in width that occur in high concentration (more than one per 2 sq. inch). Major or unsightly imperfections, honeycombs, exposed reinforcing steel, exposed aggregate, or structural defects are not permitted.
 3. Ensure protective admixture tint is uniform in color and appearance throughout wall thickness of precast concrete structure. If cross-sectional views of precast concrete structure, such as pipe cutouts or across joints, are not available for visual inspection or do not provide satisfactory evidence of color uniformity, at the request of the ENGINEER, have the structure cored to provide evidence. The OWNER will bear no cost for the coring and repair. Any unapproved coatings or paints applied to the manhole structure may be cause for rejection of the manhole by the ENGINEER.
 4. For manholes requiring an epoxy protective coating on the interior surface: provide surface preparation and protective coating in accordance with Section 09800. Manholes may be coated “in the shop” prior to delivery to project site. Repair any damage to the protective coating during shipping or installation in accordance with the manufacturer’s recommendations at no additional cost to the OWNER. Upon completion of manhole and pipe installation, ensure the protective coating is free of bugholes, pinholes, and continuous across the section joints. Extend coating over the top rim of the cone opening by one inch.
 5. Construct manholes such that their walls are plumb. Set the spigot end of the precast sections at the top of each section.
 6. Clean gaskets and gasket seats of dirt and debris just prior to placing precast units.



7. If holes must be cut in precast units, core or drill for proposed mains 18 inches in diameter or smaller. Manholes requiring larger pipe connections may be enlarged using a jack hammer, but must be neatly grouted to provide an airtight seal.
 8. Ensure there's at least 12" horizontal clearance between adjacent pipes.
- C. **Precast Concrete Riser Rings:** Ensure all inverts are 4000 psi concrete meeting the requirements of Section 1005 of these specifications and include the anti-microbial additive. Carefully form the invert to the required size and grade by gradual and even changes in sections. Make changes in directions of flow through the inlet to a true curve with as large a radius as the size of the inlet will permit.
- D. **Manhole Drop Connections:** If inlet pipe enters the manhole 2 feet above the manhole invert or higher, an external drop line is required and must comply with details in the Contract Documents. Furnish the drop line of the same material as that of the inlet pipe and one nominal pipe size smaller (minimum 8-inch diameter). Backfill drop assembly with #610 Stone Backfill material. Extend the bedding material a minimum of 4 inches outside bells.
- E. **Adjusting Sewer Manholes:** If grade adjustments of existing manholes are required, remove frames and covers and adjust manhole to new grade as specified for new Work. Make adjustment using precast concrete riser rings or cast iron riser rings as specified herein. Handle frames and covers as specified herein.

After removal of existing manhole cover, place a suitable temporary cover over manhole to prevent debris from entering manhole and to provide for safety of workmen and the public until new manhole cover is in place. If rubble or debris falls into a "live" manhole during adjustment operations, remove and dispose of debris at no cost to the OWNER. Upon completion of the manhole adjustment, install an external seal wrap in accordance as specified herein.

- F. The top of the manhole frame will be at the finished grade of the pavement of 3-inches above the ground surface in accordance with the details of the Contract Documents. In paved areas the frame and cover should match the slope and crown of the finished pavement. Set concrete riser rings in a full bed of mortar. Strike mortar smooth on the inside of the manhole using a hard trowel followed by a sponge float. Use an epoxy system designed for metal-to-metal adhesion to connect individual cast iron riser rings and the cast iron riser rings to the frame.
- G. **Stainless Steel Insert:** Install a stainless steel insert in manholes located in areas below the base flood elevation as shown on the Contract Documents.
- H. **Riser Rings and Frame:**
1. Externally seal the sewer manhole riser rings and frame with rubber seal wraps or mechanically locked corrugated rubber seals.
 - a. Rubber seal wraps:

- 1) Conform rubber seal wraps and required band widths to ASTM C



877 (Type I – Rubber and Mastic Bands).

- 2) The number of bands required will depend on the number of adjusting rings needed. Require a minimum 3-inch overlap below the cone-riser ring joint. Require a 2-inch overlap to fold over the frame base to seal the frame-riser ring joint. If there are more adjusting rings per installation there will be a requirement for an additional band. Each additional band will overlap the upper band by two inches.
2. Mechanically locked corrugated rubber seals:
 - a. Ensure the frame seal remains flexible throughout a 25 year design life. Corrugate the sleeve portion of the seal with a minimum unexpanded vertical height of 10 inches and be capable of being mechanically locked to the base flange of the manhole frame casting.
 - b. Make the sleeve and any extension from high quality EPDM rubber suitable for both above and below grade applications. Ensure minimum thickness of rubber sleeve and extension is 0.085 inches. Ensure rubber material conforms to the applicable material requirements of ASTM C 923 and have a hardness (durometer) of 45±5.
 - c. Ensure the sealing area that compresses against the base flange of the manhole frame casting and the chimney or cone has a series of sealing fins to facilitate a watertight seal. Furnish a top compression band which is "C" shaped to uniformly compress and mechanically lock the sleeve into the base flange of the manhole frame casting. Ensure both the top and bottom compression bands have a take-up mechanism capable of developing a minimum of 400 lbs. of torque.
 3. Install the external seal after the adjusting rings are set and all coatings are coated.
 4. Riser Section Joints:
 - a. Seal each manhole section joint with an external rubber seal wrap conforming to ASTM C 877 (Type I – Rubber and Mastic Bands, Type II – Plastic Film and Mesh Reinforced Mastic Bands, or Type III – Chemically Bonded Adhesive Butyl Bands).
 - b. Design the seal to prevent leakage of water through the joint sections of a manhole.
 - c. Remove any excess joint sealant material or gaskets that protrudes on the outside of the manhole section joint prior to the installation of the external rubber seal wrap.
 5. Install the external seal wrap in accordance with the details of the Contract Documents and the manufacturer's recommendations.
 - I. **Abandoned Manholes:** Clean the manhole to be abandoned as specified herein to remove and dispose of all sewage and debris. Permanently plug both



upstream and downstream pipes at the manhole, and thoroughly crack or drill holes in the manhole bottom to allow any water to drain out. Provide a plug which consists of concrete or flowable fill extending a maximum of 18" into the pipe end. Finally, completely remove the manhole structure down to a minimum three (3) feet below natural ground and fill and compact with an approved backfill sand. Removed material becomes property of the CONTRACTOR and the OWNER is not responsible for the cost of disposal.

J. Acceptance Testing:

1. Air Vacuum Test: After completion of manhole construction, wall sealing, and backfilling, conduct a vacuum test as follows:
 - a. All manholes are to be vacuum tested following backfill and compaction. Install the ring and lid casting assembly prior to testing. Ensure the testing equipment consists of a gasoline-powered vacuum pump with sufficient vacuum hose length and a test head of proper size to fit the inside opening of the manhole. Equip the test head with an inflatable rubber bladder to affect the seal to the manhole, an air pressure gauge, and a safety valve for filling the bladder, a 30-inch Hg liquid-filled vacuum gauge, a double air exhaust manifold with quarter turn ball valves, three bolt-on feet, and a bridge assembly with height adjustment rod.
 - b. Plug all pipe openings, taking care to securely brace the plugs and the pipe. Place the plugs at a minimum of 6 inches beyond the manhole wall.
 - c. With the vacuum tester in place, inflate the bladder to affect a seal between the vacuum base and the structure. Connect the vacuum pump to the outlet port with the valve open and evacuate the manhole to 10 inches Hg (0.3 bar) for 48-inch diameter manholes and 5 inches Hg (0.15 bar) for 60-inch and greater diameter manholes.
 - d. Close vacuum inlet/outlet ball valve, disconnect the vacuum pump, and monitor the vacuum for the specified time period. If the vacuum does not drop in excess of 1-inch Hg over the specified time period, the manhole is considered acceptable and passes the test. If the manhole fails the test, identify the leaking areas by removing the head assembly, coating the interior surfaces of the manhole with a soap and water solution, and repeating the vacuum test for approximately thirty seconds. Once the leaks have been identified, complete all necessary repairs by sealing the leaks of the manhole to the satisfaction of the ENGINEER, and repeat test procedures until satisfactory results are obtained.
 - e. After the specified time period, the manhole is considered acceptable and passes the test. If the manhole fails the test, identify the leaking areas by removing the head assembly, coating the interior surfaces of the manhole with a soap and water solution, and repeating the vacuum test for approximately thirty seconds. Once the leaks have been identified, complete all necessary repairs by sealing the leaks of the manhole to



the satisfaction of the ENGINEER, and repeat test procedures until satisfactory results are obtained.

f. identified, complete all necessary repairs by sealing the leaks of the manhole to the satisfaction of the ENGINEER, and repeat test procedures until satisfactory results are obtained.

g. d.

Vacuum Test Timetable			
Depth (Feet)	Manhole Diameter (inches)		
	48"	60"	72"
4'	10 sec.	13 sec.	16 sec.
8'	20 sec.	26 sec.	32 sec.
12'	30 sec.	39 sec.	48 sec.
16'	40 sec.	52 sec.	64 sec.
20'	50 sec.	65 sec.	80 sec.
24'	60 sec.	78 sec.	96 sec.
*T	5.0 sec.	6.5 sec.	8.0 sec.

*Add extra testing time "T", for each additional 2-foot depth. (The values listed above have been extrapolated for ASTM designation C924-85.

h. The OWNER reserves the right to reject any and all manholes that do not pass vacuum testing requirements, and the CONTRACTOR will be responsible for the expense of the replacement. Be aware that a significant number of leaks on a single manhole or significant number of manholes leaking will be considered as a basis for rejection and replacement of manholes.

3.5 SEWER FORCE MAINS

- A. **Trenching, Bedding, and Backfill:** Adhere to the trenching, bedding and backfill specified in Section 31 30 00.
- B. Pipe: Install force mains at the lines and grades required by the Contract Documents. Install all fittings at the required locations and ensure the spigots are well centered in the bells and are fully engaged as evidenced by pipe witness marks.
- C. Begin pipe laying at downstream end of line. Face bell ends of pipe upstream. Provide bell holes at each joint to permit the joint to be constructed properly and supported along its full length of the pipe by the trench bedding. Allowing the pipe to be "bridged" by the bell is not acceptable.
- D. Do not advance pipe laying backfilling by more than 100 feet without approval by the ENGINEER.
- E. Use restrained joints at canal crossings, horizontal and vertical bends, tees,



crosses, valves and other specified locations.

- F. At times when pipe laying is not in progress, close the open ends of pipe by a watertight plug of other approved means. Apply this provision during lunch as well as overnight. If water is in the trench, allow the plug to remain in place until the trench is pumped completely dry.
- G. In all cases walking or working on the completed pipelines, except as may be necessary in tamping or backfilling will not be permitted until the trench has been backfilled to a point one foot above the top of the pipe. Perform the backfilling of the trench and tamping of the backfill simultaneously on both sides of the pipe to ensure the completed pipeline will not be disturbed and injurious side pressures do not occur.
- H. Install all PVC, Ductile Iron and HPDE pipe with a 12-gauge stranded copper wire attached to the pipe for tracing purposes and polyethylene utility marking tape one foot above the pipe. Furnish utility marking tape green in color with black lettering and read "CAUTION – BURIED SEWER LINE BELOW". Utilize approved waterproof mechanical copper connectors for all splicing.
- I. Unless otherwise indicated by the Contract Documents, ensure all force mains have at least 36 inches of cover.
- J. Provide and use tools and facilities that are satisfactory and will allow the Work to be done in a safe and convenient manner. Use suitable equipment to lower all pipe and fittings into the trench one piece at a time. Carefully lower each piece so that neither it nor any protective coating or lining it may have will be damaged. Under no circumstances dump or drop force main materials.
- K. Do not lower pipes and fittings into the trench until they have been swabbed to remove any mud, debris, etc., which may have accumulated within them. After the pipe has been lowered, remove all unnecessary materials from it. Before any pipe is laid, clean the outside of its spigot end and the inside of its bell and leave it dry and oil-free.
- L. Cut pipe so fittings can be inserted in a workmanlike manner and without any damage to the pipe. Follow the manufacturer's recommendations concerning how to cut and machine the ends of the pipe in order to leave a smooth end at right angles to the pipe's axis. Use a "chop" saw for ductile iron pipe, PVC and HDPE pipe. The ENGINEER may consider other methods for 12-inch diameter and larger pipe. After cutting ductile iron pipe, touch up the epoxy lining to the satisfaction of the ENGINEER.
- M. Wherever pipe must be deflected from a straight line (in either the vertical or horizontal plane) in order to avoid obstructions, or wherever long radius curves are permitted, do not allow the amount of deflection to exceed that necessary for the joint to be satisfactorily made, nor more than 75 percent of that recommended by the pipe manufacturer, and be approved by the ENGINEER. Use bend fittings only when the pipe deflections are inadequate, according to manufacturer's recommendations, or as directed by ENGINEER. Do not bend PVC pipe, instead utilize fittings or joint deflections.



- N. Except for HDPE pipe, install joint restraints wherever the force main changes direction (at tees and bends), at dead ends, or at any other point recommended by the manufacturer or required by the ENGINEER. Furnish restrained joints for ductile iron and PVC force main that are in accordance with Section 1016-2.
- O. Joint all pipe in the exact manner specified by the manufacturer of the pipe and jointing materials.
- P. Locate air release/vacuum valves at all high points on the pipeline as shown on the Contract Documents or as directed by the ENGINEER.
- Q. Install force main outlets in manholes as shown on the Contract Documents
- R. Absolutely do not lay pipe on blocks under any circumstance.
- S. Ensure the cutting of pipe for inserting valves, fittings, or closure pieces is in a neat workmanlike manner, using pipe wrap, without damage to the pipe or components to leave a smooth end at right angles to the axis of the pipe. Flame cutting of pipe will not be allowed.
- T. **Tapping:**
 - 1. Take proper precautions to instruct the workmen of the correct procedures to be used for tapping pipelines under pressure. Performed incorrectly, this action could result in serious injury and/or property damage. Be responsible for all claims of damage or loss resulting from improper taps and indemnify the OWNER from any damage claims.
 - 2. Depending on the location of the proposed tap, the ENGINEER may require that the tapping operation be performed during period of lowest operating pressure. Coordinate operations through the ENGINEER to ensure that the tapping operations is performed during periods that least impact the OWNER's operation of the pipeline.
 - 3. Notify the ENGINEER at least 48 hours in advance of the start of each tapping session at the site. Complete the excavation and other preparatory work prior to the performance of the tap. Coordinate work with the ENGINEER so that any operational changes that may be required during the actual tapping operations can be planned. Give the OWNER a second notification with as much advance notice as possible of the date that the tap will be made, but in no case will notifications given less than 24 hours before the start of actual tapping operations be permitted.
 - 4. Install all tapping sleeves in accordance with the instructions supplied by the sleeve manufacturer on the pipe at the location authorized by the ENGINEER or indicated by the Contract Documents.
 - 5. Properly align the tapping assembly to prevent damage to the tapping valve and sleeve or saddle during insertion and withdrawal of the cutter head. Support the operation on solid earth and protect this support throughout the tapping operation.



6. Prior to Tie-in, pressure test the new force main as specified herein.
 7. After the pipeline is de-pressurized, proceed with connection operations.
 8. Clean the pipeline of all residual materials and properly prepared for the connection fitting assemblies. Create these assemblies adhering to the appropriate size connection as shown on the Contract Documents.
 9. Connections must be performed according to the manufacturer's recommendations with the appropriate fitting for the existing pipe.
- U. **Backfill and Restoration of the Site:** Perform excavation, backfill and associated functions as per the Contract Documents and in accordance with the direction outlined in relevant portion of Section of 801.
- V. **Removal and/or Abandonment of Existing Force Main:** This section addresses the removal and/or abandonment of the existing force main and all appurtenances which are being removed (or abandoned) as detailed on the Contract Documents.
1. **Abandon Force Main:** If certain portions of the existing force main are shown to be abandoned in place on the Contract Documents, be responsible for evacuating or "swabbing" the existing force main pipe of all sewage before it is abandoned. Treat this sewage as hazardous material and disposed of using the proper criteria from the La. Department of Environmental Quality. Subsequently, completely fill either the entire length of the pipe with flowable fill and capped as noted on the Contract Documents or as directed by the ENGINEER.
 2. **Plug and Abandon Force Main:** If an existing sewer force main is shown to be plugged and abandoned in place on the Contract Documents, be responsible for evacuating or "swabbing" the existing sewer pipe of all sewage before it is abandoned. Treat this sewage as hazardous material and disposed of using the proper criteria from the La. Department of Environmental Quality. Subsequently, plug the pipe approximately 18 inches into each end of the pipe and capped as noted on the Drawings or as directed by the Engineer.
 3. **Remove Force Main:** If certain portions of the existing force main are shown to be removed on the Contract Documents, completely remove the force main and appurtenances. Backfill the removal trench in accordance with the provisions of Section 31 30 00 - Earthwork as directed by the ENGINEER. Be responsible for evacuating or "swabbing" the existing force main pipe of all sewage before it is removed. Treat this sewage as hazardous material and disposed of using the proper criteria from the La. Department of Environmental Quality.
 4. **Remove and/or Abandon Force Main:**
 - a. If certain portions of the existing force main are shown as remove and/or abandon in place on the Contract Documents, the CONTRACTOR has the option to either completely remove the force main and appurtenances or abandon the force main. Be responsible for



evacuating the existing force main pipe of all sewage before it is abandoned or removed. Treat this sewage as hazardous material and disposed of using the proper criteria from the La. Department of Environmental Quality.

- b. If removed, backfill the removal trench in accordance with the provisions of Section 31 30 00 – Earthwork, or as directed by the ENGINEER.
 - c. If abandoned, completely fill the entire length of the pipe with flowable fill.
5. Deliver the force main appurtenances which are removed to the OWNER or otherwise properly disposed of as directed by the ENGINEER.
 6. Demolish and remove existing concrete structures to three feet minimum below surrounding grade. Fill remainder of structure with sand, using care to ensure that all voids are filled.

W. **Acceptance Tests:** Upon completion of backfilling, ensure pipelines pass the following tests:

1. **Pipe:** Subject all newly installed and backfilled pipe to a leakage test, conducted in the presence of the ENGINEER. Ensure test pressure is 150 percent of systems operating pressure based on pressure as measured at the most elevated point in pipeline or 100 psi, whichever is greater. Slowly fill the force main with water, and apply the specified test pressure (based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge) with a pump connected to the pipe in a manner satisfactory to the ENGINEER.

