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LAFAYETTE UTILITIES SYSTEM (LUS)
OWNER'S/DEVELOPER'S ACKNOWLEDGEMENT FORM FOR INSTALLATIONS OF WATER/WASTEWATER IMPROVEMENTS

Owner'/Developer's Acknowledgment:

Please Print or Type

Project Name: _____
Project Address: _____
Owner's Name: _____ Phone _____
Owner's Signature: _____ Date _____
Owner's Engineer/Architect Name: _____
Owner's Engineer/Architect Signature: _____ Date _____

I hereby acknowledge the requirements listed below and the specific plan review comments provided under separate cover. The requirements are as follows:

1. The Owner's Engineer/Architect shall be solely responsible to ensure that the required water/wastewater improvements are installed in accordance with LUS standards. As a condition of acceptance of the required water/wastewater improvements, the Owner's Engineer/Architect shall provide and record all necessary easements and provide a written certification that the construction was in accordance with the approved construction plans and LUS standards. Acceptance of the required water/wastewater improvements does not constitute acceptance of the improvements for perpetual maintenance. The certification letter shall include the following reports:

Wastewater	Water
Manhole Infiltration Report	Pressure Test
Low Air Pressure Report	

   Note: In locations where it is possible that the wastewater installations can be damaged through the installation of project facilities (IE: drainage, gas, electric, water, telephone, cable tv lines), LUS may conduct a second air pressure test to determine the integrity of the installations prior to release of service and/or Final Acceptance.

   Where buildings have connection(s) prior to release of service by LUS, the Owner's/Developer's contractor shall conduct the second air test to the section where the house/building have connected.

2. The Owner's Engineer/Architect shall conduct a preconstruction meeting with LUS and the installing contractor. The Owner's Engineer/Architect shall provide a written summary of the preconstruction meeting within five (5) working days.
3. The Owner's Engineer/Architect shall provide resident inspection during the installation of the required water/wastewater improvements, witness the connections and construction testing, and coordinate with LUS (24 hrs. in advance)for all taps/connections, valve operations, and testing. Prior to water/wastewater system testing, the Owner's Engineer shall submit asbuilt record drawings. The Owner's Engineer shall be responsible for LA ONE CALL location requests until LUS receives the Water/Wastewater asbuilt record drawings.
   Note: Remove all water testing risers and sampling points within five (5) days of approved health sample.
4. The Owner's Engineer/Architect shall conduct a final inspection with LUS and the installing contractor upon completion of all utilities construction, paving, and landscaping.
5. The Owner shall warrant the required water/wastewater improvements for a one (1) year period following the acceptance of the improvements by LUS. LUS shall own and operate the water/wastewater improvements during the warranty period. Upon the completion of the warranty period, LUS will accept perpetual maintenance.

Lafayette Utilities System
1314 Walker Road
Lafayette, LA 70506
Attn: Steve Dronet
337-291- 5865 (Fax 337-291-5999)

APPENDIX C

IRREVOCABLE LETTER OF CREDIT

LETTER OF CREDIT NO. _____ DATE _____

TO: Lafayette Consolidated Government
State of Louisiana

Gentleman:

For value received (Developer), a corporation domiciled in _____ , is herewith granted a letter of credit in the full sum of $_____ for the purpose of guaranteeing to Lafayette Consolidated Government the availability of funds for the purpose of completing improvements in _____ Subdivision as more fully shown by reference to a plat of survey prepared by (Engineers or Land Surveyors), dated (Dated) and revised (Date if any), to show final lot dimensions, a copy which is attached hereto and made a part hereof by reference, and which improvements are estimated to cost the sums of money set forth hereinafter, to-wit:

Now, therefore, the undersigned, (Bank) does by these presents promise and agree that unless such improvements set forth and described hereinabove are completed by the said (Developer) within one (1) year from the date hereof that funds will be made available to Lafayette Consolidated Government in an amount not to exceed that set forth hereinabove for the completion of said improvements and which said funds will be charged against the account of (Developer) without an obligation on the part of Lafayette Consolidated Government to reimburse the (Bank) and is further provided, however, that in the event that such improvements aforesaid are completed and accepted by Lafayette Consolidated Government then and in such event, this letter of credit shall be null and void and have no effect and at which time the (Bank) shall be release from any and all further liability in connection herewith.

The undersigned does herewith acknowledge that this letter is executed and submitted to Lafayette Consolidated Government to enable (Developer) to obtain approval from Lafayette Planning Commission of a plat of survey to be submitted to said Planning Commission without the completion of such improvements which said approval would not be given the Lafayette Planning Commission except for this letter of credit.

Subdivision Improvements Agreement
Utilities Departments

RE: _____
Name of Subdivision Location

Intending to be legally bound and in order to secure Final Plat approval, the undersigned subdivider hereby agree to provide throughout this subdivision and shown on the subdivision plat of _____ dated _____, the following improvements:

Type of Improvements	Unit	Estimated Construction Cost	Construction Completion Date
Sanitary Sewer			
Trunk Lines			
Mains			
Laterals or House Connections			
Treatment Works			
Water Mains			
Water Supply			
Fire Hydrants			
Street Lights			
Other Improvements (Specify) _____			
SUB TOTAL			

Cost of Supervision, Contingencies, and Inflation (25%) _____

Total Estimated Cost of Improvements and Supervision _____

The above improvements shall be constructed in accordance with Lafayette Utilities System requirements and specifications, and conformance with this provision shall be determined solely by Lafayette Utilities System or its duly authorized agent.

The improvements shall be constructed in accordance with the time schedule shown above.

_____ _____
Signature of Subdivider Date

(If corporation, to be signed by President and attested to by Secretary, together with the Corporate Seal.)

_____ _____
Signature of Utilities Dept. Validating Figures Date

All of the above is subject to the following terms and conditions:

6. No payment under this letter of credit will be made unit such time as the Bank has received, in writing, Estimate for Payment (Partial or full), approved by Engineers of Lafayette Consolidated Government.

7. The Bank shall have no liability whatsoever to determine disputed questions of fact or law but will rely entirely upon the Estimates for Payment furnished it by Engineers of Lafayette Consolidated Government and the facts stated herein.

8. This Letter of Credit is accompanied by draft(s) being held by this Bank marked Drawn under _____, Letter of Credit No. _____, Dated _____.

9. This Credit is subject to the Uniform Customs and Practice for Documentary Credits 1962 Revision fixed by the International Chamber of Commerce Brochure No. 222.

10. This Letter of Credit will terminate and all Bank's liability hereunder shall cease within one (1) year from date (Date), at the end of business or whereby agree with the drawers, endores and bonafide holder of drafts drawn under and in compliance with this Credit that some shall be duly honored upon presentation to the drawee Bank as specified above.

Sincerely,

(BANK)

(AUTHORIZED SIGNATURE)

CHECKLIST FOR DUMPSTER CONNECTIONS TO THE CITY OF LAFAYETTE SEWER SYSTEM

TO BE USED BY METRO CODE INSPECTORS WHEN APPROVING OR DISAPPROVING PLANS AND ACTUAL CONSTRUCTION OF DUMPSTER PADS.

- ❑ Dumpster drain must be routed to a grease trap.
- ❑ Dumpster pad must be elevated to prevent the collection of rainwater from adjacent areas.
- ❑ Dumpster pad must be enclosed to prevent anyone other than the owner from disposing into the dumpster.
- ❑ Dumpster drain shall be plugged when the dumpster area is not being washed.
- ❑ Dumpster drain shall be situated in an area of the pad so that the drain will not be hidden by the dumpster and be visible for inspection.

THIS CHECKLIST IS TO BE ROUTED TO THE WASTEWATER PRETREATMENT SECTION AFTER IT IS FILLED OUT BY INSPECTOR.

CONTACT: 337-291-5950

Section 00800

SUPPLEMENTARY CONDITIONS

ARTICLE 1 - INTRODUCTION

The work covered by these specifications shall include furnishing all labor, supervision, materials, equipment, and incidentals which may be required to complete "Wastewater Collection System Rehabilitation – Cured In Place Pipe As-Needed Project 2014" for the Lafayette City-Parish Consolidated Government (LCPCG) Wastewater Collection Division on an as needed basis for a period of nine (9) months.