Furnish all necessary apparatus to perform pressure testing including but not limited to the pump, water, pipe, temporary valves, temporary fittings, connections, gauges, and thrust restraints and blocking. Use thrust collars to restrain the force main where needed to restrain the pipe near the blind flange required for testing. The required number if thrust collars would be dependent on the magnitude of the thrust force to be restrained and the allowable load per collar. Be responsible to design the thrust collar based on the soil conditions at the collar location. Submit thrust restraint calculations for approval. If a decision is made to install restrained joint force main of adequate length to restrain the pipe for testing purposes, do so at no additional cost to the OWNER. The CONTRACTOR may choose to test at points shown to be restrained on the plans (within the stipulated testing limits), however any thrust restraints or restrained joint force main beyond the limit shown on the plans required for testing purposes will be at no additional cost to the OWNER. Before applying the specified test pressure, expel all air from the pipe. If necessary, make taps at the points of highest elevation before testing, and insert plugs after the test has been completed. Conduct the leakage test by measuring, through a calibrated meter, the amount of water which enters the test section for a period of at least 2 hours. No installation will be accepted until the leakage is less than the number of



gallons per hour as determined by the formula:

For PVC Pipe:

$$L = \frac{ND\sqrt{P}}{7,400}$$

L = allowable leakage, gallons/hour

N = number of joints in length of pipe tested

D = nominal diameter of the pipe, inches

P = average test pressure during the leakage test, psig

2. For HDPE Pipe:

- a. Make-up Water Allowance: Maximum allowable make-up water at conclusion to test phase cannot exceed recommended amounts stated in the following table. The table is based on test pressure equal to 1.5 times pressure class of pipe. If lower pressure is used for test, reduce allowances by ratio of test pressure to pressure class of pipe.

Make-Up Water Allowance for Test Phase (U.S. Gallons per 100 feet of Pipe)			
Nominal Pipe Size (inches)	1-Hour Test (gallons)	2-Hour Test (gallons)	
3	0.10	0.15	
4	0.13	0.25	
6	0.30	0.60	
8	0.50	1.0	
10	0.75	1.3	
12	1.1	2.3	
14	1.4	2.8	
16	1.7	3.3	
18	2.2	4.3	

Make-Up Water Allowance for Test Phase (U.S. Gallons per 100 feet of Pipe)



Nominal Pipe Size (inches)	1-Hour Test (gallons)	2-Hour Test (gallons)
20	2.8	5.5
24	4.5	8.9
28	5.5	11.1
32	7.0	14.3
36	9.0	18.0

3. Replace any cracked or defective pipes or fittings discovered in consequence of this leakage test with sound material in the manner specified at no cost to the OWNER. Repeat the test until the results are satisfactory to the ENGINEER.
4. **Tap Testing:** No testing other than the pressure test is required. However, include the testing requirements for the connection pipeline testing of the restrained joint section, including the connection to the tapping valve. Visually inspect the entire tapped connection and repair any visible leaks. Test in accordance with the requirements described as noted above.
5. Coordinate testing plan with surface restoration requirements. Any removal or replacement of temporary or final surface restoration by the CONTRACTOR to investigate leaks will be at no additional cost to the OWNER.

3.6 GRAVITY PIPELINE TESTING

- A. Test sanitary system pipelines in accordance with the Contract Documents.
- B. Furnish submittals in accordance with Section 01 33 00 – Contractor Submittals.
- C. Furnish:
 1. Submit a testing plan and schedule including methods for water conveyance, control, leak testing, and water disposal in writing for approval.
 2. [Where deflection testing of flexible pipe is required, submit a method for mandrel testing or other measurement, as applicable to pipe size.]
- D. **Mandrel Design:** Construct a mandrel of steel or rigid plastic which can withstand a force of 200 psi without deforming. Furnish a mandrel which has 9 or more "runners" or legs, as long as the number is an odd number. Ensure the mandrel barrel length is at least 75 percent of the pipe inside diameter.
- E. **Mandrel Diameter:** Taper the outside diameter to [[95]] percent of the inside diameter of the pipe. For the purpose of determining the mandrel diameter, ensure the inside diameter of the pipe is the average outside diameter of the



pipe, minus 2 minimum wall thicknesses for OD controlled pipe and is the average inside diameter for ID controlled pipe, ensure all dimensions are in accordance with the respective pipe standards. Do not consider statistical or "tolerance packages" in mandrel sizing. Stamp or engrave the mandrel at a location other than a runner with the pipe size and material it is intended to test.

- F. **Proving Ring:** Fabricate a 1/2-inch thick, 3-inch wide steel bar bent to a circle 0.02-inches larger than the mandrel diameter calculated above. Furnish the proving ring to the ENGINEER before any pipe is backfilled. Pass the mandrel through the proving ring at times determined by the ENGINEER.
- G. Test gravity sewer pipes and service laterals for exfiltration or infiltration and deflection as indicated. Backfill manholes and pipe prior to testing. Adhere to the maximum length of pipe tested as the 4 reaches between 5 manholes. Complete and approve leakage tests prior to placing of permanent resurfacing of pavement. When leakage or infiltration exceeds the allowed amount, locate the leaks and make the necessary repairs or replacements to reduce the leakage or infiltration to the allowable limits. Repair individually detectable leaks, regardless of whether the test results are acceptable or not.
- B. Unless otherwise indicated, water for testing will be furnished by the OWNER. Convey the water from the OWNER-designated source to the points of use.
- H. Do not use materials which would be injurious to pipeline structure and future function. Use air test gauges which are laboratory-calibrated test gauges, and if required by the ENGINEER, have been recalibrated by a certified laboratory prior to the leakage test. Utilize air test gauges which have a size and pressure range appropriate for the pipe being tested.
- I. Perform testing operations in the presence of the ENGINEER.
- J. Leakage Tests
 - 1. Perform the type of leakage tests determined from the table below, based on pipe size, slope between manholes (Criterion 1), and difference in water levels (Criterion 2).

	Criterion 1		Criterion 2	
Nominal Pipe Size	Manhole Delta H, feet		Test Water vs Ground Water Delta H, feet	
	Less than or equal to 10 ft	greater than 10 ft	greater than or equal to 4 ft	less than 4 ft
less than or equal to 24 inches	See Criterion 2	Infiltration or Air See Note 1	Exfiltration	Infiltration or Air
greater than 24	See	See Criterion 2	Exfiltration	Infiltration



inches	Criterion 2			
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Note 1. If ground water is present, perform an infiltration test or air test at the option of the CONTRACTOR; if no ground water is present, perform an air test.

2. Definitions

- a. Delta H is the difference between 2 elevations, expressed in feet.
 - b. Manhole Delta H is the invert elevation difference in 2 adjacent manholes.
 - c. Test Water vs Ground Water Delta H is the required elevation of water surface for testing minus the average elevation of ground water adjacent to the pipe to be tested. Units are feet.
- K. **Deflection Tests:** Test flexible pipe 30-inches and smaller for deflection by the mandrel test. Test larger flexible pipe by a method approved by the ENGINEER. Remove and replace excessively deflected pipe.
- L. Test each section of sewer between successive manholes by closing the lower end and the inlet sewers of the upper manhole with stoppers or inflatable plugs. Fill the pipe and manhole with water to a point 4-feet above the centerline of the sewer at the center of the upper manhole; or if ground water is present, 4-feet above the average adjacent ground water level, whichever is higher.
- M. Allow water to remain in the pipe for at least one hour or until the water level stabilizes, whichever is longer, before the test begins. Ensure the minimum test duration is 4 hours.
- N. Unless indicated otherwise, measure exfiltration. Measure the amount of water added to the upstream manhole to maintain the water level at the elevation set above. Compare the amount added to the allowable leakage calculated below, and if the amount added is equal to or less than the allowable amount, the tested section of the pipe has passed.
- O. The allowable leakage will be computed by the formula:

$$E = 0.000012 LD (H)^{1/2}$$

Where:

E = Allowable leakage in gallons per minute of sewer tested.

L = Length of sewer and house connections tested, in feet.

D = Internal diameter of the pipe in inches.

H = Elevation difference in feet between the water surface in the upper manhole and the centerline of the pipe at the lower manhole; or if ground water is present above the centerline



of the pipe in the lower manhole, the difference in elevation between the water surface in the upper manhole and the ground water at the lower manhole.

- P. Close the end of the sewer at the upper structure to prevent the entrance of water, and discontinue pumping of ground water for at least 3 days, after which test the section for infiltration.
- Q. Ensure the infiltration into each individual reach of sewer between adjoining manholes not exceed that allowed by the formula above, where H is the difference in the elevation between the ground water surface and the invert of the sewer at the downstream manhole.
- R. Unless otherwise indicated, ensure the CONTRACTOR measures infiltration.
- S. Furnish all materials, equipment, and labor for making an air test. ENGINEER will approve air test equipment.
- T. Conduct an initial air test of the sewer main line after densification of the backfill but prior to installation of the service laterals. Such tests will be considered to be for the CONTRACTOR's convenience and need not be performed in the presence of the ENGINEER.
- U. Test each section of sewer between successive manholes by plugging and bracing all openings in the pipe and the upper ends of all service laterals. Prior to insertion in the sewer, check each plug with a soap solution to detect any air leakage. If any leaks are found, release the air pressure and eliminate the leaks or replace the plug.
- V. Conduct the test of the pipe and service laterals in the presence of the ENGINEER. Testing of pipe, regardless of the pipe material, perform in accordance with ASTM F 1417 - Standard Test Method for Installation of Plastic Gravity Sewer Line Using Low Pressure Air.
- W. Increase air pressure in the sewer line to 4.0 psi above groundwater pressure (1.0 psi for each 2.3 feet of water elevation above the highest point of the pipe). Do not allow the pressure at any point in the pipe to reach 9 psi under any circumstances. Allow the pressure to stabilize for 5 minutes, then reduce the pressure to 3.5 psi above groundwater pressure and start the test. Stop the air release and record the decrease in pressure over time.
- X. **Pass/Fail Criterion:** Ensure the time taken for the pressure to decrease from 3.5 to 2.5 psi above groundwater pressure is equal to or greater than the time below

Nominal Pipe Diameter, inches	Minimum Time, min:sec	Length for Minimum Time, ft	Increased Time for Longer Lengths, seconds per foot
4	3:46	597	.0380



6	5:40	398	0.854
8	7:34	298	1.520
10	9:26	239	2.374
12	11:20	199	3.418
18	17:00	133	7.692
24	22:40	99	13.674
30	28:20	80	21.366
36	34:00	66	30.768

- Y. Testing criteria of pipe 12-inches and larger may be adjusted if the ENGINEER approves. The air pressure decrease may be 0.5 psi instead of 1.0 psi, and the corresponding minimum times will be one-half of the tabulated times.
- Z. For pipe larger than 24-inches, air pressure tests may be performed on each joint. Ensure the time for the pressure to fall from 3.5 to 2.5 psi, both above groundwater pressure, is not be less than 10 seconds regardless of pipe diameter.
- AA. If the time is less than the allowable time, consider the pipe defective and repair and retest.
- BB. Mandrel Test
 - 1. Allow the ENGINEER to test the mandrel with the proving ring at any time. Ensure the mandrel passes through the proving ring with no greater than 0.02-inch clearance, and if it does not, consider the mandrel will be considered defective and replace.
 - 2. Test all flexible pipe 30-inches and smaller for deflection, joint displacement, and other obstructions by passing the mandrel through the pipe not less than 30 days after completion of the trench backfill, [[[but prior to permanent pavement resurfacing]]].
 - 3. Pipe with diameter less than the mandrel will be considered defective. Remove and re-place such pipe at no additional cost to the OWNER.
- CC. Measure deflections in flexible pipe in sizes larger than 30-inches by a rigid metal bar, a rigid frame, or other method approved by the ENGINEER.
 - 1. Measure the average inside diameter before the pipe is installed and backfilled.
 - 2. Deflection is defined as the difference between vertical inside diameter in the pipe before and after installation and backfilling.]]]

DD. Hydrostatically test sewer manholes for leakage prior to backfilling. Prior to



testing, visually inspect manholes for obvious defects. Repair leaks or cracks to the satisfaction of the ENGINEER.

- EE. **Hydrostatic Testing:** Seal all pipes entering the manhole at a point outside the manhole walls to include testing of the pipe to manhole joints. Fill the manhole with water to a level 2-inches below the top of the frame. Secure safety lines to all plugs utilized. After a period of at least one hour to allow the water level to stabilize, refill the manhole and mark the water level. Check the water level again after 4 hours. If the water level falls more than 1-inch, consider the leakage excessive. Make repairs and retest the manhole. Inspect the exterior of the manhole during this period for visible evidence of leakage. Do not consider visible moisture, sweating, or beads of water on the exterior of the manhole as leakage, but any water running across the surface will be considered leakage and must be repaired to the satisfaction of the ENGINEER regardless of the volume of water lost.
- FF. Inspect sewer pipe and document the inspection by closed circuit television of the entire pipe.

- END OF SECTION -



SECTION 40 05 00 - PIPING, GENERAL

PART 1 -- GENERAL

1.1 THE REQUIREMENT

- A. Provide the piping systems indicated, complete and operable, in accordance with the Contract Documents.
- B. Apply the provisions of this Section to piping sections in Divisions 33 and 40.
- C. The mechanical Drawings define the general layout, configuration, routing, method of support, pipe size, and pipe type. The Drawings are **not** pipe construction or fabrication drawings. Where pipe supports and spacing are indicated on the Drawings and are referenced to a Standard Detail, use that Detail. Where pipe supports are not indicated on the Drawings, it is the CONTRACTOR's responsibility to develop the details necessary to design and construct mechanical piping systems to accommodate the specific equipment provided, and to provide spacers, adapters, and connectors for a complete and functional system.

1.2 CONTRACTOR SUBMITTALS

- A. Furnish Submittals in accordance with Section 01 33 00 - Contractor Submittals.
- B. Shop Drawings
 - 1. Furnish certified dimensional drawings of valves, fittings, and appurtenances.
- C. Certifications: Certified affidavit of compliance for pipe and other products or materials furnished under this Section and as specified in the referenced standards and the following supplemental requirements:
 - 1. Physical and chemical properties.
 - 2. Hydrostatic test reports.
- D. Require the supplier to pay for sampling and testing as necessary for the certifications.

PART 2 -- PRODUCTS

2.1 GENERAL

- A. **Extent of Work:** Provide pipes, fittings, and appurtenances in accordance with the requirements of the applicable specifications and as indicated. List materials in contact with potable water as compliant with NSF Standard 61.
- B. **Lining:** Provide application, thickness, and curing of pipe lining in accordance with the applicable sections, unless otherwise indicated.
- C. **Coating:** Provide application, thickness, and curing of coating on buried pipe in accordance with the applicable sections, unless otherwise indicated. Coat



pipes above ground or in structures in accordance with Section 09800 - Protective Coating.

- D. Pressure Rating:** Design piping systems for the maximum expected pressure as defined in Section 01 74 30 - Pressure Pipe Testing and Disinfection, or as indicated on the Piping Schedule, whichever is greater.
- E. Inspection:** Inspect pipe at the place of manufacture. During the manufacture, allow the ENGINEER access to areas where manufacturing is in progress and be permit inspections necessary to confirm compliance with requirements.
- F. Tests:** Except where otherwise indicated, test the materials used in the manufacture of the pipe in accordance with the applicable specifications and standards. Take responsibility for performing material tests.
- G. Welding Requirements:** Ensure the qualification of welding procedures used to fabricate pipe are in accordance with the provisions of AWS D1.1 - Structural Welding Code. Submit welding procedures for the ENGINEER's review.
- H. Welder Qualifications:** Provide welding by skilled welders and welding operators who have adequate experience in the methods and materials to be used. Ensure qualified welders under the provisions of AWS D1.1 or the ASME Boiler and Pressure Vessel Code, Section 9, by an independent local, approved testing agency not more than 6 months prior to commencing WORK on the piping. Use machines and electrodes similar to those used in the WORK in qualification tests. Qualification testing of welders and materials used during testing is part of the WORK.

2.2 PIPE FLANGES

- A. General:** Provide flanges with flat faces that attach with bolt holes straddling the vertical axis of the pipe unless otherwise indicated. Attach the flanges to the pipe in conformance to the applicable requirements of AWWA C207. Ensure flange faces be perpendicular to the axis of the adjoining pipe. Provide flanges for miscellaneous small diameter pipes in accordance with the standards indicated for these pipes.
- B. Pressure Ratings**
 - 1) 150 psi or less: Conform flanges to either AWWA C207 - Steel Pipe Flanges for Waterworks Service--Sizes 4 In. Through 144 In., Class D, or ASME B16.5 - Pipe Flanges and Flanged Fittings, 150 lb class.
 - 2) 150 psi to 275 psi: Conform flanges to either AWWA C207 Class E or Class F, or ASME B16.5 150 lb class.
 - 3) 275 psi to 700 psi: Conform flanges to ASME B16.5, 300 lb class.
 - 4) Selection based on test pressure: Do not expose AWWA flanges to test pressures greater than 125 percent of rated capacity. For higher test pressures, select the next higher rated AWWA flange or an ANSI-rated flange.



- C. **Blind Flanges:** Provide blind flanges in accordance with AWWA C207, or as indicated for miscellaneous small pipes. For blind flanges for pipe sizes 12-inches and greater, provide lifting eyes in the form of welded or screwed eye bolts.
- D. **Flange Coating:** Coat machined faces of metal blind flanges and pipe flanges with a temporary rust-inhibitive coating to protect the metal until the installation is completed.
- E. **Flange Bolts:** Provide bolts and nuts which conform to Section 05 50 00 - Miscellaneous Metalwork. Utilize all-thread studs on valve flange connections where space restrictions preclude the use of regular bolts.
- F. **Insulating Flanges:** Provide insulated flanges with bolt holes 1/4-inch diameter greater than the bolt diameter.

G. Flange Gaskets

- 1) Utilize full-faced type gaskets for flanged joints used in general water and wastewater service with material and thickness in accordance with AWWA C207, suitable for temperatures to 700 degrees F, a pH of one to 11, and pressures to 1000 psig. Provide blind flanges with cemented gaskets which cover the entire inside face of the blind flange. Do not use ring gaskets unless otherwise indicated. Provide flange gaskets as manufactured by **John Crane, Style 2160, Garlock, Style 3000**, or equal.
- 2) For flanged joints used in water with chloramines, provide gaskets of **Gylon, Style 3500** as manufactured by **Garlock**, by **Crane**, or equal.
- 3) Provide gaskets for flanges for PVC and CPVC piping used in general water and wastewater service that are full faced, 1/8-inch thick, made of ethylene propylene rubber (EPR) having a Type A durometer hardness of 50 to 70 when tested in accordance with ASTM D 2240. When the mating flange has a raised face, provide a flat ring gasket filler between the PVC flange and gasket and the adjacent flange.
- 4) Provide gaskets for flanged joints used in chemicals, air, solvents, hydrocarbons, steam, chlorine and other fluids made of materials compatible with the service, pressure, and temperature.

2.3 PIPE THREADS

- A. Furnish pipe threads in accordance with ASME B1.20.1 - Pipe Threads, General Purpose (inch), and be made up with Teflon tape unless otherwise indicated.