Where LUS is mentioned in these specifications, reference is made to Lafayette Utilities System, a division of the Lafayette City-Parish Consolidated Government (LCPCG).

ARTICLE 2 - TERM OF CONTRACT

The primary term of this Contract shall be for a period of nine (9) months commencing with the date of the Notice to Proceed. All prices bid shall be firm and for the entire term of the Contract. At the discretion of L.U.S. and with the consent of the Contractor, this Contract may be extended for two (2) additional nine (9) month periods, with no price adjustments of the items bid on the Bid Form. This Contract extension must be agreed upon by both parties in writing at least thirty (30) calendar days in advance of the initial Contract expiration date.

ARTICLE 3 - PAYMENT AND PERFORMANCE BONDS

The Contractor shall be required to furnish a Payment and Performance Bond for the amount of $450,000, submitted by the Surety in accordance with the provisions set forth in Article 34 of the General Conditions. If the Contract is extended for a second or third term, the Contractor shall furnish a new and similar Payment and Performance Bond for each new contract term.

ARTICLE 4 - DEFINITIONS

"Section of Pipe" - A section of pipe is a single piece of pipe, with or without bell.

"Pipe Joint" - A pipe joint connects two sections of pipe.

"Reach of Pipe" - A reach of pipe is the entire length of jointed sections of pipe between two designated points, such as from one manhole to the next one.

"Lateral Service Line" - A lateral service line conveys wastewater from public right-of-way or easement line to a wye or tee installed in a sewer main or to an existing manhole.

"Private Service Line" - A private service line conveys wastewater from individual structures or other facilities on private property to the public right-of-way or easement line.

"Sewer Main" - A sewer main is located on publicly-owned property or on property dedicated for public use, and conveys wastewater collected from service and lateral lines to the wastewater treatment facilities.

"Extra Work" - This term, as used in this contract, shall be understood to mean and include all work that may be required by the Engineer to be done by the Contractor to accomplish any change, alteration or addition to the work shown on the supplied work sketches, or reasonably implied by the Specifications, and not covered by the Contractor's Bid Proposal Form.

"Descriptive Literature" - This term, as used in this contract, means illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information as requested by the Engineer to be furnished by the Contractor to illustrate a material, product, or system for some portion of the work.

ARTICLE 5 - WORK AUTHORIZATIONS

It is anticipated that several work authorizations will be issued during the term of the Contract. Work Authorizations will be issued for a complete line section on an as-needed basis from manhole to manhole when entire section is to be lined with CIPP and for a partial line section when performing CIPP on a partial line section. The Contractor agrees and recognizes that each job at each location is an independent project. It is understood the Engineer may include several independent projects within a single work authorization.

No work shall begin on this project until the Owner has issued a written work authorization. The Engineer will provide the Contractor with necessary information and with project drawings or sketches, as necessary. Video inspection tapes of the lines to be rehabilitated will be made available, upon request, to the Contractor for review if the lines have been previously televised.

The Contractor shall be paid additional compensation, unit price quoted in the Bid Proposal Form, for mobilization of work crews on all work authorizations which are for a total dollar amount less than $15,000.00.

ARTICLE 6 - QUANTITIES & UNIT PRICES OF WORK

The Lafayette Utilities System has budgeted $450,000.00 to perform the Wastewater Collection System Rehabilitation – Cured In Place Pipe As-Needed Project 2014 and expects to spend no more than this amount over the next nine (9) months. There is no assurance that any work authorization will be issued under this contract. It is the intent of these specifications that the Contractor be paid according to the unit prices for those items actually completed. The Contractor will be due no profit or any other compensation for work not done.

The quantities given in the Bid Proposal Form are approximate only. These quantities, however, at the price bid for each item shall determine the relative value of each proposal. The quantity of each individual item is not a binding feature of the bid or contract, and Lafayette Utilities System does not, either expressly or by implication, agree that the actual amount of work to be done will correspond to the quantities given in the Bid Proposal Form. Bidders must bear this in mind. The Contractor will be due no profit or any other compensation for those items in the proposal which are either not used or not used completely.

ARTICLE 7 - SUBMITTALS

Immediately after receipt of the work authorization, the Contractor shall prepare and submit to the Engineer for approval a detailed and practical schedule of operations, showing the type and number of pieces of equipment to be used on the project, and showing the order in which he proposed to carry on the work, the dates in which he will start the work and the contemplated dates for completion of same.

The Contractor shall submit for review all product data for pipe, fittings, couplings, and accessories anticipated to be used during this project. Submit when requested by the Engineer, manufacturer's printed instructions for delivery, storage, preparation, assembly installation, adjusting and finishing. Any subsequent changes in this submittal shall be promptly brought to the attention of the Engineer.

ARTICLE 8 - CONSTRUCTION VIDEO

Prior to the start of construction of each work authorization issued, the Contractor shall provide a video survey of the entire construction area. The video shall include coverage of all surface features of the construction area and shall include, but not limited to, the following items: roadways, pavements, curbs, driveways, sidewalks, culverts, head walls, buildings, landscaping, trees and fences. Each location shall be identified by audio description with the project name, address, date and time. Video shall be of the digital MPEG format and shall produce sharp, clear pictures. The examination shall be made jointly by the Contractor and the Engineer. A copy of the video shall be provided to the Engineer. No separate payment will be made for this work. The cost of doing this work shall be included in other bid items.

ARTICLE 9 - SUBCONTRACTS

The Contractor shall not make any subcontract for performing any portion of the work included in the contract without written notice to the Owner. This contract having been made pursuant to the bid submitted by the Contractor and in reliance with the Contractor's personal qualifications and responsibility, the Owner reserves the right to withhold approval of any subcontractor which the Owner may deem would not be in the Owner's best interest.

The Contractor shall, as soon as practicable after signing the contract, submit a separate written notice to the Owner identifying each proposed subcontractor. Upon request of the Owner, the Contractor shall promptly furnish additional information tending to establish that any proposed

subcontractor has the necessary facilities, skill, integrity, past experience and financial resources to perform the work in accordance with the terms and conditions of this contract.

If the Owner determines that any proposed subcontractor is unacceptable, he shall so notify the Contractor, who may thereupon submit another proposed subcontract unless the Contractor decides to do the work himself. Disapproval by the Owner of any proposed subcontractor shall not provide a basis for any claim by the Contractor.

If any approved subcontractor fails to properly perform the work undertaken, he shall be removed from the job upon the request of the Owner, following notification to the Contractor in writing of the request for removal and the reasons thereof.

Each subcontract entered into shall provide that the provisions of this contract shall apply to each subcontractor and his officers and employees in all respects as if he and they were employees of the Contractor. The Owner's decision not to disapprove of any subcontract shall not relieve the Contractor of any of his responsibilities, duties, and liabilities hereunder. The Contractor shall be solely responsible for the acts, omissions, negligence or defaults of his subcontractors and of such subcontractors's officers, agents and employees, each of whom shall, for this purpose, be deemed to be the agent or employee of the Contractor to the extent of his subcontract.

The Contractor agrees to bind each subcontractor, and each subcontractor agrees to be bound by the terms of the Contract Documents insofar as applicable to his work. The Contractor and each subcontractor jointly and severally agree that nothing in the Contract Documents or otherwise shall create or be deemed to create any rights in favor of a subcontractor against the Owner; shall not be deemed or construed to impose upon the Owner any obligation, liability or duty to a subcontractor; or to create any contractual relation whatsoever between a subcontractor and the Owner.

ARTICLE 10 - SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION

In order to protect the lives and health of his/her employees under the contract, the Contractor shall comply with all pertinent provisions of the Contract Work Hours and Safety Standards Act, as amended, commonly known as the Construction Safety Act as pertains to health and safety standards; and shall maintain an accurate record of all causes of death, occupational disease, and injury requiring medical attention or causing loss of time from work, arising out of and in the course of employment on work under the contract.