2.4 TRACE WIRE

- A. Provide trace wire for all buried pipe and pipe installed by horizontal directional drill.
- B. Provide trace wire and trace wire products which have been domestically manufactured in the U.S.A.



- C. Furnish trace wire having HDPE insulation intended for direct bury, color coated per APWA standard for the specific utility being marked.
- D. Wire:
 - 1. Open Cut: Furnish #12 AWG Copper Clad Steel, High Strength with minimum 450 lb. break load, with minimum 30 mil HDPE insulation thickness.
 - 2. Directional Drilling/Boring: Furnish #12 AWG Copper Clad Steel, Extra High Strength with minimum 1,150 lb. break load, with minimum 30 mil HDPE insulation thickness.
- E. Connect trace wires in intersections, at mainline tees and mainline crosses. At tees, join the wires using a single 3-way lockable connector. At Crosses, join the wires using a 4-way connector. Use of two 3-way connectors with a short jumper wire between them is an acceptable alternative.
- F. Direct bury wire connectors – furnish 3-way lockable connectors and mainline to lateral lug connectors specifically manufactured for use in underground trace wire installation. Furnish dielectric silicon filled connectors which seal out moisture and corrosion. Install connectors in a manner so as to prevent any uninsulated wire exposure.
- G. Non locking friction fit, twist on or taped connectors are prohibited.
- H. All trace wire termination points must utilize an approved trace wire access box (above ground access box or grade level/in-ground access box as applicable), specifically manufactured for this purpose.
- I. Furnish grade level/in-ground access covers having “sewer” or “water” cast into the cap and which are color coded.
- J. A minimum of 2 ft. of excess/slack wire is required in all trace wire access boxes after meeting final elevation.
- K. All trace wire access boxes must include a manually interruptible conductive/connective link between the terminal(s) for the trace wire connection and the terminal for the grounding anode wire connection.
- L. Connect grounding anode wire to the identified (or bottom) terminal on all access boxes.
- M. Se Service Laterals on public property - Trace wire must terminate at an approved grade level/in- ground trace wire access box, located at the edge of the road right-of-way, and out of the roadway.
- N. Service Laterals on private property - Trace wire must terminate at an approved above-ground trace wire access box, affixed to the building exterior directly above where the utility enters the building, at an elevation not greater than 5 vertical feet above finished grade, or terminate at an approved grade level/in-ground trace wire access box, located within 2 linear feet of the building being served by the utility.



- O. Hydrants – Trace wire must terminate at an approved above-ground trace wire access box, properly affixed to the hydrant grade flange. (affixing with tape or plastic ties will not be acceptable)
- P. Long-runs, in excess of 500 linear feet without service laterals or hydrants - Trace wire access must be provided utilizing an approved grade level/in-ground trace wire access box, located at the edge of the road right-of-way, and out of the roadway. Delineate grade level/in-ground trace wire access box using a minimum 48" polyethylene marker post, color coded per APWA standard for the specific utility being marked.
- Q. Properly ground trace wire at all dead ends/stubs
- R. Furnish grounding of trace wire by use of a drive-in magnesium grounding anode rod with a minimum of 20ft of #12 red HDPE insulated copper clad steel wire connected to anode (minimum 1.5 lb.) specifically manufactured for this purpose, and buried at the same elevation as the utility.
- S. When grounding the trace wire at dead ends/stubs, install the grounding anode in a direction 180 degrees opposite of the trace wire, at the maximum possible distance.
- T. When grounding the trace wire in areas where the trace wire is continuous and neither the mainline trace wire or the grounding anode wire will be terminated at/above grade, install grounding anode directly beneath and in-line with the trace wire. Do not coil excess wire from grounding anode. Trim the grounding anode wire to an appropriate length before connecting to trace wire with a mainline to lateral lug connector.
- U. Where the anode wire will be connected to a trace wire access box, a minimum of 2 ft. of excess/slack wire is required after meeting final elevation.

2.5 MODULAR MECHANICAL SEALS FOR PIPING PENETRATIONS

- A. Where indicated and where required to prevent flow of water or air, seal the passages of piping through wall sleeves and cored openings with modular interlocking link mechanical closures. Construct individual links of EPDM rubber, be suitable for temperatures between minus 40 and plus 250 degrees F, and be shaped to fill the annular space between the outside of the pipe and the inside of the wall sleeve or cored opening. Assemble links with type 316 stainless steel bolts and nuts to form a continuous rubber belt around the pipe. Fabricate pressure plates under each bolt and nut in a corrosion-resistant composite material. After the seal assembly is positioned in the sleeve, tighten the bolts against the pressure plates to expand the rubber links and form the watertight seal. Furnish sizing and installation of sleeves and assemblies in accordance with the manufacturer's recommendations.
- B. Manufacturers, or equal
 - 1) **Thunderline Corporation, Link-Seal**



2.6 DUCTILE IRON PRESSURE PIPE

- A. Where **Pipe:** Furnish ductile iron pipe that complies with ANSI/AWWA C151/A21.51, Table 1 or Table 3. Furnish flanged joints for all above – grade pipe joints and restrained joints for all below – grade pipe joints as specified below, unless noted otherwise on the drawings. Conform pipes to the pressure ratings indicated below:

Pipe Size (in)	Minimum Working Pressure Rating (PSI)
4 " to 24"	250

- B. **Gaskets:** Furnish gaskets that are synthetic rubber. Natural rubber will not be acceptable. Furnish gaskets for potable water service that are certified as suitable at the pipe pressure and for chlorinated and chloraminated potable water; submit a certificate of gasket suitability. Submit gaskets by the manufacturer. Furnish gas and oil – resistant gaskets made of Nitrile rubber. Permanently mark or mold the name of the material on the gasket. Furnish gaskets certified as suitable where soils may be contaminated with gas and oil products. Submit a certificate of gasket suitability .
- C. **Joint Lubricant:** Utilize joint lubricant that is vegetable – based lubricant as recommended by the pipe manufacturer. Petroleum or animal – based lubricants will not be acceptable. Provide lubricants that will be in contact with treated or potable water that are certified as being in compliance with ANSI/NSF 61.
- D. **Fittings:** Provide fittings per ANSI/AWWA C110/A21.10 (except shorter laying lengths will be acceptable for US Pipe) or ANSI/AWWA C153/A21.53, minimum working pressure rating as follows unless indicated on the drawings. Ensure all fittings are made of ductile iron and are suitable for a factory test pressure of rated working pressure plus 100 PSI or 1.5 times rated working pressure, whichever is greater. Ensure all below grade fittings are mechanical joints and all fittings above grade or contained within structures are flanged, unless noted otherwise on the drawings.
- E. **Buried Pipe to Pipe Joints:** Restrain buried pipe – to – pipe joints using “push – on” joints per ANSI/AWWA C111/A21/11. Provide joints that are restrained push – on, positive locking segments, or with rings and made of American “Flex-Ring” or “Lok-Ring; Clow “Super-Lock”; Griffin “Snap – Lok”, or equal.
- F. **Buried Pipe to Fitting Joints:** Provide buried pipe to fitting joints that are restrained mechanical joints and comply with ANSI/AWWA C11/A21.11. Restrained mechanical joints with factory prepared spigot (4” through 48” that are American “MJ Coupled Joints”, Griffin “Mech-Lok”, or equal. Provide restrained mechanical joints with field cut spigot (4” through 48”) that are EBAA Iron “Mega lug” Series 1100, or Star Pipe Products “StarGrip 3000”, or equal. Provide wall pipes or Castings that are Mechanical joint with water stop and tapped holes; single



casting or fabricated ductile iron pipe; holes sized in accordance with the details on the drawings and provided with removable plugs.

- G. Flanged Joints for Above – Grade Pipe and Structures and where Indicated on the Drawings:** Ensure joints comply with ANSI/AWWA C115/A21.15. Where required by the drawings, furnish flanges that are Class 250, ductile iron, flat faced ANSI/ASME B16.1 Class 250 diameter and drilling. Utilize Ductile Iron, Class 125, ANSI/AWWA C115/A21.15 for all other flanges. Provide that all flanges are suitable for test pressure of 1.5 times rated pressure without leakage or damage. Furnish bolts that are stainless steel, ASTM A193 Grade B8 (Type 304), chamfered or rounded ends projecting 1/4" to 1/2" beyond the outer face of the nut. Furnish nuts that are heavy hex, stainless steel per ASTM A194, Grade BS (Type 304), coated to prevent galling. If required, provide washers that are Type 304 stainless steel annealed per ASTM A240. Provide gaskets that are per ASTM D1330, Grade I rubber, full face type, 1/8" thick. Furnish gaskets provided by the pipe manufacturer. Furnish gaskets for potable water service that are certified as suitable for chlorinated potable water; and provide the certificate of suitability.
- H. Mechanical Couplings:** Where indicated on the drawings, provide mechanical couplings that are Dresser "Style 38"; Smith-Blair "411 Steel Coupling"; or Romac "Style 400" or "Style 501"; without pipe stop. Provide gaskets that are Oil-resistant synthetic rubber. Furnish gaskets provided by the pipe manufacturer. Provide gaskets for potable water service which are certified as suitable for chlorinated potable water; provide a certificate of gasket suitability.

2.7 HIGH DENSITY POLYETHYLENE (HDPE) PRESSURE PIPE

- A. Pipe:** Procure pipe made of HDPE material having a material code of PE3408 or higher. Ensure the material meets the requirements of ASTM D 3350 and has a minimum cell classification of PE345464C (345464E for gray HDPE pipe). Provide pipe that meets the requirements of AWWA C906. Provide pipe in ductile iron pipe sizes (DIPS). Ensure the pressure rating is 160 psi with a maximum dimension ratio (DR) of 11. Utilize 40-ft standard laying lengths. Mark pipe as prescribed by AWWA C906. Ensure pipe markings include nominal size, OD base (ie: 12-inch ductile iron pipe sizing, DIPS). Provide water distribution pipe with a permanent, indelible blue stripe which has been integrally molded with the plastic.
- B. Fittings:** Provide fittings per ANSI/AWWA C110/A21.10 (except shorter laying lengths will be acceptable for US Pipe) or ANSI/AWWA C153/A21.53, minimum working pressure rating as follows unless indicated on the drawings. Provide all fittings made of ductile iron and suitable for a factory test pressure of rated working pressure plus 100 PSI or 1.5 times rated working pressure, whichever is greater. Provide all below grade fittings have mechanical joints and all fittings above grade or contained within structures are flanged, unless noted otherwise on the drawing.
- C. Gaskets:** Provide synthetic rubber gaskets. Natural rubber will not be acceptable. Ensure gaskets for potable water service are certified as suitable at the pipe pressure and for chlorinated and chlorinated potable water; submit a certificate of gasket suitability. Submit gaskets by the manufacturer. Provide nitrile rubber gaskets that are gas and oil – resistant. Permanently mark or mold the name of the material on the gasket. Certify that gaskets are suitable where



soils may be contaminated with gas and oil products. Submit a certificate of gasket suitability.

- D. **Joint Lubricant:** Provide vegetable-based joint lubricant as recommended by the pipe manufacturer. Petroleum or animal – based lubricants will not be acceptable. Ensure lubricants that will be in contact with treated or potable water are certified in compliance with ANSI/NSF 61.
- E. **Pipe to Pipe Connections:** Join pipe sections by heat fusion. Provide field fusion joints which are made by qualified fusion technicians. Demonstrate the qualifications of the fusion technician by providing evidence of certified training within the past year, specific to the fusion joint type and equipment to be utilized for the project. If allowed by the ENGINEER, “electro-fused” couplings in accordance with ASTM F 1055 may be utilized.
- F. **Pipe to Fitting Connections:** Mechanical joint adapters are to be used when connecting HDPE pipe to Ductile Iron Fitting. MJ Adapters are manufactured in standards IPS and DIPS sizes for connecting IPS sized or DIPS sized polyethylene pipe to mechanical joint fittings and appurtenances that meet AWWA C111. Provide restraints that are manufactured of ductile iron conforming to ASTM A536. Utilize a split ring on the PVC fitting bell. Utilize a restraint ring, incorporating a plurality of individually-actuating gripping surfaces, to grip the pipe, and use a sufficient number of bolts to connect the bell ring and the gripping ring. Ensure the combination has a minimum working pressure rating equivalent to the pipe.

2.8 POLYVINYL CHLORIDE PRESSURE PIPE

- A. **Open Cut Pipe:** Pipe installed by open cut installation may be installed using metallic restraint couplings or fusible PVC.
- B. **Horizontal Directional Drill:** Use pipe with non – metallic restraint couplings for PVC pipe to be installed by horizontal directional drill.
- C. **Pipe:** Provide PVC pressure pipe (4-inch through 12-inch) that conforms to the applicable requirements of AWWA C900, DR 25. PVC pressure pipe (14-inch through 48-inch) and to the applicable requirements of AWWA C905, DR 25. Ensure all PVC pipe also conforms to the additional requirements specified herein. Unless otherwise provided in alternate qualification procedures of PPI-TR3, ensure compounds which have a Hydrostatic Design Basis (HDB) of 4000 psi at 73.4 degrees F for water do not contain additives and fillers that exceed the recommended values in Table 1, Part Y of PPI-TR3 (e.g., allowable content range for calcium carbonate is 0.0-5.0 parts per hundred parts of resin). If requested by the ENGINEER, determine the additive and filler content by using the pyrolysis method per ASTM D 2584. Provide blue pipe for potable water mains.
- D. **Gaskets:** Provide synthetic rubber gaskets. Natural rubber will not be acceptable. Provide gaskets for potable water service that are certified as suitable at the pipe pressure and for chlorinated and chloraminated potable water. Provide a certificate of gasket suitability. Furnish gaskets as submitted by the manufacturer. Provide gas and oil – resistant gaskets made of Nitrile rubber. Permanently mark or mold the name of the material on the gasket. Utilize



gaskets certified as suitable where soils may be contaminated with gas and oil products. Submit a certificate of suitability for the gasket.

- E. Fittings:** Provide fittings per ANSI/AWWA C110/A21.10 (except shorter laying lengths will be acceptable for US Pipe) or ANSI/AWWA C153/A21.53, minimum working pressure rating as follows unless indicated on the drawings. Provide all fittings that are mechanical joint ductile iron and are suitable for a factory test pressure of rated working pressure plus 100 PSI or 1.5 times rated working pressure, whichever is greater.
- F. Buried Pipe to Fittings Joints:** Use field-cut pipe and metallic joint restraints for all buried pipe to fitting joints. Utilize metallic restraints that are manufactured of ductile iron conforming to ASTM A536. Utilize a split ring on the PVC fitting bell. Utilize a restraint ring, incorporating a plurality of individually-actuating gripping surfaces, to grip the pipe, and a sufficient number of bolts to connect the bell ring and the gripping ring. Ensure the combination has a minimum working pressure rating equivalent to the pipe. Field cut the pipe and prepare in accordance with the recommendations of the pipe supplier and the restraining joint supplier.
- G. Pipe to Pipe Joints:** For pipe to pipe for buried PVC pipe utilize either an integral bell manufactured on the pipe or a separate coupling both employing an elastomeric gasket. Ensure the bell and coupling is the same thickness as the pipe barrel, or is greater thickness. Ensure the sealing ring groove in the coupling is the same design as the groove in cast iron fittings and valves available from local water works supply distributors. Do not allow deflection at the joint to exceed 1.5 degrees or the maximum deflection recommended by the manufacturer. Do not allow deflection of the joint for joints that are over-belled or not belled to the stop mark. Unless noted otherwise on the drawings, restrain all pipe to pipe joints.
 - 1. **Metallic Joint Restraint:** Provide metallic restraints manufactured of ductile iron conforming to ASTM A536. Utilize a split ring on the PVC fitting bell. Utilize a restraint ring, incorporating a plurality of individually-actuating gripping surfaces, to grip the pipe, and a sufficient number of bolts to connect the bell ring and the gripping ring. Ensure this combination has minimum working pressure rating equivalent to the pipe.
 - 2. **Non – Metallic Joint Restraint:** Use fusible PVC by **Underground Solutions, Poway, California.**

PART 3 -- EXECUTION

3.1 MATERIAL DELIVERY, STORAGE, AND PROTECTION

- A.** Deliver piping materials, fittings, valves, and accessories in a clean and undamaged condition and stored off the ground for protection against oxidation caused by ground contact. Replace defective or damaged materials with new materials.



3.2 GENERAL

- A. Install piping, fittings, and appurtenances in accordance with plan drawings, the requirements of this section, the requirements of Division 33, and the piping material manufacturer's written installation directions. Install proprietary manufactured couplings in accordance with the coupling manufacturer's recommendation.
- B. Take care to insure that piping flanges, mechanical-type couplings, sleeve-type couplings, flexible connectors, and expansion joints are properly installed as follows:
 - 1) Carefully clean and inspect gasket surfaces prior to making up the connection. Center each gasket properly on the contact surfaces.
 - 2) Install connections to prevent inducing stress to the piping system or the equipment to which the piping is connected. Ensure contact surfaces for flanges, couplings, and piping ends are aligned parallel, concentric, and square to each axis at the piping connections.
 - 3) Ensure bolts are initially hand-tightened with the piping connections properly aligned. Tighten bolts with a torque wrench in a staggered sequence to the AISC recommended torque for the bolt material.
 - 4) Each groove ends are clean and free from indentations, projections, and roll marks in the area from the pipe end to the groove.
 - 5) After installation, ensure joints meet the indicated leakage rate. Do not provide flanges that are deformed or cracked.
- C. **Lined Piping Systems:** Hold the lining manufacturer fully responsible for the complete, final product and its application. Epoxy-coat pipe ends and joints of lined pipes at screwed flanges to assure continuous protection.
- D. **Core Drilling:** Where core drilling is required for pipes passing through existing concrete, determine core drilling locations by radiograph of concrete construction to avoid damage to embedded raceways and reinforcing bars.
- E. **Cleanup:** After completion of the WORK, removal cuttings, joining and wrapping materials, and other scattered debris from the Site. Ensure the entire piping system is handed over in a clean and functional condition.

3.3 PRESSURE TESTING AND DISINFECTION

- A. Pressure test and disinfect all potable water pipelines in accordance with the requirements of Section 01 74 30 – Pressure Testing and Disinfection.

3.4 TRACE WIRE

- A. Perform trace wire installation in such a manner that allows proper access for connection of line tracing equipment, proper locating of wire without loss or deterioration of low frequency (512Hz) signal for distances in excess of 1,000



linear feet, and without distortion of signal caused by multiple wires being installed in close proximity to one another.