The Contractor alone shall be responsible for the safety, efficiency, and adequacy of his/her plan, appliances, and methods, and for any damage which may result from their failure or their improper construction, maintenance, or operation.

ARTICLE 11 - UNIT RESPONSIBILITY

All equipment, manufactured units, components, products, etc. shall be furnished by a single manufacturer who shall be responsible for the adequacy and compatibility of the completed system. This does not relieve the Contractor of overall responsibility.

ARTICLE 12 - PRE-CONSTRUCTION CONFERENCE

After the Contract is executed and recorded and prior to commencing any work under this Contract, a pre-construction conference between the Contractor, his project superintendent(s) and representatives of the Owner will be held in a location designated by the Owner. It is recommended that a pre-construction conference be held for each work authorization as well.

ARTICLE 13 - DELIVERY, STORAGE, AND HANDLING

All material and equipment shall be stored in an appropriate stock yard, in strict accordance with the manufacturer's recommendations, and in a manner that leaves the material and equipment accessible to inspectors. No materials or equipment may be placed upon the property of the Owner unless authorized by the Engineer.

ARTICLE 14 - RESPONSE TIME

Due to Administrative Orders from EPA, the Contractor shall respond to work directives within ten (10) calendar days. Failure to respond within this time can be grounds for termination of the entire contract.

ARTICLE 15 - BOUNDARIES OF WORK

The Owner will provide land for the work specified in this contract and make suitable provisions for ingress and egress. The Contractor shall not enter or occupy with men, tools, equipment or material, any ground outside the property of the Owner or the LCPCG without the written consent of the owner of such ground. Other Contractors and employees or agents of the Owner may for all necessary purposes enter upon the work and premises used by the Contractor and the Contractor shall conduct his work so as not to impede unnecessarily any work being done by others on or adjacent to the site.

The Contractor shall be solely responsible for obtaining and paying all costs in connection with any additional work area, storage sites, access to the site or temporary right-of-way which may be required for proper completion of the work.

ARTICLE 16 - LOCAL CONDITIONS

The Contractor shall satisfy himself regarding all local conditions affecting his work by personal investigations, and neither the information contained in this section nor that derived from maps or plans and specifications shall act to relieve the Contractor from any responsibility hereto or from fulfilling any and all of the terms and requirements of this contract.

ARTICLE 17 - SUBSURFACE CONDITIONS

The Owner and Engineer hereby acknowledge the following relative to the existing subsurface conditions for all of the work denoted in these Contract Documents.

a. The Owner and Engineer have no information (either actual or constructive) as to the true subsurface conditions (soil and ground water) at the particular work sites.

b. Any reference or implied references on the work sketches or in the Specifications to subsurface conditions are superceded by this paragraph.

Based upon the above statement regarding subsurface conditions, it should be clear to all parties concerned that each Bidder and the eventual Contractor for the project are knowingly accepting the potential risks of the unknown. Adverse subsurface conditions shall not be considered for additional pay.

ARTICLE 18 - RELINING GUIDELINES

For all design calculations for sewers, unless otherwise directed by LUS, the groundwater level shall be assumed to be at grade (ground level).

ARTICLE 19 - COORDINATION REQUIREMENTS

As more fully set forth in the General Conditions, the Contractor shall be solely responsible for coordination of all the work. He shall supervise, direct and cooperate fully with all subcontractors, manufacturers, fabricators, suppliers, distributors, installers, testing agencies and all other whose services, materials or equipment are required to ensure completion of the work.

As more fully set forth in the General Conditions, the Contractor shall cooperate with and coordinate his work with the work of any other contractor, utility service company or Lafayette Utilities System's employees performing additional work related to the project at the site. Contractor shall notify the Lafayette Utilities System Project Engineer or his/her representative twenty-four (24) hours prior to mobilization and/or beginning any work.

Contractor shall not be responsible for damage done by Contractors not under his jurisdiction. He will not be liable for any such loss or damage unless it is through the negligence of the Contractor.

Contractor shall also coordinate his work with the work of others to assure compliance with schedules.

Contractor shall attend and participate in all project coordination or progress meetings and report on the progress of all work and compliance with schedules.

ARTICLE 20 - "OR EQUAL" - EQUIPMENT & MATERIAL BRAND NAMES

It is not the intent of these specifications to prohibit equal material and/or equipment manufacturers from providing and/or bidding on any items described in these specifications. In some cases, only performance requirements are described, with no brand names being listed.

It shall be understood that the words "Or Equal" shall be considered to be included after all brand names of equipment or material specified in these specifications, irrespective if these words are not provided after the names of certain equipment and/or material.

If any Contractor wishes to provide equipment or materials of a name brand different from those named in these Specifications, or where performance requirements only as described with no brand name being listed, written approval must be obtained from the Engineer prior to bidding. The contractor must submit descriptive literature and information to the Engineer not less than fourteen (14) calendar days before the date of bid opening for his evaluation before approval can be obtained. The Contractor shall utilize only approved name brands as the basis for prices quoted in the Bid Proposal Form.

Descriptive literature means illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information as requested by the Engineer to be furnished by the contractor to illustrate a material, product or system for some portion of the work.

ARTICLE 21 - LABORATORY TESTING

The Owner will provide at his expense and discretion all testing services not required by the Contract Documents. The Contractor shall cooperate with the laboratory on furnishing and obtaining samples of material for testing.

ARTICLE 22 - CONSTRUCTION SCHEDULE

The Contractor is required to determine his own method of construction and detailed work sequence, within the terms of the Contract.

Immediately after receipt of the work authorization, the Contractor shall prepare and submit to the Engineer for approval a detailed and practical schedule of operations, showing the type and number of pieces of equipment to be used on the project, and showing the order in which he proposed to carry on the work, the dates in which he will start the work and the contemplated dates for completion of same.

ARTICLE 23 - NOTICE OF WORK

At least two (2) days but not more than four (4) days prior to performing work within a particular area, the Contractor shall notify, in writing, the property owners adjacent to the site and/or whose property construction shall occur during a one (1) week (Monday thru Friday) time period. The notification for repair work shall include the commencement dates, routes, a general description

of the work required, and a person to contact with questions concerning the project. In addition, the Contractor shall give twenty-four (24) hours notice to all property owners whose sewer service will be interrupted by construction and whose driveways will be interrupted by construction. A copy of the notification shall be sent to the Engineer for approval prior to distribution. Each day, the Contractor shall contact the Engineer or his designated representative to provide information as to whether work will be performed that day and, if so, the location of all crews performing work.

ARTICLE 24 - PROVISIONS FOR TRAFFIC

The Contractor shall plan his work in such a manner so as not to unnecessarily interrupt traffic. The Contractor shall at all times maintain all streets, trenches, driveways, walkways and ditches in such condition as to minimize inconvenience to the public and to the property owners and to permit passage of emergency vehicles. Operations shall be so conducted as to cause minimum interference with access to the property on the streets where construction is proceeding.

Any vehicular re-routing, roadway barricading, or any other operation that will affect the flow of traffic must be approved by the Traffic Engineering Division (291-8531) not less than four (4) or more than ten (10) working days in advance of implementation. It shall be the Contractor's responsibility to obtain such approvals. The Traffic Engineering Division will provide technical advice and inspection services as required.

All traffic control signs and barricades including placement thereof shall conform generally to the U.S. Department of Transportation, Federal Highway Administration "Manual on Uniform Traffic Control Devices", Part VI, Traffic Controls for Street and Heavy Construction and Maintenance Operations with the modifications requested by the Traffic Engineering Division for Traffic Patrolmen, etc.

The Contractor shall be required to provide ingress and egress to all property adjacent to his work site(s) whose accessibility has been affected by this construction work. At locations where private driveways become isolated from street traffic due to installation of equipment, temporary force mains, etc., the Contractor shall provide a way of bridging to permit access of people and vehicles in and out of private homes, businesses, etc.

The LCPCG Police Department, Fire Department, as well as residents and businesses affected must be notified, in advance, of the anticipated closures and the duration thereof.

Maximum efforts must be made to maintain fifty percent (50%) of all roadways open to traffic at all times. In those instances, when a complete roadway must be closed or a lane(s) of an arterial street must be closed, a traffic control plan indicating in detail the location of signs, cones, lights, arrow boards, and barricades must be prepared by the Contractor in advance of starting work for approval by the Traffic Engineering Division.

A flagman (flagmen) shall be provided by the Contractor as required. All traffic control signage, (i.e. signs, cones, lights, flashing arrow boards, equipment, etc.) shall be provided by the Contractor. No additional compensation will be made for traffic control during normal working hours; all costs shall be considered incidental to the work performed.

With prior approval by the Engineer, compensation for hiring a traffic officer during non-standard work hours will be allowed. Compensation will be granted as per bid item "Traffic Control for Sewers during Non-Standard Working Hours".

ARTICLE 25 - COMMENCEMENT, PROSECUTION, AND COMPLETION

The Contractor shall begin work within ten (10) calendar days of the date of issue of the written Notice to Proceed. The Contractor will be allowed to begin a project in less time, if conditions warrant, as determined by LUS and the Contractor. Work shall be prosecuted continuously and systematically except for delays beyond the control of the Contractor. Prior to performing any work, the Contractor shall notify the Engineer that he is mobilized on the job site.

Inclement days that fall between the date the Notice to Proceed was issued and the start date will not affect the deadline date to start work. If the deadline date to start work is an inclement day, the Contractor shall start work the very next day that is not inclement, the exception being if the next non-inclement day is a Saturday, Sunday, or a holiday. It shall be the responsibility of the Contractor to notify LA ONE CALL (1-800-272-3020) prior to commencing the work. Failure to properly notify LA ONE CALL shall not relieve the Contractor from being required to begin the project no more than ten (10) calendar days after issuance of the Notice to Proceed.

The Contractor hereby agrees to commence work as stated above and to continue such operations diligently and without delay, in a good workmanlike manner. The Contractor further agrees to pay as liquidated damages, the sum of $378.00 for each consecutive working day beyond that specified in the Notice to Proceed described in this article.

ARTICLE 26 - WATER

Water for chemical mixing, cleaning of sewer lines, inversion of liners, and miscellaneous uses shall be furnished by the Owner. Contractor shall use a metering device when using fire hydrants. Advance notification shall be given to the Water Distribution Department (291-5742 or 291-5741) of the use of any fire hydrant. Care shall be exercised to prevent contamination of the potable water system. The Contractor when drawing water from a public hydrant shall use an approved backflow preventer and/or an eighteen (18) inch air gap. No fire hydrant shall be obstructed or used when there is a fire in the area. The Contractor shall remove the water meter(s)/piping, etc. from all fire hydrants at the end of each working day.

ARTICLE 27 - SEWAGE CONTROL

Contractor shall be responsible for controlling sewage flows during rehabilitation operations. However, Lafayette Utilities System reserves the right to provide the necessary sewage control.

ARTICLE 28 - MANHOLE COVERS

Before removal of any manhole covers, the Contractor shall mark covers to allow for replacement of the cover in its original position.

ARTICLE 29 - GENERAL CONSTRUCTION PRACTICES AND SITE WORK

In all phases of the Contract, the Contractor shall adhere to the following provisions. If no special pay item is included in the Bid Form for these items, they shall be considered as subsidiary work as outlined in Article 35 of this section of these specifications.

Clearing - Clearing shall be accomplished by cutting and grubbing. The clearing operations shall not involve the use of herbicides, or defoliants.

Erosion Control - The Contractor shall make every effort to reduce erosion and sediment loadings on the downhill side of the work by using sediment basins, temporary settling pits and dikes.

Dust Control - The Contractor shall minimize blowing dust problems by sprinkling problem areas with water.

Noise Control - The Contractor is required to limit his work to daylight hours unless written authorization is received from the Owner. Blasting operations will not be permitted. Internal combustion engines shall be adequately equipped with mufflers. Necessary measures shall be taken to keep construction noises as low as is practicable in compliance with OSHA guidelines.

Street Cleaning - All streets, driveways and sidewalks shall be washed and cleaned at the end of each work day.

ARTICLE 30 - PROTECTION OF SITE

The Contractor shall protect all existing structures from damage during the progress of his work; shall remove from the site all cuttings, debris and unusable material; and shall upon completion of the work restore the site as nearly as possible to its original condition, including the replacement at the Contractor's sole expense, of any facility or landscaping which has been damaged beyond restoration or destroyed. Existing structures shall be defined as all above or below ground level structures, including all pipelines, poles, tracks, roads, culverts, sidewalks, drains, cables, wires, conduits, vaults, manholes, landscaping, and other appurtenant facilities, whether owned or operated by public bodies, private individuals, corporations, firms or companies. Contractor shall clean the site, as it is needed, after completion of the work in that area.

ARTICLE 31 - ERRORS AND OMISSIONS

Regardless of culpability, the Contractor shall not be allowed to take advantage of any errors or omissions in these specifications or his work directives. The Contractor is required to notify the Lafayette Utilities System of all errors or omissions as soon as he becomes aware of them. Suitable instructions will be given to the Contractor by the Lafayette Utilities System when such errors or omissions are discovered. No compensation for any delay or down time, for these

reasons, including time to receive the Lafayette Utilities System's instructions or approval, shall be allowed. Further, any errors and/or omissions contained in the specifications do not absolve the Contractor from ultimate and final responsibility for the successful completion of this project to the satisfaction of the Lafayette Utilities System. The degree of detail reflected in the specifications, or lack of same, does not absolve the Contractor from the necessity of conducting an extensive investigation of the Project Area prior to submission of his/her bid. The contractor is hereby advised to conduct a suitable site investigation. The Contractor will not be due any additional compensation for difficulties arising out of his/her failure to inspect and analyze the Project Area prior to submission of his/her bid.

ARTICLE 32 - INDEMNIFICATION

The Contractor will indemnify and hold harmless the Owner and all of their agents and employees from and against all claims, damages, losses, and expenses including attorney's fees arising out of or resulting from operations under the Contract Documents by the Contractor, any sub-contractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, which are caused in whole or in part by any error, omission or act of any of them. If any and all claims against the Owner or any of their agents or employees by any employee of the Contractor, sub-contractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation of the Contractor under this article shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any sub-contractor under Workmen's Compensation laws.

ARTICLE 33 - PAYMENT

Payment for each work authorization shall be made on a monthly basis. All work must be inspected and approved by Lafayette Utilities System prior to payment. A 10% retainage fee shall be used as per the General Conditions, Article 30.

ARTICLE 34 - WORK FOR WHICH NO PAY ITEMS ARE INCLUDED IN THE BID FORM

Whenever work is described in these Specifications but for which no pay items are included in the Bid Proposal Form, it is intended that these descriptions and requirements will govern such work in the event it is encountered during construction. There shall be no specific payment for any item of work required on the work sketches or in these documents unless specifically

included as a bid item. Payment for bid items shall be considered to include payment for other work not specified as a separate bid item.

ARTICLE 35 - SUBSIDIARY WORK AND EXTRA WORK

There will be no separate or additional payment for any items of work required or implied on the work sketches or in these documents unless specifically included as a bid item in the Bid Proposal Form except as extra work ordered by the Engineer, in writing, in a formal change order.

The term "Extra Work" as used in this contract, shall be understood to mean and include all work that may be required by the Engineer to be done by the Contractor to accomplish any change, alteration or addition to the work shown on the supplied work sketches, or reasonably implied by the Specifications, and not covered by the Contractor's Bid Proposal Form.

ARTICLE 36 - INSURANCE (ARTICLE 32 - GENERAL CONDITIONS REVISION)

(PERTAINING TO THE GENERAL CONDITIONS)

THE FOLLOWING CHANGES OF ARTICLE 32 ARE FOR SECTIONS "I THROUGH III". ANY OTHER REQUIREMENTS OF ARTICLE 32, NOT ADDRESSED, SHALL BE APPLICABLE.