- B.** Trace wire systems must be installed as a single continuous wire, except where using approved connectors. No looping or coiling of wire is allowed.
- C.** Any damage occurring during installation of the trace wire must be immediately repaired by removing the damaged wire, and installing a new section of wire with approved connectors. Do not tape or utilize spray coating.
- D.** Install trace wire the bottom half of the pipe and secured (taped/tied) at 5' intervals.
- E.** Trace wire must be properly grounded as specified.
- F.** Trace wire on all service laterals/stubs must terminate at an approved trace wire access box located directly above the utility, at the edge of the road right-of-way, but out of the roadway. (See Trace wire Termination/Access)
- G.** At all mainline dead-ends, ground trace wire using an approved connection to a drive-in magnesium grounding anode rod, buried at the same depth as the trace wire.
- H.** Do not connect trace wire to existing conductive pipes. Treat as a mainline dead- end, ground using an approved waterproof connection to a grounding anode buried at the same depth as the trace wire.
- I.** Furnish service laterals a single trace wire, connected to the mainline trace wire using a mainline to lateral lug connector, installed without cutting/splicing the mainline trace wire.
- J.** In occurrences where an existing trace wire is encountered on an existing utility that is being extended or tied into, connect the new trace wire and existing trace wire connected using approved splice connectors, and properly ground the wire at the splice location as specified.
- K.** Water System
 - 1. A mainline trace wire must be installed, with all service lateral trace wires properly connected to the mainline trace wire, to ensure full tracing/locating capabilities from a single connection point.
 - 2. Lay mainline trace wire continuously, by-passing around the outside of valves and fittings on the North or East side.
 - 3. Trace wire on all water service laterals must terminate at an approved trace wire access box color coded blue and located directly above the service lateral at the edge of road right of way.
 - 4. Above-ground tracer wire access boxes will be installed on all fire hydrants.
 - 5. Furnish conductive and non-conductive service lines with tracer wire.



- L. Testing: Locate all treace wite using typical low frequency (512Hz) line tracing equipment, as witnessed by the contractor, engineer and facility owner as applicable, prior to acceptance of ownership. Continuity testing in lieu of actual line tracing will not be accepted.

- END OF SECTION -



SECTION 40 91 00 –CONTROL PANELS

PART 1 -- GENERAL

1.1 THE REQUIREMENT

- A. Furnish and install control panels to provide un-attended automatic operation of pumps. Furnish and install control panels that are fully assembled, wired and tested. Provide panels from a supplier certified by Underwriters Laboratories (UL) to manufacture UL 508A control panels. Present such certification documentation with submittal drawings.
- B. Furnish control panel for each station as indicated on the drawings and as specified herein.

1.2 REFERENCE STANDARDS

- A. National Electrical Manufacturer's Association (NEMA)
NEMA 250 Enclosures for Electrical Equipment, 1000 Volts Maximum
- B. National Fire Protection Association (NFPA)
NFPA 70 National Electrical Code
- C. Underwriter's Laboratory (UL)
UL 508 Industrial Control Panels

1.3 CONTRACTOR SUBMITTALS, SAMPLING, AND TESTING

- A. Provide submittals in accordance with Section 01 33 00 – Contractor Submittals.
- B. Quality assurance requirements are continued throughout this specifications section.

1.4 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 PUMP CONTROL EQUIPMENT – PRIMARY CONTROLLER

- A. **General:** Provide microprocessor based, intelligent pump controller with pre-configured pump control logic and fault handling.



- B. Surge Protection:** Include line-voltage surge protection in all control equipment. Comply with UL 1449 and ANSI C62.41 Standards.
- C. Standard Functions:** Provide pump controller with pre-configured (default) parameters which are selectable via the user interface keypad, including:
1. Set point adjustment for pump activation/deactivation and level alarms;
 2. Level device input, 4-20 mA signal for conductive level probe
 3. Redundant level device inputs;
 4. Selectable between charge (fill) and discharge (empty);
 5. Pump control of up to four (4) pumps, including alternation and grouping;
 6. Station optimization including maximum off time for any pump, maximum pumps to run simultaneously, maximum pump starts per hour, inter – pump start and stop delays, blocked pump detection, well washer control functions, well cleanout, alternat profiles of set points (conditional pump management), data logger functions,
 7. Monitoring of DC power supply, battery voltage, and internal temperature;
 8. Motor protection and power module including overcurrent and undercurrent protection, ground and earth fault, insulation resistance testing for motor windings, 3 – phase supply monitoring and supply protection including under – voltage, over – voltage, phase failure and phase rotation; kVA, kW, and power factor management;
 9. Calculated flow function.
- D. User Interface:** Provide field hardware which includes a user interface for operations and configuration. Provide display which shows status of the pump station, control of pumps, resetting of faults and configuration of parameters.
- E. Control:** Provide controller which controls at a minimum the following through the user interface:
1. Pump mode for each pump (H/O/A);
 2. Pump fault reset;
 3. Level alarm reset.
- F. Communications:** Provide the following:
1. Physical: Include Ethernet Port (10MB/S) and RS232 Ports (115kB/s).
 2. Protocols: Support DNP3.
- G. Power Requirements:** Provide controller which operates on power input of 10 – 30 volts DC.



2.2 BACKUP LEVEL CONTROL SYSTEM (LEVEL CONTROL RELAYS)

- A. **General:** Provide a backup level control system consisting of one or more level sensing relays. Provide the number of relays as determined by the by the number of pumps specified for backup control. Furnish non – mercury float switches for backup level control system.

2.3 LEVEL SENSING EQUIPMENT

- A. **General:** Provide submersible level transducer, Siemens SITRANS or equal.

2.4 FLOW METERING EQUIPMENT

- A. Where indicated on the drawings, furnish a magnetic flow meter and recording device. Install the measuring element at the location shown on the drawings, and locate the recording device within the control panel enclosure such that it can be easily read only by opening the enclosure front.
- B. Manufacturer, or Equal":
 - 1. ABB Watermaster FEW Series Measuring Element with ABB Screenmaster 500F Videographic Recorder.

2.5 VARIABLE FREQUENCY DRIVES AND BYPASS EQUIPMENT

- A. Provide a properly sized for each pump. Size according to pumps as well as motor full load amps. Utilize appropriate safety factors. Provide Flygt Smart Run, or approved equal.
- B. **Operation:**
 - 1. Provide controller which adheres to the controls scheme as follows:
 - a. Lead pump starts up upon level rise;
 - b. Variable frequency drive adjusts pump speed to maintain level;
 - c. When VFD reaches maximum set – point speed, first lag pump starts;
 - d. Both VFD's adjust pump speeds to maintain wet well level;
 - e. Both pumps draw the wet well down to their cut off level.
 - 2. Provide controller which alternates the lead pump upon each cycle. Provide controller that allows for any out of service pump to be skipped in a rotation sequence. Provide controller that forces an alternation sequence whenever any pump operates continuously for a user – adjustable time.
- C. Equip each panel with a NEMA 4X stainless steel industrial control panel air conditioner factory sized for all connected pumps operating simultaneously plus heat gain from other electrical components in the panel as well as heat gain due to mounting of the control panel in direct sunlight. Provide calculations with submittals. Provide air conditioner which operates operate at the level of the



incoming main service voltage without transformation. Mount air conditioner on the side of the enclosure. Provide air conditioner with corrosion protection of all of its electronics suitable for long term exposure to the outdoors. Provide "Icecube" or approved equal.

2.6 COMMUNICATIONS MODULE

- A.** Provide Automation Model CP6-12DC self-contained isolated communication module. Communication module must meet end-user approval for module components. Provide unit with custom configuration for installation in all end user new and existing field devices. Ensure that modules are factory installed and integrated by the panel supplier.

2.7 CONTROL POWER TRANSFORMER

- A.** Provide each control panel with a circuit breaker to feed a minimum 1 KVA, 120/240 volt internally mounted transformer for control power and other 120 volt power requirements.

2.8 CIRCUIT BREAKERS

- A.** Provide back panel mounted branch thermal magnetic motor circuit breakers for each motor. Use breakers which include quick make, quick break and trip free operating mechanism.

2.9 MOISTURE DETECTION

- A.** Where submersible pumps are utilized, provide a sensor to sense moisture in the pump seals. Provide moisture detection relays and other devices as recommended by the particular pump manufacturer. Coordinate all requirements with the pump supplier.

2.10 OVERTEMPERATURE PROTECTION

- A.** Provide panel wired to connect an over temperature device in or on the pump that will activate on high temperature and stop the pump. Provide temperature device that will automatically reset when the temperature drops to normal. Coordinate all requirements with the pump supplier.

2.11 PILOT DEVICES

- A.** Provide a minimum of 22mm HOA selector switches and indicator lights as required.
- B.** Provide light colors as follows:
 - 1.** Run – Red
 - 2.** Alarm – Amber

2.12 CONTROL POWER SUPPLY



- A. Provide Astrodyne AD55A/DRL or equal for primary control power supply.

2.13 CONTROL PANEL CONSTRUCTION AND MITIGATION

- A. Provide entire panel to be enclosed in an outdoor NEMA 4X / UL Type 4X, 316 stainless steel, Hoffman, or equal. Provide enclosures having quick release ¼ turn latches allowing for fast entry and that are suitable for attaching the OWNER's pad locks.
- B. Provide panel having two modes of mitigation. In the first mode, removing the swing panel only (and VFD's and soft starts if supplied) must save all of the expensive components and allow for the pumps to remain in operation in the emergency operating mode using the back-up float switches. Should the entire assembly be desired to be removed, both the interior swing panel and the back plate with all components must be capable of being removed simultaneously thus emptying the entire enclosure.
- C. To ensure product support, provide panel manufactured by a supplier having been in the business of manufacturing pump station control panels for at least 10 years and which maintains an adequate parts stock and is capable of supplying any part within 24 hours.

2.14 ACCESSORIES

- A. Provide the following accessories:
 1. TVSS 4X Rated for External Mounting
 2. Phase monitor to protect motors from phase failure (in service only on bypass operation)
 3. Current transformers in each motor leg
 4. Main distribution block
 5. Control circuit breaker
 6. Circuit breaker for GFI receptacle
 7. GFI receptacle
 8. Two spare 120 volt circuit breakers
 9. Switches on swing panel for fan and light (dry pit stations only).
 10. SCADA Communication module CP6-12DC.

2.15 PUMP DEVICES

- A. Some pump manufactures have special seal fail and temperature detection relays and equipment that must be installed in the control panel when using their pumps. Require the pump supplier to provide this equipment to the panel supplier for mounting in the control panels. Include these devices in the pump



prices. Furnish them with pumps and ship them to the control panel manufacturer for mounting and wiring in the control panel.

PART 3 -- EXECUTION

3.1 INSTALLATION

- A.** Install the control panel in accordance with the Manufacturer's instructions and as shown on the drawings. Utilize the mounting ears furnished with the panels. Mount panels straight and true to prevent problems with removing and reinstalling the interiors. Do not drill any mounting holes in the enclosure. Use weatherproof hubs for all conduit entries into the enclosure to prevent water intrusion.
- B.** The control panel has special locations required for entry of conduits. These locations will be marked on the shop drawings as well as on the enclosure. Install conduit through the enclosure at these locations only, otherwise the enclosure rating will be compromised. Give strict instructions to his Subcontractors to contact the Manufacturer if there is any question as to where to install conduits.
- C.** Utilize hole punches designed for punching through stainless steel. Do not use drills and hole saws.
- D.** Install the panel and accessories such that sewer gasses and moisture are prevented from entering the panel.
- E.** Verify that the correct control voltage is present before energizing the control circuit.
- F.** After installing a panel on the equipment rack, padlock the panel before leaving the job site for the day. Do not leave unlocked panels unattended
- G.** As soon as conduits are connected to the control panel, and even before wires are installed, seal conduits with approved sealers to prevent sewer gasses or moisture, especially from the wet well, from entering panel. Gasses or water vapor will destroy components in the panel and will void the warranty. Any damage resulting from moisture or gasses entering the panel will be the responsibility of the Contractor.
- H.** The panel air conditioner must remain in an upright position. Do not lay the control panel in an off vertical position during storage or handling.

- END OF SECTION -



SECTION 43 20 00 - PUMPS, GENERAL

PART 1 - GENERAL

1.1 THE REQUIREMENT

- A. Provide pumps and pumping appurtenances, complete and operable, as indicated in accordance with the Contract Documents.
- B. The provisions of this Section shall apply to pumps and pumping equipment throughout the Contract Documents, except where otherwise indicated.
- C. The requirements of Section 46 01 00 – Equipment General Provisions, apply to this Section.
- D. Unit Responsibility
 - 1. The pump manufacturer shall be made responsible for furnishing the pumps, motors, and VFDs as one package and for the coordination of design, assembly, testing, and installation of the WORK of each specific pump Section.
 - 2. The CONTRACTOR shall be responsible to the OWNER for compliance with the requirements of each specific pump Section.
- E. Single Manufacturer
 - 1. Where 2 or more pump systems of the same type or size are required, provide pumps produced by the same manufacturer.

1.2 CONTRACTOR SUBMITTALS

- A. Furnish submittals in accordance with the requirements of Section 01 33 00 – Contractor Submittals.
- B. **Shop Drawings**
 - 1. Submit pump name, identification number, and specification Section number.
 - 2. Performance Information
 - a. Submit performance data curves showing head, capacity, horsepower demand, NPSHr3 required, and pump efficiency over the entire operating range of the pumps. Submit efficiency curves of motors and VFDs.
 - b. Require the equipment manufacturer to indicate the head, capacity, required horsepower, pump efficiency, and NPSHr corresponding to each flow condition indicated in the respective performance requirement paragraph of each individual pump specification section. Indicate on the pump curve the Allowable Operating Region (AOR), Preferred Operation Region (POR), and minimum submergence required at maximum flow for vertical and submersible pumps.



- c. Submit performance curves at intervals no greater than 100 RPM from the specified minimum speed to maximum speed for each centrifugal pump equipped with a variable speed drive.

3. Operating Range

- a. Require the manufacturer to indicate the limits on the performance curves recommended for stable operation without surge, cavitation, or excessive vibration.
4. Submit assembly and installation drawings, including shaft size, seal, coupling, bearings, anchor bolt plan, part nomenclature, material list, outline dimensions, and shipping weights.
5. Where lead containing materials are used for drinking water service pumps submit a calculation to demonstrate that the weighted average of lead content of wetted components do not exceed 0.25% to meet the requirement of the Reduction of Lead in Drinking Water Act.
6. Submit data, in accordance with the requirements of Section 26 05 10 – Electric Motors, for the electric motor proposed for each pump.
7. Submit an elevation drawing of the proposed local control panel, showing panel-mounted devices, details of enclosure type, a single-line diagram of power distribution, current draw of the panel, and a list of terminals required to receive inputs or to transmit outputs from the local control panel.
8. Submit a wiring diagram of field connections, with identification of terminations between local control panels, junction terminal boxes, and equipment items.
9. Submit a complete electrical schematic diagram.

C. Technical Manual

1. Submit a Technical Manual containing the required information indicated in Section 01 33 00 – Contractor Submittals and each specific pump Section.

D. Spare Parts List

1. Submit a spare parts list containing the required information indicated in Section 01 33 00 – Contractor Submittals and each specific pump Section.

E. Factory Test Data

1. For pumps that shall be factory witness tested, submit factory test plan showing piping diameter sizes and lengths, locations of valves and instruments that will be used during testing as part of shop drawing submittal.
2. For pumps that shall be factory witness tested, submit current calibration certificates of test instruments prior to testing.



3. Submit signed, dated, and certified factory test data for each pump system which requires factory testing.
4. Submit these data before shipment of equipment.

F. Certifications

1. Submit the manufacturer's certification of proper installation.
2. Submit the CONTRACTOR's certification of satisfactory field testing.

PART 2 - PRODUCTS

2.1 GENERAL

A. Compliance with the requirements of the specific pump Sections may necessitate modifications to the manufacturer's standard equipment.

B. Performance Curves

1. Provide centrifugal pumps with a continuously rising pump curve, or with a pump curve that does not cross the system curve within the pump curve's "dip region."
2. Unless otherwise indicated, the required shaft horsepower for the entire pump assembly at any point on the performance curve shall not exceed the rated horsepower of the motor or engine or encroach on the service factor.
3. For VFD driven pumps, the rated horsepower of the selected motor shall be 110 percent of the maximum brake horsepower required by the pump.

C. Compatibility

1. Provide entirely compatible components of each pump system provided under the specific pump Sections.
2. In each unit of pumping equipment, incorporate basic mechanisms, couplings, electric motors or engine drives, variable speed controls, necessary mountings, and appurtenances.

D. Balancing

1. Unless otherwise specified the rotating assembly shall be dynamically balanced to ISO 1940 G6.3.

2.2 MATERIALS

A. Provide materials suitable for the intended application.

B. For materials not indicated, provide high-grade, standard commercial quality, free from defects and imperfections that might affect the serviceability of the product for the purpose for which it is intended, and conforming to the following requirements:



1. For drinking water service, use materials with weighted average of lead content of wetted components not to exceed 0.25% to meet the requirement of the Reduction of Lead in Drinking Water Act.
 2. Bowls and Casings
 - a. Provide cast iron pump casings constructed of close-grained gray cast iron, conforming to ASTM A 48 - Gray Iron Castings, Class 30, or equal. Unless otherwise indicated on the specific pump sections, cast iron-fitted pumps shall be epoxy lined and coated for better efficiency.
 3. Impellers
 - a. Where individual pump sections indicate cast iron impellers, such impellers shall be epoxy coated and constructed of close-grained gray cast iron, conforming to ASTM A 48 - Gray Iron Castings, Class 30, or equal.
 - b. Where individual pump sections indicate stainless steel impellers, such impellers shall be constructed of Type 316 stainless steel.
 - c. Where individual pump sections indicate bronze impellers, or where the impeller material is not otherwise specified, such impellers shall be constructed of zero-lead aluminum bronze conforming to ASTM B 148 – Standard Specification for Aluminum-Bronze Sand Castings, or zero-lead, zincless nickel aluminum bronze ASTM –B 148-C95800.
 4. Provide pump shafts constructed of Type 416 or 316 stainless steel.
 5. Provide anti-friction bearings or zero-lead bronze bearings. Bronze bearings shall be Bismuth Tin Bronze ASTM B 584 C89835, or equal.
 6. All elastomeric materials such as gaskets, seals, O-rings in contact with water with chloramine and ozone shall be Teflon, Viton-A or other materials compatible with the fluid service. Test certificate from a material testing laboratory to provide proof of test shall be made available to the ENGINEER if requested.
 7. Miscellaneous stainless steel parts shall be of Type 316.
 8. Provide anchor bolts, washers, and nuts in standard service (non-corrosive application) of galvanized steel in accordance with the requirements of Section 05 50 00 – Miscellaneous Metalwork.
 9. Provide anchor bolts, washers, and nuts in corrosive service of stainless steel in accordance with Section 05 50 00 – Miscellaneous Metalwork.
- C. Materials in contact with potable water shall be listed as compliant with NSF Standard 61. Test certificate from a material testing laboratory to provide proof of test shall be made available to the ENGINEER if requested



2.3 PUMP COMPONENTS - GENERAL

A. Flanges and Bolts

1. Provide suction and discharge flanges conforming to ASME B16.1 - Cast Iron Pipe Flanges and Flanged Fittings, or ASME B16.5 - Pipe Flanges and Flanged Fittings dimensions. Pressure class shall be suitable for the application or as otherwise recommended by the pump manufacturer.
2. Provide flange bolts in accordance with the requirements of Section 40 05 00 – Piping, General.
3. Flange gaskets shall be in accordance with Section 40 05 00 - Piping, General

B. Lubrication

1. Vertical pump shafts for clean water pumps shall be product water-lubricated, unless otherwise indicated.
2. Provide deep-well pumps with external flushing water- or oil-lubricated bearings and seals, and enclosed line shafts.
3. Pumps for sewage, sludge, and other process fluids shall be grease lubricated or as indicated.