The successful contractor will be required to furnish an ACORD certificate of insurance as follows:

I. Standard Worker's Compensation Insurance - Coverage for all Worker's Compensation claims as permitted under Louisiana State Law together with Employer's Liability Coverage of $1,000,000 minimum, per occurrence.

II. Commercial General Liability Insurance - Coverage under this policy must be provided on an "occurrence" basis, and not on a "claims made" basis. THE LAFAYETTE CITY-PARISH CONSOLIDATED GOVERNMENT, ITS OFFICIALS, EMPLOYEES AND VOLUNTEERS MUST BE NAMED AS AN ADDITIONAL INSURED ON THE POLICY. All comprehensive general liability insurance shall include coverage for the following:

A. Premises Operations	$1,000,000
B. Independent Contractors	$1,000,000
C. Products - Completed Operations	$1,000,000
D. Contractual Liability	$1,000,000
E. Broad Form Property Damage	$1,000,000

Pollution Liability Coverage is required in the amount of $1,000,000.

III. Business Auto Liability Policy

	BODILY INJURY per person	BODILY INJURY per accident	PROPERTY DAMAGE per accident
A. Any Auto	$ 1,000,000	$1,000,000	$1,000,000
B. Owned Autos	$ 1,000,000	$1,000,000	$1,000,000
C. Non-Owned Autos	$ 1,000,000	$1,000,000	$1,000,000
D. Hired	$ 1,000,000	$1,000,000	$1,000,000

If Coverage A - Any Auto is carried, Coverages B, C, & D will not be required. If the Contractor does not own an automobile (vehicle) and an automobile (vehicle) is utilized in the execution of the contract, then hired and non-owned coverage is required.

END OF SECTION 00800

SECTION 01505

MOBILIZATION

PART 1 GENERAL

1.01 WORK INCLUDES

Work consists of preparatory work and operations, including, but not limited to, those necessary for scheduling; preliminary meetings; traffic control planning; cost of bonds and any required insurance; movement of personnel, equipment, supplies and incidentals to the project; and establishment of all facilities necessary for work on this project.

1.02 BASIS OF PAYMENT

A. Maximum amount to be bid on this item will be two percent (2%) of the total bid amount.

B. Payment will be based on a lump sum amount. Payment for this item will be made in partial payments based on the following payment table:

Percent of Total Contract Amount Earned	Allowable Percent of the Lump Sum Price for the Item
1st Partial Payment	25
10	50
25	75
50	100

PART 2

Not Used

PART 3

Not used

END OF SECTION

SECTION 01520

MISCELLANEOUS CONSTRUCTION REQUIREMENTS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Water

B. Sanitary Facilities

C. Barriers

D. Protection of Installed Work

E. Controls

F. Cleaning During Construction

G. Access to Emergency and Other Facilities

H. Traffic Regulation

I. Temporary Surfacing

J. Construction Parking

K. Removal

L. Unit Prices

1.02 WATER

A. Source: Arrange with authorities and connect to public utility. No connections shall be allowed without approval of Lafayette Utilities System.

1.03 SANITARY FACILITIES

A. Provide required facilities and enclosures.

B. Toilet Facilities: Enclosed portable self-contained units or temporary water closets and urinals, secluded from the public view.

C. Provide facilities at time of site mobilization.

D. Clean areas of facilities daily, maintain in sanitary condition. Provide toilet paper, paper towels, and soap in suitable dispensers.

1.04 BARRIERS

A. Provide as required to prevent public entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.

B. Prohibit traffic and material storage on lawn and landscaped areas.

1.05 PROTECTION OF INSTALLED WORK

A. Provide temporary protection for installed products. Control traffic in immediate area to minimize damage from subsequent operations.

1.06 CONTROLS

A. All aspects of Louisiana Pollutant Discharge Elimination System (LPDES) Permit shall be followed by the Contractor.

B. Water Control: Rough grade site to prevent standing water and to direct surface drainage away from excavations, trenches, adjoining properties, and public rights-of-way. Maintain excavations and trenches free of water. Provide and operate pumping equipment and dewatering systems of a capacity to control water flow as required to conduct construction operations properly.

C. Dust Control: Execute Work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere.

D. Mud Control: Control accumulation of excessive mud or debris from the work site onto the Public Access Road.

E. Erosion and Sediment Control:

1. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.

2. Minimize amount of bare soil exposed at one time.

3. Provide temporary measures such as berms, dikes, and drains to prevent water flow.

4. Construct fill areas by selective placement to avoid erosive surface silts or clays.

5. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

F. Noise:

1. Noise abatement measures are to be exercised during the course of the project in order to maintain construction noise as low as is practicable.

2. Maintain and operate equipment in a manner which will minimize noise generation.

3. Equipment to be equipped with properly functioning mufflers.

1.07 CLEANING DURING CONSTRUCTION

A. Control accumulation of waste materials, rubbish and other debris; remove periodically and dispose of off-site.

1.08 ACCESS TO EMERGENCY AND OTHER FACILITIES

A. Maintain access, free from obstruction, hydrants under pressure, valve boxes, fire and police call boxes, or other emergency or utility controls which are not part of the Work.

1.09 TRAFFIC REGULATION

A. Conduct operations to minimize interference with public travel and vehicles utilizing public and private highways, streets, and roads.

B. Provide and maintain warning signs, flagmen, flares, lights, barricades, pavement markings, and other devices as necessary to regulate traffic through the construction area.

C. Provide representative to receive calls and dispatch proper personnel and equipment on a 24 hour basis for the purpose of maintaining traffic regulation devices.

D. Provide regulation and safety precautions as required by insurers.

E. Bear responsibilities for the safety of the traveling public and for any liability in connection therewith.

F. Comply with all State and local laws and ordinances.

G. Comply with all other requirements regarding the protection of the work, workmen, and safety of the public.

H. Regulate traffic to comply with the following requirements:

1. All streets, roads and highways:

a. Provide and maintain local traffic and access.

b. Restore traffic prior to sunset.

I. Provide adequate notification (4 days minimum) to appropriate government entities and private owners prior to commencement of construction operations that may interfere with their daily routine operations.

1. Provide 24 hour notice to owners of private driveways prior to interference.

2. Provide seven day notice to owners of above and below grade utilities and owners of other underground facilities prior to commencing construction in the vicinity of their facilities.

1.10 TEMPORARY SURFACING

A. Maintain temporary surfacing as required by the individual Specification Sections.

B. Provide representative to receive calls and dispatch proper personnel and equipment on a 24 hour basis for the purpose of maintaining temporary surfacing.

1.11 CONSTRUCTION PARKING

A. Control vehicular traffic to prevent interference with public traffic and access by emergency vehicles.

B. Monitor parking of construction personnel's vehicles.

C. Prevent parking on or adjacent to public roadways, private driveways or in non-designated areas.

1.12 REMOVAL

A. Remove temporary materials, equipment, services, and construction prior to Substantial Completion inspection.

B. Clean and repair damage caused by installation or use of temporary facilities. Remove underground installations; underground installations over a depth of 2 feet

may remain if approved by the Engineer. Grade site as indicated. Restore existing facilities used during construction to specified, or to original condition.

1.13 UNIT PRICES

A. Method of Measurement: Items and actions required by and provided under this Section will not be measured for payment.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01531

TEMPORARY FENCING

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. Included in the work is the erection, maintenance, and dismantling of temporary fencing.

B. The completed fence installation shall provide a secure and continuous barrier. The Contractor shall perform all miscellaneous work required to meet this requirement.

1.02 SUBMITTALS

A. Submit manufacturer's technical data for posts fabric, gates, and other components necessary for the complete installation of temporary fencing.

B. Submit shop drawings where required by LUS.

1.03 WORKMANSHIP

A. The installer shall use workmen experienced in fence erection for the installation, maintenance, and removal of temporary fencing.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Upon approval by the Engineer, used fencing material in good condition may be used for temporary fencing.

B. Line Posts: All line posts shall be galvanized steel pipe section 1.9" o.d. weighing 2.7 pounds per foot (standard 1-1/2" pipe).

C. Fabric: Wire fabric shall be a one piece 11 gauge galvanized chain link fabric woven of commercial quality steel wire with a uniform square mesh of 2".

D. Gates:

1. Interior temporary gates shall be equal in construction quality to the temporary fencing.

2. Exterior gates and corner posts shall be standard 3" pipe (3-1/2" o.d.). All posts shall be heavily coated with zinc by the hot-dip process after fabrication. All posts shall be of such length that they may be embedded in concrete foundations to a depth of not less than 24". Gate frames shall be 2" o.d. high carbon-steel tubing welded at all joints to provide rigid water-tight construction. Gate fabric shall be one piece 11 gauge galvanized chain link. Contractor shall furnish hinges, latches, stops and keepers necessary for the complete erection and smooth working of the gates and posts.

E. Concrete: Concrete shall have a minimum 28-day strength of 2500 psi.

F. Other: Provide all clamps, braces, hinges, latches, ties, post caps tension bands, loop caps, sleeves, ties, wire, and other items necessary for a complete installation, manufactured by the same maker of the fencing and posts.

PART 3 - EXECUTION

3.01 GRADE PREPARATION

A. Remove all weeds, refuse, and debris along proposed temporary fence line. Rough grade ground surface as required to receive bottom of fence fabric.

3.02 INSTALLATION

A. Line posts shall be set 2'-6" below grade and spaced a maximum of 10'-0" o.c. Posts may be driven or set in holes, backfilled and tamped. Concrete plugs approximately 12" square and 4" to 8" deep (top flush with grade) shall be poured around line post if ground is soft or unstable.

B. Fabric shall extend to within 2" of stable ground. Anchor bottom of fabric to ground at the one-third points between line posts with 24" long 3/8" wide rebar driven 20" into the ground and secured to the bottom stand of fabric with 11 gauge wire. The fabric shall be installed on the construction area side of the post. The fabric shall be attached to the post 12" o.c. with 9 gauge wire. Wire fabric shall be continuous and stretched taut enough to give a straight and flat appearance.

3.03 MAINTENANCE

A. The Contractor shall be responsible for maintaining the fencing in good condition and appearance from erection to takedown. Damage from any cause shall be reported to the Engineer and repaired promptly.

3.04 REMOVAL

A. Upon completion of work or when authorized, the Contractor shall remove the temporary fence and any concrete plugs completely. Upon removal of the fence posts and plugs, the Contractor shall fill the holes in a manner that will reduce or eliminate any hazardous conditions. Backfill in holes shall be compacted; holes in paving shall be surfaced to match existing paving.

END OF SECTION

SECTION 02060

MAINTENANCE AGGREGATE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aggregate for temporary applications.

B. Aggregate for permanent applications.

1.02 REFERENCES

A. DOTD Designation: TR 113 – Sieve Analysis of Fine and Coarse Aggregates.

1.03 UNIT PRICES

A. Method of Measurement:

1. Maintenance Aggregate (Temporary and Permanent Applications): Measured by the ton in approved hauling vehicles at the point of delivery. No adjustment factor will be used.

B. Basis of Payment:

1. Maintenance Aggregate (Temporary and Permanent Applications): Paid for by the ton which includes furnishing, placement, compaction, maintenance, removal, stockpiling, reuse and disposal.

PART 2 PRODUCTS

2.01 MATERIALS

A. Maintenance Aggregate (Limestone): Limestone aggregate material shall be approved 100% crushed limestone; shall show not more than 45% loss when tested by AASHTO Designation: T96; shall show not more than 15% loss when tested in accordance with DOTD Designation: T104, and shall meet the following gradation requirements:

U.S. SIEVE	PERCENT PASSING (BY WEIGHT)
1 ½”	100
1”	90 to 100
3/4”	70 to 95
3/8”	50 to 80
No. 4	35 to 65
No. 10	25 to 50
No. 40	10 to 26
No. 200	4 to 12

PART 3 EXECUTION

3.01 TEMPORARY APPLICATIONS

A. Verify thickness of aggregate to be used.

B. Verify subgrade is properly compacted.

C. Place and compact aggregate by suitable means to tight uniform condition. Compact to the satisfaction of the Engineer.

D. Maintain aggregate in good condition at all times.

E. Maintain by blading, recompacting, and adding additional material as necessary to maintain a tight uniform condition.

F. Remove and reuse or stockpile for future reuse aggregate which is no longer necessary for the particular temporary application.

G. Dispose of removed aggregate when no longer necessary for temporary applications.

3.02 PERMANENT APPLICATIONS

A. Verify thickness of aggregate to be used.

B. Verify subgrade is properly compacted, to proper grade and approved.

C. Place and compact aggregate by suitable means to tight uniform condition. Compact to the satisfaction of the Engineer.

D. Fill and blade ruts as necessary to prevent breaking through into subgrade.

E. Level surface to elevations and gradients. Holes, waves and deficiencies in thickness not corrected by blading to be rectified by the addition of more material.

F. Perform hand tamping in areas inaccessible to compaction equipment.

G. Final surface to be smooth, uniform, closely knit, and free from ridges, depressions or loose material.

3.03 SCHEDULE OF APPLICATIONS

A. Temporary Applications:

1. Temporary patching for driveways, shoulders, walks, roadways, and other areas as necessary.

2. Locations as directed by the Engineer.

B. Permanent Applications:

1. Permanent surfacing for driveways and shoulders.

2. Locations designated in the Drawings and as directed by the Engineer.

END OF SECTION

SECTION 02200

SITE PREPARATION

PART 1 GENERAL

1.01 SPECIFICATION INCLUDES

A. Clearing and Grubbing

B. Removing Surface Debris

C. Removal of Structures and Obstructions

D. Salvage

E. Relocated or Reinstalled Items

1.02 REGULATORY REQUIREMENTS

A. Conform to applicable laws and ordinances for disposal of debris.

1.03 DEFINITIONS

A. Clearing and Grubbing: Consists of cutting timber, logs, brush, stumps, cane and debris; excavation and removal of all stumps, roots, submerged logs, snags, corduroy and other perishable and objectionable material; and disposing of removal material and cleaning up the construction area.

B. Removal of Structures and Obstructions: Consists of removal and satisfactory disposal of all buildings, septic tanks, fences, culverts, structures, pavements, abandoned pipelines and other obstructions not designated or permitted to remain on the Site; includes salvaging of designated materials and backfilling trenches, holes and pits.

C. Removal and Replacement of Signs: Consists of removal and satisfactory replacement of existing sign. Sign shall be re-installed to the satisfaction of the Engineer. If existing sign is damaged by Contractor, the sign shall be replaced using the same materials of equal quality, color, and texture as the original at no expense to the owner. The sign shall be the same size, shape, and form as the original or as directed by the Owner.

1.04 UNIT PRICES

A. Method of Measurement:

1. Work described under this section will not be measured for payment.

PART 2 PRODUCTS

2.01 MATERIALS

A. See Section 1.03.C

PART 3 EXECUTION

3.01 PREPARATION

A. Protect existing structures and appurtenances to remain from damage or displacement.

B. Protect bench marks and existing work from damage or displacement.

C. Protect above and below grade utilities and other Underground Facilities designated to remain.

D. Protect items salvaged until reuse or delivery to Owner.

3.02 CLEARING AND GRUBBING

A. Minimize areas to be cleared for access and execution of work.

B. Remove trees and shrubs only as necessary for execution of work. Grub out stumps, roots, and other perishable and objectionable matter.

C. Remove and promptly dispose of contaminated, vermin infested, or dangerous materials encountered.

D. Backfill and compact stump holes and other holes from which obstructions are removed.

3.03 REMOVAL OF STRUCTURES AND OBSTRUCTIONS

A. Remove as required for proper execution of work, existing structures, foundations, pavements or other obstructions as indicated in the Drawings or designated in individual Specifications Sections. Demolish and remove in an orderly and careful manner.

B. Exercise due care in removal of items to be stored and reused as indicated in the Drawings or required by individual Specifications Sections.