2.4 PUMP APPURTENANCES

A. Nameplates

1. Equip each pump with a stainless steel nameplate indicating serial number(s), rated head and flow, impeller size, pump speed, and manufacturer's name and model number.

2.5 FACTORY TESTING

A. Conduct the following tests on each indicated pump system:

1. Certified Factory Non-witnessed Test
 - a. Perform factory non-witnessed tests on centrifugal pumps with drives up to and including 125 hp in accordance with the ANSI/HI 14.6, Rotodynamic Pumps for Hydraulic Performance Acceptance Test.
 - b. For pumps with drives smaller than 15 hp, sump pumps, and sample pumps, pumps shall meet hydraulic acceptance criteria Grade "2U" unless otherwise indicated. Such tests shall, at a minimum, consist of the following:
 - 1) Hydrostatic test;
 - 2) Performance test at guaranteed design point or duty point documenting head, flow, bhp, and efficiency results.



- 3) Unless otherwise indicated, it is not required to test NPSHr in the factory. Instead, manufacturer shall submit the published NPSHr curve in accordance with the requirements of this specification section.
 - 4) Additional tests as indicated in the specific pump specification sections.
- c. For pumps with drives 15 hp and larger shall meet hydraulic acceptance criteria Grade "1U" unless otherwise indicated. Such tests shall, at a minimum, consist of the following:
- 1) Hydrostatic test;
 - 2) Performance Test:
 - a) Conduct performance testing at maximum speed, obtain a minimum of 5 hydraulic test readings between shutoff head and 25 percent beyond the maximum indicated capacity, and record on data sheets as defined by the Hydraulic Institute Standards;
 - b) For variable speed driven pumps, test each pump between maximum and minimum speed at intervals no greater than 100 RPM;
 - c) Submit pump curves showing head, flow, bhp, NPSHr and efficiency results. The manufacturer's certification shall be visible on each submitted curve;
 - 3) Mechanical testing shall be limited to observation during the hydraulic performance test for any abnormal bearing temperature and pump vibration. Any deficiencies shall be corrected by the manufacturer.
 - 4) NPSHr3
 - a) Perform a net positive suction head required test (NPSHr3), if required by the specific pump Section.
 - b) Acceptance criteria shall be in accordance with ANSI/HI 14.6
 - c) If not required by the specific pump Section, submit the published manufacturer-calculated NPSHr3 curve.
 - 5) Additional tests as indicated in the specific pump specification sections.
- d. Perform tests using the completely assembled project pump, motor, and VFD system (if equipped with variable speed drive). Calibrated factory motor may be used in lieu of project motor subject to approval of the ENGINEER.



- e. Where multiple pumps is required in the project, one project variable speed drive and motor of each size shall be used for testing pumps as completely assembled systems.
- f. Testing of prototype models will not be accepted.
- g. Submit certification signed by a senior official of the pump manufacturer that the required pump shaft horsepower did not exceed the rated motor horsepower of 1.0 service rating at any point on the curve.
- h. No equipment shall be shipped until the test data have been approved by the ENGINEER.

PART 3 - EXECUTION

3.1 MANUFACTURER'S SERVICES

A. Inspection, Startup, and Field Adjustment

1. Where required by the specific pump Section, furnish an authorized service representative of the manufacturer at the Site continuously to supervise the following items and to certify in writing that the equipment and controls have been properly installed, aligned, lubricated, adjusted, and readied for operation:
 - a. installation of the equipment;
 - b. inspection, checking, and adjusting the equipment;
 - c. startup and field testing for proper operation; and
 - d. Performance of field adjustments to ensure that the equipment installation and operation comply with the indicated requirements.

B. Instruction of OWNER's Personnel

1. Where required by the individual pump Section, furnish an authorized training representative of the manufacturer at the Site for the number of Days indicated in the specific pump Section, to instruct the OWNER's personnel in the operation and maintenance of the equipment, including step-by-step troubleshooting with necessary test equipment.
2. Furnish instruction specific to the model of equipment provided.
3. Qualifications
 - a. Furnish a representative with at least 2 years' experience in training.
 - b. Submit a resume for the representative.
4. Schedule the training a minimum of 3 weeks in advance of the first session.
5. Lesson Plan Review



- a. Submit the proposed training material and a detailed outline of each lesson for review.
 - b. Incorporate review comments into the material.
6. The trainees will keep the training materials.
 7. The OWNER may videotape the training for later use with the OWNER's personnel.

3.2 INSTALLATION

A. General

1. Install pumping equipment in accordance with the manufacturer's written recommendations.

B. Alignment

1. Field-test the equipment in order to verify proper alignment and freedom from binding, scraping, shaft run out, or other defects.
2. Measure the pump drive shafts just prior to assembly in order to ensure correct alignment without forcing.
3. Ensure that the equipment is secure in position and neat in appearance.

C. Lubricants

1. Provide the necessary oil and grease for initial operation.

3.3 PROTECTIVE COATING

- A.** Coat materials and equipment in accordance with the requirements of Section 09 96 00 – Protective Coating.

3.4 FIELD TESTS

- A.** Field-test each pump system after installation simulating all of the operational scenarios as specified in order to demonstrate:
 1. satisfactory operation without excessive noise and vibration;
 2. no material loss caused by cavitation;
 3. no overheating of bearings; and,
 4. Meet indicated head, flow, and efficiency at the design point.
- B.** Conduct the following field testing:
 1. Startup, check, and operate the pump system over its entire speed range.



2. If the pump is driven by a variable speed drive, test the pump and motor at 100-RPM increments.
3. If the pump is driven by constant speed, test the pump and motor at the maximum RPM.
4. Unless otherwise indicated, vibration shall be within the amplitude limits recommended by the Hydraulic Institute standards at a minimum of 4 pumping conditions defined by the ENGINEER.
5. Obtain concurrent readings of motor voltage, amperage, pump suction head, and pump discharge head for at least 4 pumping conditions at each pump rotational speed, at 100-RPM increments if equipped with a variable speed drive or at maximum RPM if equipped with a constant speed drive.
6. Check each power lead to the motor for proper current balance.
7. Bearing Temperatures
 - a. Determine bearing temperatures by a contact-type thermometer.
 - b. Precede this test with a run time sufficient to stabilize bearing temperatures, unless an insufficient liquid volume is available to furnish such a run time.
8. Ensure that electrical and instrumentation tests conform to the requirements of the Section under which that equipment is specified.

C. Witnessing

1. Field testing will be witnessed by the ENGINEER.
2. Furnish 3 Days advance notice of field testing.

D. If the pumping system fails to meet the indicated requirements, modify or replace the pump and re-test as indicated above until it satisfies the indicated requirements.

E. Certification

1. After each pumping system has satisfied the requirements, certify in writing that it has been satisfactorily tested and that final adjustments have been performed.
2. Certification shall include the date of the field tests, a listing of persons present during the tests, and the test data.

F. The CONTRACTOR shall be responsible for costs of field tests, including related services of the manufacturer's representative, except for power and water, which the OWNER will bear.

G. If available, the OWNER'S operating personnel will provide assistance in field testing.



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SECTION 43 25 06 - SUBMERSIBLE SOLIDS-HANDLING PUMPS

PART 1 -- PRODUCTS

1.1 THE REQUIREMENT

- A. Furnish, install, and place into service submersible solids-handling pumps and appurtenant WORK, complete and operable, in accordance with the Contract Documents.
- B. The requirements of Section 43 20 00 - Pumps, General apply to this Section.
- C. Require the supplier to examine the Site conditions, intended application, and operation of the pump system and recommend the pump that will best satisfy the indicated requirements.

1.2 EXTENDED PERIOD FOR CORRECTION OF DEFECTS

- A. Correct defects in the pumping system upon notification from the OWNER within 5 years from the date of Substantial Completion. Complete corrections within 5 Days after notification.

PART 2 -- GENERAL

2.1 GENERAL DESCRIPTION

- A. **Operating Conditions:** Furnish pumping units suitable for long-term operation within a sewerage pumping station.
- B. **Performance Requirements:** Furnish pumping units meet the performance requirements as indicated in the drawings.

2.2 PUMP REQUIREMENTS

A. General

1. Furnish pumping units capable of continuous operation at full load with a water level of 36-inches above the invert of the wet pit, without cavitation or overheating of the motor.
2. Furnish pumping units, with cables and appurtenances, that will withstand continuous submergence to a minimum depth of 65-feet, whether running or off, without leakage.
3. Furnish pumping units able to operate for short periods at zero static suction head without causing any damage to any part of the unit.

- B. **Construction:** Furnish pumping units complying with the following construction requirements:

Connections	Machined metal-to-metal quick disconnect type, for withdrawal of unit from above without disconnecting pipe. Furnish pumps which automatically connect and lock into
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	the discharge pipe, allowing for zero leakage at all anticipated pumping heads.
Pump Design	Single stage, centrifugal type, close-coupled to sealed or submersible electric motor, for operation in dry or wet pit, without external cooling.
Impeller	Maximum 3-port non-clog type with replaceable wear rings on impeller and in casing, to handle raw unscreened sewage, solids, and fibrous materials.
Bearings	Permanently-lubricated, heavy-duty axial and radial ball or roller bearings top and bottom, with a minimum L-10 life of 50,000 hours, at continuous, maximum load and speed, supported by detailed calculations, to be submitted with the Shop Drawings.
Seals	Dual mechanical tandem, one stationary and one revolving shaft seals with individual springs, tungsten carbide or silicon carbide ring, each not requiring any maintenance, and capable of withstanding 1.5 times pump shutoff head. Furnish oil lubricated seals, with moisture detector probes, alarm, and test circuits.
Oil Chamber	To supply oil for lubrication and cooling of the shaft seals.
Support	Cast duckfoot bend or discharge elbow with machined face, anchored to sump floor.
Cables	Include necessary cables for power connection, moisture detection, and overload protection, sheathed, coded, and suitable for submersible pumps, and of sufficient length for direct connection to the terminal boxes indicated. Furnish pumping units having cables connected to the pumps and tested at the factory.
Lifting Devices	Type 316 stainless steel guide rails with brackets and stainless steel lifting system of sufficient operating length, or with a stainless steel guide cable system with hooks and tension device, all rated at least 5 times the weight of the pump and motor.

C. Materials

Pump, volute, oil casing, sliding bracket, motor frame	cast iron
Impeller	cast iron, statically and dynamically balanced



Pump shaft	Type 420 stainless steel, shaft sleeves are not acceptable.
Exposed bolts, nuts, washers	Type 316 stainless steel
Mechanical seals	Independently operating tandem tungsten-carbide or silicon carbide and carbon rings with stainless steel springs
Wear rings	Type 304 or 416 stainless steel and nitrile rubber with steel insert, with a Brinnell hardness of 300 on impeller and 350 on case

2.3 MOTOR

- A. **Approval:** Furnish pumping systems, including the motor and wiring, that are listed as approved by a nationally approved testing agency for explosion-proof service. Furnish pumping units listed as complying with the requirements for Class I, Division 1, Group C and D service as determined by the National Electric Code and approved by a nationally recognized testing agency (UL or FM) at the time of opening Bids.
- B. **Insulation:** Provide pumping units with motors designed for continuous duty in hazardous locations. Furnish stator and leads which are moisture-resistant, triple varnished and insulated according to Class F, capable of withstanding a temperature rise of up to 155 degrees C. The allowable temperature rise of the motor at full load condition may not exceed 80 degrees C.
- C. **Stator:** Furnish pumping units having the stators mounted in an air-filled, watertight casing and not held in place by externally-mounted screws which may cause leakage in the motor.
- D. **Motor Rating:** Furnish motors having a service factor of 1.15 or greater. Furnish motors having sufficient horsepower such that the pump motor will be non – overloading throughout the full range of the pump curve.
- E. **Junction Box:** Furnish motors having a junction box capable of being sealed completely from the stator casing to prevent leakage through the junction box into the stator housing should a motor cable be damaged or have some other means to prevent leakage into the junction box under any condition.
- F. **Cable Entry:** Furnish pumps having a cable entry water seal design such that it precludes specific torque requirements to ensure a watertight and submersible seal. Furnish pumps having cable entry seal arrangements which allow no entry of water into any high voltage area even if the cable is severed below the water level.
- G. **Motor Protection:** Furnish pumps having integrated thermal sensors in the motors, one for each phase, to monitor stator temperatures. Furnish these sensors for use



in conjunction with external motor over-current protection located at the control panel.

2.4 PUMP CONTROLS

- A.** Furnish pumps which are compatible with the Control Panel specified in Section 41 90 00 – Process Instrumentation and Controls System.

2.5 SPARE PARTS

- A.** Furnish the following spare parts for each pump:
 1. One set of mechanical shaft seals for each pump.
 2. One set of wear rings for each pump.
 3. One set of bearings for each pump and motor.
 4. Three sets of O-rings and gaskets for each pump.
 5. One submersible cable of required length, with termination kit, for each pump.

2.6 FACTORY TESTING AND SHIPMENT

- A.** In addition to the factory tests in Section 43 20 00, require the supplier to complete the following procedures with the factory test prior to shipment:
 1. Verification of the pump characteristic curves by testing at 1/4, 1/2, 3/4, and full flow and recording the measured head and motor current for each flow.
 2. Verification of cavitation-free service and absence of motor overheating during conditions simulating the actual operating conditions after installation, whether submerged, semi-submerged, or dry.
 3. Submit data on factory testing and quality control of pump seals with the submittals.
 4. Ensure that parts are properly lubricated and protected so that no damage or deterioration will occur even during a prolonged delay from the time of shipment until installation is completed and the pumps are ready for operation.
 5. Protect finished ferrous surfaces not painted to prevent rust and corrosion.
 6. Protect the finished surfaces of exposed flanges by strong wooden blind flanges.
 7. Properly crate each pump to protect against damage during shipment.

2.7 MANUFACTURERS, OR EQUAL

- A. Flygt Corporation**



PART 3 -- EXECUTION

3.1 INSTALLATION

- A.** In addition to the requirements of Section 43 20 00, ensure that anchor bolts are set only after the discharge piping has been properly installed, to ensure exact fit with embedded piping components.

3.2 SERVICES OF MANUFACTURER

- A.** Inspection, Startup, and Field Adjustment: Require the service representative of the manufacturer to be present continuously at the Site to furnish the services required by Section 43 20 00 – Pumps, General.
- B.** Instruction of OWNER'S Personnel: Require the training representative of the manufacturer to be present at the Site for three Days to furnish the services required by Section 43 20 00 – Pumps, General.
- C.** For the purposes of this paragraph, a Day is defined as an 8 hour period at the Site, excluding travel time.
- D.** The ENGINEER may require that the inspection, startup, and field adjustment services above be furnished in three separate trips.

END OF SECTION



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SECTION 43 25 08 – SELF PRIMING SOLIDS HANDLING PUMPS

PART 1 -- PRODUCTS

1.1 THE REQUIREMENT

- A. Furnish, install, and place into service self - priming solids-handling pumps and appurtenant WORK, complete and operable, in accordance with the Contract Documents.
- B. The requirements of Section 43 20 00 - Pumps, General apply to this Section.
- C. Require the supplier to examine the Site conditions, intended application, and operation of the pump system and recommend the pump that will best satisfy the indicated requirements.

1.2 EXTENDED PERIOD FOR CORRECTION OF DEFECTS

- A. Correct defects in the pumping system upon notification from the OWNER within 5 years from the date of Substantial Completion. Complete corrections within 5 Days after notification.

PART 2 -- GENERAL

2.1 GENERAL DESCRIPTION

- A. **Operating Conditions:** Furnish pumping units suitable for long-term operation within a sewerage pumping station.
- B. **Performance Requirements:** Furnish pumping units meet the performance requirements as indicated in the drawings.
- C. **General Description:** Furnish pumping units of the horizontal, self-priming centrifugal type, designed specifically for handling raw, unscreened, domestic sanitary sewage.
- D. **Manufacturer Qualifications:** Furnish pumping units manufactured by ISO 9001:2008 revision certified manufacturer, with scope of registration including design control and service after sales activities.

2.2 PUMP REQUIREMENTS

- A. **Construction:** Furnish pumping units complying with the following construction requirements:

Pump Casing	Cast iron with integral volute scroll, inclusive of mounting feet sized to prevent tipping or binding when pump is completely disassembled for maintenance. Casing to include cover plate, 3 1/2" diameter, which is opened by after loosening a hand nut/clamp bar assembly. In consideration for safety, hand nut threads must provide slow release of pressure, and the clamp bar shall be retained by detente lugs. Furnish Teflon gasket to prevent adhesion of
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	the fill port cover to the casing. Casing to include 1-1/4" Drain Plug to ensure complete and rapid draining.
Fill Port Cover Plate	Lightweight inspection coverplate, retained by acorn nuts, for access to pump interior for removal of stoppages. Designs that require removal of complete coverplate for access to the impeller will not be accepted. Back coverplate removal must allow service to the impeller, seal, wear plate or check valve without removing suction or discharge piping. Back coverplate must incorporate an obstruction free flow path by combining four support posts into a two-point "webbed" plate design for increased durability, reduced clogging, and increased operational efficiency.
Self – Cleaning Wear Plate	Replaceable wear plate secured to the back cover plate by studs and nuts. Self-cleaning design ensuring that debris is cleared away and does not collect on the impeller vanes. Inclusive of integral laser cut notches and grooves in combination with a "tooth" designed to disturb and dislodge any solids which might otherwise remain on the impeller in dynamic operation. Wear plate is designed to clear the eye of the impeller constantly and effectively without the use of blades or cutters.
Rotating Assembly	Complete rotating assembly, which includes impeller, shaft, mechanical shaft seal, lip seals, bearings, seal plate and bearing housing, must be removable as a single unit without disturbing the pump casing or piping. f. Pusher bolt capability to assist in removal of rotating assembly. Pusher bolt threaded holes sized to accept same cap screws as used for retaining rotating assembly.
Impeller	Ductile iron, two-vane, semi-open, non-clog, with integral pump out vanes on the back shroud. Impeller shall thread onto the pump shaft and be secured with a lock screw and conical washer
Mechanical Shaft Seal	Cartridge oil lubricated mechanical type. The stationary and rotating seal faces shall be tungsten titanium carbide alloy. Each mating surface shall be lapped to within three light bands flatness (35 millionths of an inch), as measured by an optical flat under monochromatic light. The stationary seal seat shall be double floating by virtue of a dual O-ring design; an external O-ring secures the stationary seat to the seal plate, and an internal O-ring holds the faces in alignment during periods of mechanical or hydraulic shock (loads which cause shaft deflection, vibration, and axial/radial movement). Elastomers shall be Viton; cage and spring to be stainless steel. Seal shall be oil lubricated from a dedicated reservoir. The same oil shall not lubricate both shaft seal and shaft bearings. Seal shall be warranted in



	accordance with requirements listed as a part of this section.
Bearings	Anti-friction ball type of proper size and design to withstand all radial and thrust loads expected during normal operation. Bearings shall be oil lubricated from a dedicated reservoir. Pump designs which use the same oil to lubricate the bearings and shaft seal shall not be acceptable.
Seal Plate	Seal plate and bearing housing of cast iron Class 30. Separate oil filled cavities, vented to atmosphere, shall be provided for shaft seal and bearings. Cavities must be cooled by the liquid pumped. Three lip seals will prevent leakage of oil. The bearing cavity shall have an oil level sight gauge and fill plug check valve. The clear sight gauge shall provide easy monitoring of the bearing cavity oil level and condition of oil without removal of the fill plug check valve. The check valve shall vent the cavity but prevent introduction of moist air to the bearings. The seal cavity shall have an oil level sight gauge and fill/vent plug. The clear sight gauge shall provide easy monitoring of the seal cavity oil level and condition of oil without removal of the fill/vent plug.
Impeller Face Adjustment	Adjustment of the impeller face clearance (distance between impeller and wearplate) must be accomplished by external means.
Suction Check Valves	Molded neoprene with integral steel and nylon reinforcement, inclusive of blow out center to protect pump from hydraulic shock.
Spool Flanges	One -piece cast iron, class 30 fitted to suction and/or discharge ports. Each spool shall have one 1-1/4" NPT and one 1/4" NPT tapped hole with pipe plugs for mounting gauges or other equipment.

2.3 MOTOR

- A. Each pump shall be provided with a vertical, solid shaft, high efficiency, high thrust TEFC, 480 volt, 3 phase, 60 Hertz heavy duty, electric motor. Each electric motor shall be designed to accept the total unbalanced thrust imposed by the pump.
- B. Electric motor shall be NEMA premium efficiency, squirrel cage induction motor. Motor shall comply with latest edition of NEMA MG-1. Motor shall be designated by the manufacturer as "Severe Duty", or similar, and shall comply with IEEE 841. Motor shall be rated severe duty, 1.15 SF at 40 degrees C. Motor shall have a Class F or better insulation and shall operate at a Class B temperature rise at full load. Motor electrical supply shall be as shown on the drawings. Motor terminal box shall be oversized and complete with grounding terminal.



- C. Motor shall be equipped with a 3 winding thermostat. Motor shall be equipped with a 120V space heater. Motor shall have seals per IEEE 841. Bearings shall have an L-10 life of 100,000 hour. A mechanical non reverse ratchet rated at 100% full load torque shall be provided to prevent reverse rotation due to phase reversal or backspin at shutdown. Motor shall have corrosion resistant drain plugs and 316 stainless steel hardware.

2.4 PUMP CONTROLS

- A. Furnish pumps which are compatible with the Control Panel specified in Section 41 90 00 – Process Controls and Instrumentation Systems.

2.5 SPARE PARTS

- A. Furnish the following spare parts for each pump:
 1. One set of mechanical shaft seals for each pump.
 2. One set of wear rings for each pump.
 3. One set of bearings for each pump and motor.
 4. Three sets of O-rings and gaskets for each pump.
 5. One submersible cable of required length, with termination kit, for each pump.

2.6 FACTORY TESTING AND SHIPMENT

- A. In addition to the factory tests in Section 43 20 00, require the supplier to complete the following procedures with the factory test prior to shipment:
 1. Verification of the pump characteristic curves by testing at 1/4, 1/2, 3/4, and full flow and recording the measured head and motor current for each flow.
 2. Verification of cavitation-free service and absence of motor overheating during conditions simulating the actual operating conditions after installation, whether submerged, semi-submerged, or dry.
 3. Submit data on factory testing and quality control of pump seals with the submittals.
 4. Ensure that parts are properly lubricated and protected so that no damage or deterioration will occur even during a prolonged delay from the time of shipment until installation is completed and the pumps are ready for operation.
 5. Protect finished ferrous surfaces not painted to prevent rust and corrosion.
 6. Protect the finished surfaces of exposed flanges by strong wooden blind flanges.
 7. Properly crate each pump to protect against damage during shipment.



2.7 MANUFACTURERS, OR EQUAL

- A. Gorman Rupp, Mansfield, Ohio.**

PART 3 -- EXECUTION

3.1 INSTALLATION

- A.** In addition to the requirements of Section 43 20 00, ensure that anchor bolts are set only after the discharge piping has been properly installed, to ensure exact fit with embedded piping components.

3.2 SERVICES OF MANUFACTURER

- A.** Inspection, Startup, and Field Adjustment: Require the service representative of the manufacturer to be present continuously at the Site to furnish the services required by Section 43 20 00 – Pumps, General.
- B.** Instruction of OWNER'S Personnel: Require the training representative of the manufacturer to be present at the Site for three Days to furnish the services required by Section 43 20 00 – Pumps, General.
- C.** For the purposes of this paragraph, a Day is defined as an 8 hour period at the Site, excluding travel time.
- D.** The ENGINEER may require that the inspection, startup, and field adjustment services above be furnished in three separate trips.

END OF SECTION



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SECTION 43 30 00 - VALVES, GENERAL

PART 1 -- GENERAL

1.1 THE REQUIREMENT

- A. Provide valves, actuators, and appurtenances, complete and operable, as indicated in accordance with the Contract Documents.
- B. The requirements of Section 46 01 00 – Equipment General Provisions, apply to the WORK of this Section.
- C. The provisions of this Section apply to all valves and valve actuators except where otherwise indicated.
- D. Valves and actuators in particular locations may require a combination of units, sensors, limit switches, and controls, as indicated.

E. Support

- 1. Where a valve is to be supported by means other than the piping to which it is attached, obtain from the valve manufacturer a design for its support and foundation that satisfies the criteria in Section 46 01 00 – Equipment General Provisions.
- 2. Submit the support design, including drawings and calculations sealed by an engineer, with the Shop Drawings.

F. Unit Responsibility

- 1. Assign a single manufacturer to be responsible for the supply, coordination of design, assembly, testing, and furnishing of each valve. Assume the full and sole responsibility for compliance with the requirements of these specifications.

G. Single Manufacturer

- 1. Where 2 or more valves of the same type and size are required, furnish valves manufactured by the same manufacturer.

1.2 CONTRACTOR SUBMITTALS

- A. Furnish submittals in accordance with the requirements of Section 01 33 00 – Contractor Submittals.
- B. Furnish the following information on Shop Drawings:
 - 1. valve name, size, Cv factor, pressure rating, identification number (if any), and specification section number;
 - 2. complete information on the valve actuator, hydraulic power units (HPU), pneumatic air supply system including size, manufacturer, model number, limit switches, and mounting;



3. assembly drawings showing part nomenclature, materials, dimensions, weights, and relationships of valve handles, hand wheels, position indicators, limit switches, integral control systems, needle valves, and control systems;
 4. A valve-labeling schedule, listing the valves to be furnished with stainless steel tags, indicating in each case the valve location and the proposed wording for the label.
- C. Furnish a technical manual containing the required information for each valve, as indicated.
- D. Furnish a spare parts list, containing the required information for each valve assembly, as indicated.
- E. Factory Test Data
1. Where indicated, submit signed, dated, and certified factory test data for each valve requiring certification, before shipping the valve.
 2. Furnish a certification of quality and test results for factory-applied coatings.
- F. Field Test Data
1. Submit signed, dated, and certified field test data for each valve.

PART 2 -- PRODUCTS

2.1 PRODUCTS

A. General

1. Provide valves and gates of new and current manufacture.
2. Provide valves 6-inch and larger with actuators with position indicators.
3. Unless otherwise indicated, provide valve actuators in accordance with Section 43 30 12 – Valve and Gate Actuators.

B. Protective Coating

1. Coat the exterior surfaces of valves and the wet interior surfaces of ferrous valves of sizes 2-inch and larger in accordance with the requirements of Section 09 96 00 – Protective Coating.
2. Require the manufacturer to certify in writing that the required coating has been applied and tested in the manufacturing plant prior to shipment, in accordance with the indicated requirements.
3. Do not coat the machined flange faces of valves except where such flanges are not adjoining a mating flange as shown in the Contract Documents. Apply rust inhibitor coating on machined surfaces of the flange prior to shipment.

C. Valve Labeling



1. Except when such requirement is waived by the ENGINEER in writing, provide a label on shut-off valves and control valves except for hose bibbs and chlorine cylinder valves.
2. Furnish a label composed of 1/16-inch plastic or stainless steel, a minimum of 2 inches by 4 inches in size, as indicated in Section 43 10 51 – Piping Identification Systems, and permanently attached to the valve or on the wall adjacent to the valve as directed by the ENGINEER.

D. Valve Testing

1. As a minimum, unless otherwise indicated or recommended by the reference standards, test valves 3 inches in diameter and smaller in accordance with the manufacturer's standard procedure.
2. Factory-test valves 4 inches in diameter and larger as follows:
 - a. Hydrostatic Testing
 - 1) Subject valve bodies to an internal hydrostatic pressure equivalent to twice the water-rated pressure of the valve.
 - 2) Base metallic valves rating pressures at 100 degrees F.
 - 3) Base plastic valve rating pressures at 73 degrees F, or at a higher temperature according to material type.
 - 4) During the hydrostatic test, allow no visible leakage through the valve body, end joints, or shaft seals, nor may any part of the valve be permanently deformed.
 - 5) Allow test duration of at least 10 minutes, in order to allow visual examination for leakage.
 - b. Seat Testing
 - 1) Test the valves for leaks in the closed position, with the pressure differential across the seat equal to the water rated pressure of the valve.
 - 2) Provide test duration of at least 10 minutes, in order to allow visual examination for leakage.
 - 3) Take the leakage rate to be the more stringent of the following:
 - a) As recommended by the reference standard for that type of valve; or
 - b) Leakage past the closed valve not to exceed one fluid ounce per hour per inch diameter for metal seated valves, and drop-tight for resilient seated valves.
 - c. Performance Testing



- 1) Shop-operate the valves from the fully-closed to the fully-open position, and reverse under no-flow conditions in order to demonstrate that the valve assembly operates properly.

E. Certification

1. Prior to shipment of valves with sizes larger than 12-inches in diameter, submit certified, notarized copies of the hydrostatic factory tests, showing compliance with the applicable standards of AWWA, ANSI, or ASTM.

F. Valve Markings

1. Permanently mark valve bodies in accordance with MSS SP25 - Standard Marking Systems for Valves, Fittings, Flanges, and Unions.

2.2 MATERIALS

A. General

1. Provide materials suitable for the intended application.
2. Provide materials in contact with potable water listed as compliant with NSF Standard 61.
3. Ensure that materials not indicated are of high-grade standard commercial quality, free from defects and imperfections that might affect the serviceability of the product for the purpose for which it is intended.
4. Unless otherwise indicated, provide valve and actuator bodies conforming to the following requirements:
 - a. 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
 - b. Ductile Iron: ASTM A 536 - Ductile Iron Castings, or to ASTM A 395 - Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures
 - c. 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
 - d. Bronze: ASTM B 62 - Composition Bronze or Ounce Metal Castings, and valve stems not subject to dezincification conforming to ASTM B 584 - Copper Alloy Sand Castings for General Applications. Provide bronze materials which are lead free in when in contact with potable water as required by the Lead Reduction Act.
 - e. Stainless Steel: Stainless steel valve and operator bodies and trim confirming to ASTM A 351 - Steel Castings, Austenitic, for High-Temperature Service, Grade CF8M, or Type 316 stainless steel



- f. PVC: Polyvinyl chloride materials for valve body, flanges, and cover conforming to Cell Classification 12454
- g. CPVC: Chlorinated Poly Vinyl Chloride materials for valve body, flanges, and cover conforming to Cell Classification 23447
- h. NSF Standard 61: Provide materials listed as compliant with NSF 61 for use in contact with potable water.
- i. Provide elastomeric materials for seat, seals and O-rings which are compatible with temperature, pressures and fluid or gas service.
 - 1) Elastomeric materials for water with chloramines: provide Teflon or Viton-A.
 - 2) Elastomeric materials for water with dissolved ozone residual: Provide Teflon suitable for ozone service.
 - 3) Elastomeric materials for oxygen (LOX or GOX): Provide Teflon specially manufactured and packaged suitable for oxygen service.

2.3 VALVE CONSTRUCTION

A. Bodies

1. Provide valve bodies that are cast, molded (in the case of plastic valves), forged, or welded, of the materials indicated, and with smooth interior passages.
2. Provide wall thicknesses uniform and in agreement with the applicable standards for each type of valve, without casting defects, pinholes, and other defects that could weaken the body.
3. Perform welds on welded bodies by certified welders and ground welds smooth.
4. Provide valve ends as indicated, and rated for the maximum temperature and pressure to which the valve will be subjected.

B. Valve End Connections

1. Unless otherwise indicated, valves 2-1/2 inches in diameter and smaller may be provided with threaded end connections.
2. Provide valves 3 inches in diameter and larger with flanged end connections.
3. Provide flanges, bolts and gaskets conforming with the requirements of Section 43 10 50 - Piping, General.

C. Bonnets

1. Connect valve bonnets to the body by clamping, screwing, or flanging.



2. Provide bonnets of the same material, temperature, and pressure rating as the body.
3. Make provisions for the stem seal with the necessary glands, packing nuts, and yokes.

D. Stems

1. Provide valve stems of the materials indicated, or, if not indicated, of the best commercially-available material for the specific service, with adjustable stem packing, O-rings, chevron V-type packing, or other suitable seal. Provide NSF 61 approved and lead free materials for bronze in contact with potable water. Provide elastomeric materials which are completely compatible with fluid service.

E. Stem Guides

1. Provide stem guides spaced with an L/R ratio not to exceed 200:1. Submit calculations for L/R ratios and guide spacing to the ENGINEER for review.
2. Provide stem guides with slotted holes and that are adjustable in two directions.
3. Construct submerged stem guides from Type 304 stainless steel.

F. Internal Parts

1. Provide internal parts and valve trim as indicated for each individual valve.
2. Where not indicated, construct valve trim from Type 316 stainless steel or other material best-suited for the intended service.

G. Nuts and Bolts

1. Unless otherwise indicated, provide nuts and bolts on valve flanges and supports in accordance with the requirements of Section 05 50 00 – Miscellaneous Metalwork and Section 43 10 50 – Piping, General.

2.4 TORQUE TUBES

- A.** Supply submerged or buried valves with a remote gearbox and actuator with a torque tube to transfer torque from the actuator to the valve. Provide tubes directly connected to the valve and the floor stand and gear actuator. Size each torque tube and floor stand to operate under the maximum service conditions for the valve. Unless otherwise indicated, provide torque tubes fabricated of schedule 40, steel pipe with epoxy coating suitable for the fluid service. Ensure that each submerged valve, torque tube, floor stand and actuator is pre-assembled and “matched marked” in the manufacturer’s shop to ensure proper fit when assembled in field.



2.5 EXTENSION SHAFT STEM

- A. Supply valves mounted in dry areas with gearbox attached to the valve and with remote actuator with an extension shaft stem with universal joint attached to the gear and actuator. Size all components to operate under the maximum service conditions for the valve. Unless otherwise indicated, provide shaft stem and universal joints of carbon steel with epoxy coating suitable for the fluid service. Ensure that each valve, shaft stem, floor stand and actuator are pre-assembled and "matched marked" in the manufacturer's shop to ensure proper fit when assembled in field.

2.6 VALVE ACTUATORS

- A. Provide valve actuators and as specified herein and conforming with the requirements of Section 43 30 12 – Valve and Gate Actuators

2.7 VALVE ACCESSORIES

- A. Provide valves complete with the accessories required to provide a functional system.

2.8 SPARE PARTS

- A. Furnish the required spare parts, suitably packaged and labeled with the valve name, location, and identification number.
- B. Furnish the name, address, and telephone number of the nearest distributor for the spare parts of each valve.
- C. Spare parts are intended for use by the OWNER, after expiration of the correction of defects period.