3.04 DISPOSITION OF MATERIALS

A. Salvaged Items: Salvage items designated with reasonable care and deliver to a location specified by the Owner within 10 miles of the site. Store and protect on the site until time of delivery.

B. Unsalvaged Items: Remove from site in accordance with the provisions of this Section.

C. Relocated or Reinstalled Items: Remove items designated to be removed or reused in the same or different location on the site. Store and reinstall in such a manner to prevent damage to the item.

3.05 REMOVAL

A. Remove debris from site as work progresses. Leave site in a clean condition.

B. Debris to be removed from site prior to commencement of other work.

END OF SECTION

SECTION 02271

GEOTEXTILE FABRIC

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Geotextile Fabric

1.02 REFERENCES

A. DOTD Section 1019 – Geotextile Fabric and Geocomposite Systems.

1.03 UNIT PRICES

A. Method of Measurement: Measured by the square yard of "Geotextile Fabric (Class D)".

B. Bais of Payment: Paid for by the square yard which includes furnishing and placement.

PART 2 PRODUCTS

2.01 Materials

A. Geotextile fabric shall be composed of at least 85 percent of weight of polyolefins, polyesters, or polyamides. The geotextile fabric shall be resistant to chemical attack, rot and mildew and shall have no tears or defects which adversely alter its physical properties.

B. When required, the geotextile fabric shall contain stabilizers and/or inhibitors added to the base material to make filaments resistant to deterioration due to ultraviolet and heat exposure.

C. Edges of geotextile fabric shall be finished 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. Durability of these fibers shall be equivalent to that of the geotextile fabric.

D. Geotextile fabric rolls shall be furnished with an opaque, waterproof wrapping for protection against moisture and extended ultraviolet exposure prior to placement. Each roll shall be labeled or tagged with the manufacturer's name, date of manufacture, batch number, name of product.

E. Unless otherwise specified on the plans or in the project specifications, the geotextile fabric shall be an approved product in LA DOTD Qualified Products List (QPL) 61.

F. The geotextile fabric shall conform to the requirements in Table 1 below and shall be utilized as follows unless otherwise specified:

Use:	Classes
(1) Drainage:	
Underdrains	A, B, C, or D
Pipe and Precast Manhole Joints	A, B, C, or D
Weep Holes	A, B, C, or D
Bedding Fabric	B, C, or D
Approach Slabs	D
(2) Stabilization:	
Bulkheads	C or D
Flexible Revetments	C or D
Rip Rap	D
Railroad Crossings	D
Soil Stabilization	C, D or S
(3) Silt Fence:	
Wire Supported	F
Self Supported	G

Table 1
GEOTEXTILE FABRICS

		CLASSES						
PROPERTY	**TEST METHOD**	**A**	**B**	**C**	**D**	**S**	**F**	**G**
AOS, U.S. Sieve, Min.	ASTM D 4751	50	50	50	70	32	20	20
Grab Tensile, lb. Min.	ASTM D 4632	75	90	130	180	180	90	90
% Elongation @ Failure Min.	ASTM D 4632	--	--	50	50	--	--	50
Burst Strength psi, Min.	ASTM D 3787	100	140	210	290	290	--	--
Puncture, lb., Min.	ASTM D 4833	25	30	40	75	75	--	--

Trapezoid Tear Strength, lb. Min.	ASTM D 4533	25	30	40	50	50	--	--

PROPERTY	TEST METHOD	A	B	C	D	S	F	G
Permittivity, Sec. – 1 Min.	ASTM D 4491	1.0	1.0	1.0	1.0	.2	.01	.01
Strength Retained at 150 h Weatherometer, %, Min.	ASTM D 4632 DOTD TR 611	70	70	70	70	70	--	--
Strength at 500 h Weatherometer, %, Min.	ASTM D 4632 DOTD TR 611	--	--	--	--	--	70	70

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 02315

SPECIAL BACKFILL AND TOPSOIL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Special backfill for backfilling of trenches or around structures.

B. Topsoil for final dress-up applications.

1.02 REFERENCES

A. DOTD Section 715-Topsoil.

1.03 UNIT PRICES

A. Method of Measurement:

1. Special Backfill: Measured by the cubic yard in approved hauling vehicles at the point of delivery. Special backfill shall be used only with the Engineers approval where the excavated material is not suitable for backfilling the trench or obtaining the required compaction.

2. Topsoil: Measured by the cubic yard in approved hauling vehicles at the point of delivery.

B. Basis of Payment:

1. Special Backfill: Paid for by the cubic yard, which includes furnishing, placement, and compaction.

2. Topsoil: Paid for by the cubic yard, which includes placement and grading.

PART 2 PRODUCTS

2.01 MATERIALS

A. Special Backfill: Class A-6 soil classification, as per La. DOTD Designation: TR 423, Plasticity Index of between 11 and 20 and a Liquid Limit of 40, free of all foreign matter.

B. Topsoil: Natural, workable, loamy soil, free of debris, refuse, and similar foreign matter and reasonably free of subsoil, hard lumps, gravel, roots, and other such material. Topsoil shall have a minimum plasticity index of 4 and shall be capable of supporting adequate vegetation.

PART 3 EXECUTION

3.01 PLACEMENT OF SPECIAL BACKFILL

A. Special Backfill shall be used, with the Engineer's approval, where the excavated material is not suitable for backfilling the trench and obtaining the required compaction. (At the Contractor's option, limestone may be used for special backfill at no additional cost to L.U.S.)

B. Where compaction density is specified, maximum density shall be determined in accordance with requirements of Louisiana DOTD Designation: TR 418 and TR 401.

C. Placement of special backfill shall follow the provisions as set forth in Section 02530.

3.02 PLACEMENT OF TOPSOIL

A. Topsoil shall be used, with the Engineer's approval, where final dressing is being conducted.

B. Placement of topsoil shall conform to the existing natural ground and shall have a smooth transition to existing natural ground.

C. Hand raking shall be utilized to obtain the necessary placement, if required by the Engineer.

3.03 PROTECTION OF FINISHED WORK

A. Maintain settlement of backfills which may occur within one year after final completion of the Contract under which the Work was performed.

END OF SECTION

SECTION 02510

WATER MAIN DISTRIBUTION SYSTEM

PART I GENERAL

1.01 SECTION INCLUDES

A. Pipe Materials and Fittings

B. Main Installation

C. Testing and Disinfection

1.02 SCOPE OF WORK

The work covered by this section of the specifications consists of furnishing all labor and material for the construction of water lines and appurtenances as described in the plans and elsewhere in the specifications.

1.03 REFERENCES

A. ANSI/ASTM D 1784 Rigid Poly (vinyl Chloride) (PVC) Compounds.

B. ANSI/ASTM D 2241 Poly (vinyl Chloride) (PVC) Plastic Pipe (SDR-PR).

C. ANSI/AWWA C104/A21.4 Cement Mortar Lining for Ductile-Iron Pipe and Fittings.

D. ANSI/AWWA C110/A21.10 Ductile-Iron and Gray-Iron Fittings, 3 In. through 48 In.

E. ANSI/AWWA C111/A21.11 Rubber Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings.

F. ANSI/AWWA C150/A21.50 Thickness Design of Ductile-Iron Pipe.

G. ANSI/AWWA C151/A21.51 Ductile-Iron Pipe for Water or Other Liquids.

H. AWWA C651 Disinfecting Water Mains.

I. AWWA C900 Poly (vinyl Chloride) (PVC) Pressure Pipe 4 In. through 12 In.

J. AWWA C605 Underground Installation of PVC Pressure Pipe & Fittings for Water.

1.04 REGULATORY REQUIREMENTS

A. Conform to applicable state and local codes for installation and testing of the work in this section.

1.05 QUALITY CONTROLS

A. Submit manufacturer's certifications that PVC pipe and fittings meet requirements of AWWA or the appropriate ASTM standard.

B. Submit manufacturer's certifications that ductile iron pipe and fittings meet requirements of the appropriate ANSI standard.

1.06 MEASUREMENT AND PAYMENT

A. Method of Measurement:

1. Water Main: Water main installed will be measured by the linear foot of the various sizes and types actually installed excluding water main that is required to complete other items of work that have been defined in the bid. Measurement shall be continuous from end to end without deductions for fittings, valves, or jack or bored mains.