2.9 RUBBER FLAPPER SWING CHECK VALVES

- A. **General:** Provide rubber flapper swing check valves for water, sewage, sludge, and abrasives having full pipe size flow areas, one moving part only, and body seats at 45 degrees to permit horizontal and vertical up-flow. Provide valves designed for a minimum water-working pressure of 150 psi, with a flanged cover plate holding down the rubber flapper. Provide valves of a non-clog design.
- B. **Body:** Provide having valve bodies and covers manufactured of cast iron conforming to ASTM A 126 with flanged ends conforming to ASME B 16.1. Provide valves having threaded tapping in the bottom of the body for insertion of a back-flow device, and provision for mounting of a signal switch.
- C. **Disc:** Provide valves having valve disc or flapper of Buna-N or other best-suited elastomer one-piece construction, precision molded, with integral O-ring type sealing surface, steel and nylon or fabric reinforced, with non-slam closing action through a 35 degree disc stroke, for bubble-tight shut off at high and low pressures.
- D. **Manufacturers, or Equal**



1. **APCO (Valve and Primer Corporation)**
2. **VAL-MATIC (Valve and Manufacturing Corporation)**

2.10 ECCENTRIC PLUG VALVES (1/2-inch to 72-inches)

- A. Construction:** Provide eccentric plug valves of the non-lubricated, eccentric plug design with cast iron bodies conforming to ASTM A 126 - Gray Iron Castings for Valves, Flanges, and Pipe Fittings, with ANSI 125 lb. flanged ends for valves 3-inches and larger, and screwed or flanged ends for smaller sizes. Provide valves having plugs of cast iron or ductile iron conforming to ASTM A 536 - Ductile Iron Castings. Provide valves having lugs lined with a resilient coating, best suited for the specific service. Provide valves lined with a suitable elastomer, where required for a special service, epoxy-lined in accordance with Section 09 96 00 - Protective Coating. Provide valves with seats of nickel or stainless steel welded to the body. Provide valves having top and bottom shaft bearings of permanently lubricated stainless steel or Teflon coated stainless steel. Provide valves having grit seals of Teflon, Nylatron, or similar suitable material at the top and bottom plug journals. For valves up to and including 20-inches in size, valves having an unobstructed port area of not less than 80 percent of full pipe area. For larger valves provide valves having an unobstructed port area not less than 70 percent for larger valves. Provide plug valves having a pressure rating of not less than 150 psi WOG, for bubble-tight shut-off in the standard flow direction, and 25 psi WOG in the reverse flow direction. When equipped with worm gear actuator, provide valves having pressure rating of 150 psi WOG in both directions. Provide valves having stem seals consisting of field adjustable packing, replaceable without removal of the actuator, or of self-adjusting U-cup packing.
- B. Actuators:** Unless otherwise indicated, provide eccentric plug valves 3-inches and smaller with operating levers. For larger valves, provide valves with worm-gear actuators. Provide valve actuators complying with the requirements with Section 43 30 12 - Valves and Gate Actuators.
- C. Manufacturers, or Equal**
1. **DeZurik Corporation**
 2. **Clow Valve Company**
 3. **Val – Matic**

2.11 RESILIENT-SEATED GATE VALVES

- A. General:** Provide resilient-seated gate valves.
- B.** For 250-psig applications, consult the valve manufacturer and revise this Section accordingly.
- C. Construction:** Provide resilient-seated gate valves conforming to the requirements of AWWA C509 - Resilient-Seated Gate Valves for Water and Sewerage Systems or AWWA C515 - Reduced-Wall, Resilient-Seated Gate Valves



for Water Supply Service. Furnish valves suitable for a minimum design working water pressure of 150 psig, with flanged, bell and spigot, or mechanical joint ends. Provide valves having valve body, bonnet, and disc manufactured of cast iron or ductile iron. Provide valves having rubber coated disc or bodies. Furnish valves having body and bonnet wall thickness equal to or greater than the minimum wall thickness as listed in Table 1 of AWWA C509 or AWWA C515. Provide valves having stem, stem nuts, glands, and bushings manufactured bronze, with the stem seal per AWWA C509 or AWWA C515.

D. Pressure Ratings:

1. AWWA C509 valves that are 3, 4, 6, 8, and 12 inches in size: Provide valves rated for 200 psig minimum design working water pressure. For 16-, 20-, 24-, and 30-inch valves, provide valves rated for 150 psig minimum design working water pressure.
2. AWWA C515 valves 3- through 36-inch with outside screw-and-yoke (OS&Y) rising stem and 3- through 16-inch for non-rising-stem (NRS): Provide valves be rated for 200 psig minimum design working water pressure.

E. Protective Coating: Provide valves that have been factory coated in accordance with Section 09 96 00 - Protective Coating. Submit a test report from a coating inspector that the coating is holiday-free. The CONTRACTOR may retain the services of a third party coating applicator to achieve the holiday-free requirement.

F. Actuators: Unless otherwise indicated, provide resilient-seated gate valves having manual actuators in accordance with Section 43 30 12 - Valve and Gate Actuators.

G. Manufacturers, or Equal

1. **Mueller Company**
2. **M & H**
3. **Clow**

2.12 AIR-VACUUM AND AIR-RELEASE VALVES

A. Air and Vacuum Valves: Provide air and vacuum valves capable of venting large quantities of air while pipelines are being filled, and allowing air to re-enter while pipelines are being drained. Provide valves of the size indicated, with flanged or screwed ends to match piping. Provide valves having bodies manufactured of high strength cast iron. Provide valves having float, seat, and moving parts constructed of Type 316 stainless steel. Provide valves having washers and gaskets of a material ensuring water tightness with a minimum of maintenance. Provide valves designed for a minimum of 150 psi water-working pressure, unless otherwise indicated.

B. Air-Release Valves: Provide air-release valves which vent accumulating air while system is in service under pressure and be of the size indicated. Provide valves meeting the same general requirements as indicated for air and vacuum valves



except that the vacuum feature will not be required. Provide valves designed for a minimum water-working pressure of 150 psi, unless otherwise indicated.

- C. Combination Air Valves:** Provide combination air valves which combine the characteristics of air and vacuum valves and air release valves by exhausting accumulated air in systems under pressure and releasing or re-admitting large quantities of air while a system is being filled or drained, respectively. Provide valves having the same general requirements as indicated for air and vacuum valves.
- D. Sewage Air Release Valves:** Provide sewage air release valves which vent accumulating gases during system operation. Provide valves having long float stems and bodies to minimize clogging. Provide valves meeting the same general requirements as indicated for air and vacuum valves. Furnish each sewage air release valve with the following backwash accessories, fully assembled on the valve:
 - 1. Inlet shut-off valve.
 - 2. Blow-off valve.
 - 3. Clear water inlet valve.
 - 4. Rubber supply hose.
 - 5. Quick disconnect couplings.
- E. Manufacturers, or Equal**
 - 1. **APCO (Valve and Primer Corporation)**
 - 2. **Val-Matic (Valve and Manufacturing Corporation)**

PART 3 -- EXECUTION

3.1 VALVE INSTALLATION AND TRIAL OPERATION

A. General

- 1. Install valves, actuating units, stem extensions, valve boxes, and accessories in accordance with the manufacturer's written instructions and as indicated.
- 2. Adequately brace gates in order to prevent warpage and bending under the intended use.
- 3. Firmly support valves in order to avoid undue stresses on the pipe.

B. Access

- 1. Install valves in a manner to provide easy access for actuation, removal, and maintenance, and to avoid interference between valve actuators and structural members, handrails, and other equipment.

C. Valve Accessories



1. Where combinations of valves, sensors, switches, and controls are indicated, properly assemble and install such items such that systems are compatible and operating properly.
2. Clearly note the relationship between interrelated items on Shop Drawing submittals.

D. Trial Operation

1. After installation, schedule trial operation witnessed by the ENGINEER and the OWNER representative.
2. Clean all thoroughly of all foreign materials and make final adjustments. Operate all valves through one complete cycle from a fully closed position to a fully open position and back to a fully closed position to verify that the assembly is functional.
3. For control valves that operate in multiple operating scenarios, all operational scenarios including the hydraulic power units, pilot control system or pneumatic air supply system to demonstrate compliance to the specifications.
4. Conduct a field leakage test meeting the maximum allowable specified requirement.
5. Furnish test certificate signed by the valve manufacturer and the CONTRACTOR to the ENGINEER.

END OF SECTION



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SECTION 43 30 12 - VALVE AND GATE ACTUATORS

PART 1 -- GENERAL

1.1 THE REQUIREMENT

- A. Provide valve and gate actuators and appurtenances, complete and operable, as indicated in accordance with the Contract Documents.
- B. The provisions of this Section apply to valves and gates except where otherwise indicated in the Contract Documents.
- C. Unit Responsibility
 - 1. Make the valve or gate manufacturer responsible for the coordination of design, assembly, testing, and installation of actuators on the valves and gates; however, the CONTRACTOR is responsible to the OWNER for compliance of the valves, gates, and actuators with the Contract Documents.
- D. Where 2 or more valve or gate actuators of the same type or size are required, provide actuators produced by the same manufacturer.

1.2 CONTRACTOR SUBMITTALS

- A. Furnish submittals in accordance with the requirements of Section 01 33 00 – Contractor Submittals and Section 43 30 00 – Valves, General.
- B. Submit Shop Drawing information for actuators with the valve and gate submittals as a complete package.
- C. Submit calculations showing dynamic seating and unseating torques versus the output torque of the actuator.

PART 2 -- PRODUCTS

2.1 GENERAL

- A. Unless otherwise indicated, provide shut-off and throttling valves and externally actuated valves and gates with manual or power actuators.
- B. Provide actuators complete and operable with mounting hardware, motors, gears, controls, wiring, solenoids, hand wheels, levers, chains, and extensions, as applicable.
- C. Provide actuators with torque ratings equal to or greater than required for valve seating and dynamic torques, whichever is greater, and capable of holding the valve in any intermediate position between fully-open and fully-closed without creeping or fluttering.
- D. Manufacturers



1. Where indicated, certain valves and gates may be provided with actuators manufactured by the valve or gate manufacturer.
2. Where actuators are furnished by different manufacturers, coordinate the selection to result in the fewest number of manufacturers possible.

E. Materials

1. Provide actuators of current models, of the best commercial quality materials, and liberally sized for the required torque.
2. Provide materials suitable for the environment in which the valve or gate is to be installed.

F. Actuator Mounting and Position Indicators

1. Securely mount actuators by means of brackets or hardware specially designed and sized for this purpose and of ample strength.
2. Cast the word "OPEN" on each valve or actuator, with an arrow indicating the direction to open in the counter-clockwise direction.
3. Equip gear and power actuators with position indicators.
4. Where possible, locate manual actuators between 48 and 60 inches above the floor or the permanent working platform.

G. Provide fasteners in accordance with the requirements of Section 05 50 00 – Miscellaneous Metalwork.

H. Provide coatings in accordance with the requirements of Section 09 96 00 – Protective Coating.

2.2 MANUAL ACTUATORS

A. General

1. Unless otherwise indicated, provide valves and gates with manual actuators.
2. Provide valves in sizes up to and including 4 inches with direct-acting lever or hand wheel actuators of the manufacturer's best standard design.
3. Provide valves and gates larger than 4-inch with gear-assisted manual actuators, with an operating pull of maximum 60 pounds on the rim of the hand wheel.
4. Provide buried and submerged gear-assisted valves, gates, gear-assisted valves for pressures higher than 250 psig, valves 30 inches in diameter and larger, and where indicated, with worm gear actuators, hermetically-sealed water-tight and grease-packed.



5. Valves 6-inch to 24-inch diameter may be provided with traveling-nut actuators, worm gear actuators, spur or bevel gear actuators, as appropriate for each valve.

B. Buried Valves

1. Unless otherwise indicated, provide buried valves with extension stems to grade, with square nuts or floor stands, position indicators, and cast-iron or steel pipe extensions with valve boxes, covers, and operating keys.
2. Where indicated, provide buried valves in cast-iron, concrete, or similar valve boxes with covers of ample size in order to allow operation of the valve actuators.
3. Permanently label the valve box covers as required by the local Utility Company or the ENGINEER.
4. Provide wrench-nuts in compliance with AWWA C 500 - Metal-Seated Gate Valves for Water Supply Service.
5. Size the tee wrenches such that the tee handle will be 2 to 4 feet above ground, and to fit the operating nuts.

C. Manual Worm Gear Actuator

1. Provide an actuator consisting of a single- or double-reduction gear unit contained in a weatherproof cast iron or steel body with cover, and a minimum 12-inch diameter handwheel.
2. Provide the actuator to be capable of a 90-degree rotation, and equip the actuator with travel stops capable of limiting the valve opening and closing.
3. Provide the actuator with spur or helical gears and worm gearing.
4. Provide a self-locking gear ratio in order to prevent "back-driving."
5. Construct the spur or helical gears of hardened alloy steel, and the worm gear of alloy bronze.
6. Construct the worm gear shaft and the hand wheel shaft from 17-4 PH or similar stainless steel.
7. Accurately cut gearing with hobbing machines.
8. Use ball or roller bearings throughout.
9. Provide the output shaft end with a spline in order to allow adjustable alignment.
10. Actuator output gear changes must be mechanically possible by simply changing the exposed or helical gearset ratio without further disassembly of the actuator.



- 11. Design gearing for a 100 percent overload.
- 12. Provide sealed weatherproof entire gear.
- D. Design and rate buried gear actuators for buried service, provide with a stainless steel input shaft, and double-seal on shaft and top cap.

PART 3 -- EXECUTION

3.1 INSTALLATION

- A. Install valve and gate actuators and accessories in accordance with the requirements of Section 43 30 00 – Valves, General.
- B. Locate the actuators to be readily accessible for operation and maintenance without obstructing walkways.
- C. Do not mount actuators where shock or vibrations will impair their operation, and do not attach the support systems to handrails, process piping, or mechanical equipment.

END OF SECTION



SECTION 46 01 00 – EQUIPMENT GENERAL PROVISIONS

PART 1 -- GENERAL

1.1 THE REQUIREMENT

- A. Provide equipment and appurtenant WORK, complete and operable, in accordance with the Contract Documents.
- B. Apply this Section to all equipment except where otherwise indicated.
- C. **Equipment Arrangement:** Unless specifically indicated otherwise, the arrangement of equipment shown on the Drawings is based upon information available at the time of design and is not intended to show exact dimensions particular to a specific manufacturer in all cases. Some aspects of the Drawings are diagrammatic and some features of the illustrated equipment arrangement may require revision to meet the actual equipment requirements. Structural supports, foundations, piping and valve connections, and electrical and instrumentation connections indicated may have to be altered to accommodate the equipment provided. No additional payment will be made for such revisions and alterations. Submit substantiating calculations and drawings prior to beginning the installation of equipment.

1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Provide equipment in accordance with the following standards, as applicable and as indicated in each equipment specification:
 - 1. American Society for Testing and Materials (ASTM).
 - 2. American National Standards Institute (ANSI).
 - 3. American Society of Mechanical Engineers (ASME).
 - 4. American Water Works Association (AWWA).
 - 5. American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE).
 - 6. American Welding Society (AWS).
 - 7. National Fire Protection Association (NFPA).
 - 8. Federal Specifications (FS).
 - 9. National Electrical Manufacturers Association (NEMA).
 - 10. Manufacturer's published recommendations and specifications.
 - 11. General Industry Safety Orders (OSHA).
- B. The following standards are referenced in this Section:



ASME B16.1	Cast Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250, and 800
ASME B16.5	Pipe Flanges and Flanged Fittings, Steel, Nickel Alloy and other Special Alloys
ASME B46.1	Surface Texture
ANSI S12.6	Method for the Measurement of the Real-Ear Attenuation of Hearing Protectors
ASME B1.20.1	General Purpose Pipe Threads (Inch)
ASME B31.1	Power Piping
AWWA C206	Field Welding of Steel Water Pipe
AWWA C207	Steel Pipe Flanges for Waterworks Service - Sizes 4 In. Through 144 In. (100 mm through 3,600 mm)
AWWA D100	Welded Steel Tanks for Water Storage
ASTM A 48	Gray Iron Castings
ASTM A 108	Steel Bars, Carbon, Cold-Finished, Standard Quality

1.3 CONTRACTOR SUBMITTALS

- A. Provide submittals, samples for testing, and testing of materials in accordance with Section 01 33 00 – Contractor Submittals.

1.4 QUALITY ASSURANCE

- A. **Costs:** Be responsible for performing and paying the costs of inspection, startup, testing, adjustment, and instruction services performed by factory representatives. The OWNER will pay for costs of power and water. If available, the OWNER's operating personnel will provide assistance in the field testing.
- B. **Inspection:** Inform the local authorities, such as building and plumbing inspectors, fire marshal, OSHA inspectors, and others, to witness required tests for piping, plumbing, fire protection systems, pressure vessels, safety systems, and related items to obtain required permits and certificates, and pay inspection fees.
- C. **Quality and Tolerances:** Show and closely adhere to tolerances and clearances 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 that are homogeneous and free from non-metallic inclusions and defects. Clean to remove foundry irregularities on surfaces of castings which are not machined. 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. Bear responsibilities for the costs of casting new material as part of the WORK.
 3. Provide materials that meet the physical and mechanical properties in accordance with the reference standards.
- D. Machine Finish:** Utilize the types of finishes most suitable for the application and show in micro-inches in accordance with ANSI B46.1. Utilize the following finishes:
1. Require surface roughness not greater than 63 micro-inches for surfaces in sliding contact.
 2. Require surface roughness not greater than 250 micro-inches for surfaces in contact where a tight joint is not required.
 3. Require rough 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 not greater than 32 micro-inches.

PART 2 -- PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Noise Level:** Do not exceed the OSHA noise level requirement of 105 dBA for one hour exposure per day on any single piece of equipment.
- B. High Noise Level Location:** Provide one personal hearing protection station at each high noise level location. Locations are defined as follows:
 1. Outdoor Location: Any single equipment item or any group of equipment items that produce noise exceeding OSHA noise level requirements for a 2 hour exposure. Where such equipment is separated by a distance of more than 20-feet, measured between edges of footings, provide each group of equipment with a separate hearing protection station.
 2. Indoor Location
 - a. Any single equipment item or any group of equipment items located



within a single room not normally occupied, that produces noise exceeding OSHA noise level requirements for a 2 hour exposure.

- b. Any single equipment item or any group of equipment items located within a single room normally occupied by workers, that produces noise exceeding OSHA noise level requirements for an 8 hour exposure.

C. Personal Hearing Protection: Furnish 3 pairs of high attenuation hearing protectors in the original unopened packaging. Provide ear protectors that meet the requirements of ANSI S12.6 and produce a noise level reduction of 25 dBA at a frequency of 500 Hz. Provide hearing protectors with fluid filled ear cushions and an adjustable, padded headband. Store the protectors in a weatherproof, labeled, steel cabinet, provided at an approved location near the noise producing equipment.

D. Drive Trains and Service Factors: Apply service factors in the selection or design of mechanical power transmission components. All components of drive train assemblies between the prime mover and the driven equipment must be designed and rated to deliver the maximum peak or starting torque, speed, and horsepower. Consider all 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, apply the following load classifications in determining service factors:

Type of Equipment	Service Factor	Load Classification
Blowers centrifugal or vane lobe	1.0 1.25	Uniform Moderate Shock
Centrifugal Fans	1.0	Uniform
Reciprocating Compressors Air multi-cylinder single-cylinder	2.0 2.0	Heavy Shock Heavy Shock
Pumps centrifugal or rotary reciprocating cavity progressing	1.0 1.8 1.0	Uniform Moderate Shock Uniform
Mixers constant density variable density rapid mixer flocculator	1.0 1.25 1.25 1.25	Uniform Moderate Shock Moderate Shock Moderate Shock



sludge mixer surface aerator	2.5 2.5	Moderate Shock Heavy Shock
Clarifiers	1.0	Uniform
Sludge Thickeners	1.25	Moderate Shock
Vacuum Filters	1.25	Moderate Shock
Dewatering Screws	1.25	Moderate Shock
Grit Handling Equipment	1.25	Moderate Shock
Mechanical Bar Screens	1.0	Uniform
Scum Breakers	1.25	Moderate Shock
Cranes or Hoists	1.25	Moderate Shock

E. Mechanical Service Factors

	Mechanical Service Factors	
	Electric Motor	Internal Combustion Engine
Uniform	1.25	1.50
Moderate Shock	1.50	1.75
Heavy Shock	2.00	2.25

F. For thermal rating adjustments such as start frequency, ambient temperature, and hourly duty cycle factor, ventilation factor, and fan factor, refer to gear manufacturer sizing information.

G. Where load classifications are not indicated, utilize service factors for standard load classifications and for flexible couplings.

H. Welding: Unless otherwise indicated, conform welding to the following:

1. Latest revision of AWWA D100.
2. Latest revision of AWWA C206.
3. Provide continuous seal welds to prevent entrance of air or moisture for 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.
4. Utilize 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 welding. Deem welders qualified in accordance with AWS Standards.

5. In assembly and during welding, adequately clamp, support and restrain the component parts to minimize distortion and for control of dimensions. Utilize 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. Ground sharp corners of material that are to be painted or coated to a minimum of 1/32-inch on the flat.
- I. **Protective Coating:** Paint or coat 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.
- J. **Protection of Equipment:** Box, crate, or otherwise protect equipment from damage and moisture during shipment, handling, and storage. Protect equipment from exposure to corrosive fumes and keep thoroughly dry at all times. Store pumps, motors, drives, electrical equipment, and other equipment having anti-friction or sleeve bearings in weathertight storage facilities prior to installation. For extended storage periods, plastic equipment wrappers should be avoided, to prevent accumulation of condensate in gears and bearings. Energize motor space heaters and rotate shafts. Reject any equipment delivered to the Site with rust or corroded parts. Disassemble, clean, and recoat equipment that develops defects during storage and restore to original condition.
- K. Identification of Equipment Items
 1. Ensure each item of equipment has a legible identifying mark which corresponds to the equipment number in the Contract Documents for the particular item at the time of shipping.
 2. After installation, give each item of equipment a permanent identification.
- L. **Vibration Isolators:** Provide air compressors, blowers, engines, inline fans with restrained spring-type vibration isolators or pads per manufacturer's written recommendations. Provide vibration isolations with seismic restraint.
- M. **Shop Fabrication:** Perform shop fabrication in accordance with the Contract Documents and the Shop Drawings.
- N. **Controls:** Provide equipment and system controls in accordance with the electrical and control panel specifications.

2.2 EQUIPMENT SUPPORTS AND FOUNDATIONS

- A. **Equipment Supports:** Adequately design equipment supports, anchors, and restrainers for static, dynamic, wind, and seismic loads unless otherwise indicated. Design horizontal seismic force for the greater of: that noted in the general structural notes or as required by the governing building code, or



10 percent of gravity. Submit design calculations for equipment supports with the signature and seal of an engineer registered in the State wherein the project is to be built, unless otherwise indicated. Provide calculations which account for forces and distribution of forces on supporting structures resulting from normal operation, normal operation plus seismic loadings, and normal operation plus wind loadings.

1. Provide wall-mounted equipment weighing more than 250 pounds or which is within 18-inches above the floor with fabricated steel supports. Utilize welded steel pedestals. If the supported equipment is a panel or cabinet or is enclosed with removable sides, match the pedestal with the supported equipment in appearance and dimensions.
2. Seismic requirements: Anchor freestanding and wall-hung equipment in place by methods that satisfy the building code. Perform, sign and stamp calculations for equipment weighing more than 400 pounds. Calculate and analyze lateral and overturning forces and include a factor of safety against overturning equal to 1.5. Include calculations for the distribution of forces imposed on the supporting structure and anchors, verifying that each anchor can develop the required resistance forces.
3. Wind requirements: Anchor exterior freestanding equipment in place by methods that satisfy the building code. Perform, sign and stamp calculations by analyzing lateral and overturning forces and include a factor of safety against overturning equal to 1.5. Calculate utilizing the distribution of forces imposed on the supporting structure and anchors, verifying that each anchor can develop the required resistance forces.

B. Anchors: Provide anchor bolts in accordance with Section 05 50 00 - Miscellaneous Metalwork. Determine the size, type, capacity, location, and other placement requirements of anchorage elements. Follow anchoring methods and leveling criteria in the manufacturer's literature. Submit methods and criteria with the Shop Drawings.

C. Equipment Foundations: Mount mechanical equipment, tanks, control cabinets, enclosures, and related equipment on minimum 3.5-inch high concrete bases, unless otherwise indicated. Equipment foundations are indicated on Drawings. Verify the size and weight of equipment foundation to insure compatibility with equipment through the equipment manufacturer.

2.3 COUPLINGS

A. Provide mechanical couplings between the driver and the driven equipment. Provide flexible couplings between the driver and the driven equipment to accommodate slight angular misalignment, parallel misalignment, end float, and to cushion shock loads. Unless otherwise indicated or recommended by the equipment manufacturer, furnish coupling type with the respective equipment as follows:

Equipment Type	Coupling Type
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Horizontal and end suction pumps	Gear or flexible spring
Vertical turbine pumps	3 piece spacer for solid shaft or double nut for hollow shaft
Vertical nonclog pumps, close coupled	Flexible disc pack
Screw pumps	Flexible spring, gear coupling, fluid coupling
Vertical nonclog pumps with extended shaft	Flexible disc pack or Universal joint with carbon fiber composite shaft and steady bearing support(s)
Belt conveyors	Gear coupling for fractional to 7.5 horsepower, Silicone filled fluid coupling for 10 hp and larger
Sludge collector	Gear coupling or jaw clutch
Engine driven pumps	Universal joint type or elastomeric flexible type
Single stage centrifugal blowers	Flexible disc pack
Air compressors	Gear or flexible disc pack

- B. Determine each coupling size based on the rated horsepower of the motor, speed of the shaft, and the load classification service factor. Request the equipment manufacturer to select or recommend the size and type of coupling required to suit each specific application.
- C. **Differential Settlement:** Provide 2 sets of universal type couplings where differential settlement between the driver and the driven equipment may occur.
- D. **Taper-Lock** or equal bushings may be used to provide for easy installation and removal of shafts of various diameters.

2.4 SHAFTING

- A. **General:** Provide continuous shafting between bearings and size to transmit the power required. Accurately cut keyways in line. Do not turn shafting down at the ends to accommodate bearings or sprockets whose bore is less than the diameter of the shaft. Allow shafts to rotate in the end bearings and ensure they are turned and polished, straight, and true.
- B. **Design Criteria:** Design all shafts to carry the steady state and transient loads suitable for unlimited number of load applications, in accordance with ASME



B106.1M - Design of Transmission Shafting. Where shafts are subjected to fatigue stresses, such as frequent start and stop cycles, determine the mean stress by using the modified Goodman Diagram. Do not allow the maximum torsional stress to exceed the endurance limit of the shaft after application of the factor of safety of 2 in the endurance limit and the stress concentration factor of the fillets in the shaft and keyway. Utilize stress concentration factor in accordance with ASME Standard B17.1 - Keys and Keyseats.

- C. Materials:** Provide shafting materials appropriate for the type of service and torque transmitted. Consider environmental elements such as corrosive gases, moisture, and fluids. Utilize materials as indicated unless furnished as part of an equipment assembly.
1. Conform low carbon cold-rolled steel shafting to ASTM A 108, Grade 1018.
 2. Conform medium carbon cold-rolled shafting to ASTM A 108, Grade 1045.
 3. Utilize other grades of carbon steel alloys suitable for service and load.
 4. Utilize corrosion-resistant shafting stainless steel or Monel, whichever is most suitable for the intended service.
- D. Differential Settlement:** Where differential settlement between the driver and the driven equipment may occur, provide a shaft of sufficient length with 2 sets of universal type couplings.

2.5 GEARS AND GEAR DRIVES

- A.** Unless otherwise indicated, provide gears of the spur, helical, or spiral-bevel type, designed and manufactured in accordance with AGMA Standards, with a service factor suitable for load class, mechanical service and thermal rating adjustment, a minimum L-10 bearing life of 60,000 hours, and a minimum efficiency of 94 percent. Check peak torque, starting torque, and shaft overhung load when selecting the gear reducer. Do not use worm gears unless specifically approved by the ENGINEER.
- B.** Provide gear speed reducers or increasers of the enclosed type, oil- or grease-lubricated and fully sealed, with a breather to allow air to escape but keep dust and dirt out. Provide casings for cast iron or heavy-duty steel construction with lifting lugs and an inspection cover for each gear train. Provide and locate an oil level sight glass and an oil flow indicator for easy reading.
- C.** Ship gears and gear drives that are part of an equipment assembly fully assembled for field installation.
- D.** Leave material selections to the discretion of the manufacturer, provided the above AGMA values are met. Adequately design input and output shafts for the service and load requirements. Computer-match gears for minimum tolerance variation. Provide an output shaft with 2 positive seals to prevent oil leakage.
- E.** Provide easily accessible oil level and drain locations. Provide oil coolers or heat exchangers with all required appurtenances when necessary.



- F. Where gear drive input or output shafts from one manufacturer connect to couplings or sprockets from a different manufacturer, have the gear drive manufacturer furnish a matching key taped to the shaft for shipment.

2.6 DRIVE CHAINS

- A. Provide power drive chains that are commercial type roller chains meeting ASME Standards.
- B. Provide a chain take-up or tightener in every chain drive arrangement to provide easy adjustment.
- C. Provide a minimum of one connecting or coupler link in each length of roller chain.
- D. Provide chain and attachments of the manufacturer's best standard material and be suitable for the process fluid.

2.7 SPROCKETS

- A. **General:** Utilize sprockets in conjunction with chain drives and chain-type material handling equipment.
- B. **Materials:** Unless otherwise indicated, utilize the following materials:
 - 1. Provide sprockets with 25 teeth or less, normally used as a driver, made of medium carbon steel in the 0.40 to 0.45 percent carbon range.
 - 2. Provide type A and B sprockets with 26 teeth or more, normally used as driven sprockets, made of minimum 0.20 percent carbon steel.
 - 3. Provide large diameter sprockets with Type C hub made of cast iron conforming to ASTM A 48, Class 30.
- C. Accurately machine sprockets to ASME Standards. Provide sprockets with deep hardness penetration in tooth sections.
- D. Furnish complete finish bored sprockets with keyseat and set screws.
- E. To facilitate installation and disassembly, provide sprockets of the split type or furnish with **Taper-Lock** bushings as required.
- F. Provide idler sprockets with brass or Babbitt bushings, complete with oil hole and axial or circumferential grooving with stainless steel tubing and grease fitting extended to an accessible location. Steel collars with set screws may be provided in both sides of the hub.

2.8 V-BELT DRIVES

- A. Provide v-belts and sheaves of the best commercial grade which conform to ASME, MPTA, and RMA Standards.
- B. Unless otherwise indicated, provide sheaves machined from the finest quality



gray cast iron.

- C. Provide statically balanced sheaves. In certain applications where vibration is a problem, provide dynamically balanced sheaves. Sheaves operating at belt speeds exceeding 6,500 fpm may be required to be of special materials and construction.
- D. To facilitate installation and disassembly, provide sheaves complete with **Taper-Lock** or **QD** bushings as required.
- E. Provide complete finish bored sheaves with keyseat and set screws.
- F. Provide sliding motor bases to adjust the tension of V-belts.

2.9 DRIVE GUARDS

- A. Guard power transmission trains, prime movers, machines, shaft extensions, and moving machine parts to conform with the OSHA Safety and Health Standards (29CFR1910). Construct the guards utilizing a minimum 10 gauge expanded, flattened steel with smooth edges and corners, galvanized after fabrication, and securely fastened. Where required for lubrication or maintenance, provide guards with hinged and latched access doors.

2.10 BEARINGS

- A. **General:** Conform bearings 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 the selection of bearings.
- C. Equip re-lubricatable type bearings with a hydraulic grease fitting in an accessible location and provide sufficient grease capacity in the bearing chamber.
- D. Factory-lubricate lubricated-for-life bearings with the manufacturer's recommended grease to insure maximum bearing life and best performance.
- E. **Anti-Friction Type Bearing Life:** Except where otherwise indicated, provide bearings with a minimum L-10 life expectancy of 5 years or 20,000 hours, whichever occurs first. Where so indicated, provide bearings with a minimum rated L-10 life expectancy corresponding to the type of service, as follows:

Type of Service	Design Life, years	L-10 Design Life, hours
	(whichever comes first)	
8-hour shift	10	20,000
16-hour shift	10	40,000



Continuous	10	60,000
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- F. Provide bearing housings made of cast iron or steel and bearing mounting arrangement as indicated or as recommended in the published standards of the manufacturer. Split-type housings may be used to facilitate installation, inspection, and disassembly.
- G. **Sleeve Type Bearings:** Provide sleeve-type bearings with a cast iron or ductile iron housing and Babbitt or bronze liner. Bolt or dowel bearing housing to the lower casing half. Provide these housings with cast iron caps bolted in place and bore the bearing end caps to receive the bearing shells. Design sleeve bearings on the basis of the maximum allowable load permitted by the bearing manufacturer. If the sleeve bearing is connected to an equipment shaft with a coupling, the coupling transmitted thrust will be assumed to be the maximum motor or equipment thrust. Provide a lubricant, lubrication system, and cooling system as recommended by the bearing manufacturer.
- H. **Plate Thrust Bearings:** Provide **Kingsbury** Type thrust bearings, which are designed and manufactured to maintain the shaft in the fixed axial position without undue heating or the necessity of adjustment or attention. Oil lubricate the bearings to suit the manufacturer's standard method of lubrication for the specific bearing. Require manufacturer to provide necessary piping, filters, and valves if bearing cooling is required.

2.11 PIPING CONNECTIONS

- A. **Pipe Hangers, Supports, and Guides:** Support, anchor and guide pipe connections to equipment to avoid stresses and loads on equipment flanges and equipment. Provide supports and hangers in accordance with Section 40 05 07 - Pipe Supports.
- B. **Flanges and Pipe Threads:** Provide flanges on equipment and appurtenances that conform to ASME B16.1, Class 125, or B16.5, Class 150, unless otherwise indicated. Provide pipe threads in accordance with ASME B1.20.1 and Section 40 05 00 - Piping, General.
- C. **Flexible Connectors:** Install flexible connectors in all piping connections to engines, blowers, compressors, and other vibrating equipment and in piping systems in accordance with the requirements of Section 45 05 00. Harness or otherwise anchor flexible connectors to prevent separation of the pipe where required by the installation.
- D. **Insulating Connections:** Utilize insulating bushings, unions, couplings, or flanges, as appropriate, in accordance with the requirements of the Section 45 05 00.

2.12 GASKETS AND PACKINGS

- A. Provide gaskets in accordance with Section 45 05 00.
- B. Utilize compressible material compatible for fluid being used for packing around valve stems and reciprocating shafts. Provide Chevron-type "V" packing of



Garlock No. 432, John Crane "Everseal," or equal.

- C. Provide "O"-rings, stuffing boxes, or mechanical seals around rotating shafts (other than valve stems) as recommended by the manufacturer and approved by the ENGINEER.

2.13 NAMEPLATES

- A. Engrave or stamp equipment nameplates of stainless steel and fasten to the equipment in an accessible location with No. 4 or larger oval head stainless steel screws or drive pins. Supply nameplates which contain the manufacturer's name, model, serial number, size, characteristics, and appropriate data describing the machine performance ratings.

2.14 TOOLS AND SPARE PARTS

- A. **Tools:** Furnish one complete set of special wrenches and other special tools necessary for the assembly, adjustment, and dismantling of the equipment. Provide tools of the best quality hardened steel forgings with bright finish. Provide wrench heads with work faces dressed to fit nuts. Provide tools suitable for professional work and manufactured by **Snap On, Crescent, Stanley,** or equal. Neatly mount the set of tools in a labeled toolbox of suitable design provided with a hinged cover.
- B. Furnish spare parts as indicated in the individual equipment sections. Provide spare parts which are suitably packaged in a metal box and labeled with equipment numbers by means of stainless steel or solid plastic nametags attached to the box.

2.15 EQUIPMENT LUBRICANTS

- A. Install lubricants for all equipment during storage and prior to initial testing of the equipment. After successful initial testing, final testing, and satisfactory completion startup testing as specified in Section 01 75 00 - Equipment Testing and Plant Startup, conduct one complete lubricant change on all equipment. Properly dispose of all used lubricants. The OWNER will then be responsible for subsequent lubricant changes

PART 3 -- EXECUTION

3.1 SERVICES OF MANUFACTURER

- A. **Inspection, Startup, and Field Adjustment:** Where required by individual sections, an authorized, experienced, and competent service representative of the manufacturer is to visit the Site for the number of days indicated in those sections to witness or perform the following and to certify in writing that the equipment and controls have been properly installed, aligned, lubricated, adjusted, and readied for operation.
 1. Installation of equipment
 2. Inspection, checking, and adjusting the equipment and approving its



installation

3. Startup and field testing for proper operation, efficiency, and capacity
4. Performing field adjustments during the test period to ensure that the equipment installation and operation comply with requirements

B. Instruction of the Owner's Personnel

1. Where required by the individual equipment sections, an authorized training representative of the manufacturer is to visit the Site for the number of days indicated in those sections to instruct the OWNER's personnel in the operation and maintenance of the equipment, including step-by-step troubleshooting with necessary test equipment. Provide specific instruction to the models of equipment provided.
2. Provide a representative with at least 2 years experience in training. Submit a resume of the representative.
3. Schedule training 3 weeks in advance of the scheduled session.
4. Submit proposed training material and a detailed outline of each lesson for review. Incorporate review comments from the ENGINEER into the material.
5. Provide training materials which will remain with the trainees after the session.
6. The OWNER may videotape the training for later use by the OWNER's personnel.

- C. Vibration Monitoring:** For the equipment types listed in paragraph 1.3D, arrange 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.

3.2 INSTALLATION

- A. General:** Install equipment in accordance with the manufacturers written recommendations.
- B. Alignment:** Field test equipment to verify proper alignment.

3.3 PACKAGED EQUIPMENT

- A.** When any system is furnished as pre-packaged equipment, coordinate all necessary space and structural requirements, clearances, utility connections, signals, and outputs with subcontractors to avoid later change orders.
- B.** If the packaged system has any additional features (as safety interlocks, etc.) other than required by the Contract Documents, coordinate such features with the ENGINEER and provide all material and labor necessary for a complete



installation as required by the manufacturer.

3.4 FIELD ASSEMBLY

- A. Coat studs, cap screws, bolt and nuts used in field assembly with “**Never Seize**” compound or equal.

3.5 WELDING

- A. Clean welds of weld-slag, splatter, etc. to provide a smooth surface.

3.6 FIELD TESTS

- A. Where indicated by the individual equipment sections, field test equipment after installation to demonstrate satisfactory operation without excessive noise, vibration, or no 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 the vibration level is within the amplitude limits as indicated or as recommended by the reference applicable Standards..
 - 2. Obtain concurrent readings of motor voltage, amperage, capacity, vibration and bearing temperatures.
 - 3. Operate equipment indicated in Section 01 75 00.
- C. The ENGINEER will witness field-testing. Notify the ENGINEER of the test schedule three days in advance.
- D. In the event that any equipment fails to meet the test requirements, modify the equipment and resettle until it satisfies the requirement.

- END OF SECTION -



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