2. Fittings: Ductile iron fittings installed with water lines shall be measured by the ton, based on the catalog weight per fitting. The weights of the fittings shall be exclusive of bolts, nuts, and gaskets and exclusive of glands when a retainer is used. All fittings not specifically included in the other items of work defined in the proposal shall be included in this measurement.

3. Jacking or Boring: Jacking or boring measurement shall be by the linear foot and shall be the actual center line length of pipe so installed as measured from the vertical cut on each side of the obstruction to be bored but shall not exceed two (2') feet beyond obstruction. Jacking or boring operations shall in no way interfere with the operation of railroads, streets, highways, or other facilities and shall not weaken or damage such facilities. Jacking or boring HDPE pipe quantity shall include adapters, reducers, and fittings necessary to tie-in HDPE pipe with PVC pipe.

4. Casing Pipe: The basis of measurement for casing pipe shall be by the linear foot and shall be the actual center line of casing so installed.

5. Stream Crossing: Stream crossing shall be measured by the lump sum for the limits designated in the water details which includes pipe, fittings, and all incidentals necessary to complete the work for this item.

6. Tie-In To Existing Mains: Tie-in connections to existing mains shall be paid for per each. Valves and fittings are measured and paid for under other items.

7. Select Fill: Select fill for foundation or for backfill over pipe shall be measured by the cubic yard based on the truck volume placed, as ordered by the Engineer.

B. Payment:

1. Water Main: Payment for water main installed, tested, and accepted will be made at the unit price bid per linear foot of pipe of the various sizes. Such payment shall also include excavation, backfill, hauling, and disposition of surplus excavated material.

2. Fittings: Payment shall be based on the number of tons actually installed and shall be made at the price bid per ton. Payment shall include full compensation for all labor, materials, supplies, thrust blocks, anchors, equipment, tools and incidentals necessary for completely installing the fittings in accordance with these specifications and the contract drawings.

3. Jacking or Boring: The work performed and materials furnished as specified herein shall be paid for at the contract unit price bid per linear foot of jacking or boring, which price shall be full compensation for furnishing all materials (except carrier pipe, casings, or liners), labor, tools, equipment and incidentals necessary to complete the work.

4. Casing Pipe: Payment for casing installed will be at the unit price bid for furnishing and installing the casing pipe. No direct payment will be made for casing spacers installed around the carrier pipe in the casing.

5. Stream Crossing: Payment for stream crossing shall be lump sum as stipulated in the bid. This work will consist of furnishing all labor, material, equipment, tools and other incidentals necessary to complete this item as shown on the plans.

6. Tie-In To Existing Mains: Tie-in to existing main shall be paid for per each and includes full compensation for furnishing all equipment, tools, labor, and incidentals necessary to complete the connection.

7. Select Fill: Payment for select fill shall be by the cubic yard at the unit price bid and shall constitute full compensation for furnishing, hauling, placing the fill and removal of excavated material.

PART 2 PRODUCTS

2.01 GENERAL

All products must conform to the state regulations (Act 362) requiring low lead in water distribution systems. Details and applicability of the act are included in Appendix attached. Submittals on all products to be used shall be provided to the owner for review and approval prior to installation.

2.02 WATER MAIN

A. PVC Pipe (2 Inch)

1. Pipe and fittings shall be made from clean, virgin NSF approved Type I, Grade I PVC conforming to ASTM Resin Specification D1784-65T.

2. PVC pipe shall be supplied in standard nominal laying lengths of 20 feet. The color of pipe shall be blue or white with blue lettering. The pipe shall be marked with the size, material code, dimension ratio (DR), AWWA pressure class and AWWA designation.

3. Pipe shall meet ASTM D2241 pipe standards working pressure of 160 psi, SDR 26, Commercial Standard C5256-63, and be approved by the National Sanitation Foundation.

4. Fittings shall be brass, compression type.

5. No 2" PVC pipe joint will be allowed in roadway.

B. PVC Pipe (Above 2 Inch)

1. Pipe:

A. 4 - 12 inch: AWWA C900, SDR 18, 235 psi pressure, NSF approved, 12454 PVC compound conforming to ASTM Resin Specification D1784.

B. 14 - 24 inch: AWWA C905, SDR18 DIPS, 235 psi rating, NSF approved, 12454 PVC compound conforming to ASTM Resin Specification D1784.

2. Provide pipe which is homogeneous throughout, free of voids, cracks, inclusions, and other defects, uniform as commercially practical in color, density, and other physical properties.

3. Fittings shall be ductile iron and conform to Section 2.01.E.

4. Joints shall be made of gasket bell push-on type. Joints shall be gasket joints conforming to ASTM F477. Joints assembled with non-toxic lubricant.

5. All joints under roadways shall be restrained.

6. PVC pipe shall be supplied in standard nominal laying lengths of 20 feet. The color of pipe shall be blue or white with blue lettering. The pipe shall be marked with the size, material code, dimension ratio (DR), AWWA pressure class and AWWA designation.

7. Fusion-joined PVC pipe shall be Fusible C-900 (3" – 12") and Fusible C-905 (14" – 24") with the same properties (SDR, coloring, labeling, etc.) as stated above. The chemical compounds for fusion-joined PVC pipe shall be formulated to facilitate the thermal-fusion process.

8. Fusion-joined PVC shall be joined by a pipe manufacturer-certified technician with manufacturer approved equipment and shall include a means of logging fusion process data.

C. Ductile Iron Water Pipe

Pipe shall be designed in accordance with ANSI Specification A21.50 (AWWA C150), latest revision. All pipe shall be designed for the following minimum conditions, unless noted otherwise:

1. Internal working pressure of 250 psi plus 100 psi surge allowance plus safety factor of 2.

2. Earth load of 5 feet of cover or as shown on the plans.

3. Laying Condition Type 2.

4. AASHTO H-20, truck loading.

Pipe shall be manufactured in accordance with ANSI Specification A21.51 (AWWA C151), latest revision, except the minimum nominal wall thickness shall be as shown on the following table:

Size	Pressure Class	Thickness
6"	350	0.25
8"	350	0.25
10"	350	0.26
12"	350	0.28
14"	250	0.28

16”	250	0.30
18”	250	0.31
20”	250	0.33
24”	250	0.37
30”	250	0.42

Pipe shall be standard cement lined and seal coated on the inside with a bituminous coat in accordance with ANSI Specification A21.4 (AWWA C104), latest revision. The exterior of the pipe shall be coated, with an asphaltic coating approximately 1 mil thick in accordance with ANSI Specification A21.51 (AWWA C151), latest revision. Ductile iron pipe shall be as manufactured by American Cast Iron Pipe Company, Clow Corporation, U.S. Pipe and Foundry Company, or approved equal.

Joints shall be push-on, conforming to ANSI Specification A21.11 (AWWA C111), latest revision, unless noted otherwise. Push-on joints shall be equal to push-on joints manufactured by American Cast Iron Company, U.S. Pipe and Foundry Company, or approved equal.

All pipe is to be hydrostatically proof tested to a minimum of 75% yield strength after manufacture. The manufacturer will furnish the Owner sworn certificates that pipe has been manufactured, tested and inspected in accordance with applicable specifications.

D. Ductile Iron Restrained Joint Pipe

Restrained joint pipe shall be ductile iron pipe designed and manufactured in accordance with Section B, Ductile Iron Pipe, of this article. Restrained joint fittings and the restraining components shall be ductile iron in accordance with the applicable requirements of ANSI/AWWA C110/A21.10, C111/A21.11 and C153/A21.53.

Restrained joint pipe and fittings for 12 inch and smaller diameter pipe shall be “Flex-Ring” by American Cast Iron Pipe Company, “TR-Flex” by U.S. Pipe and Foundry Company, “Super-Lock” by Clow Corporation, or approved equal. Restrained joint pipe and fittings for 14 inch and larger diameter pipe shall be “Lok-Ring” by American Cast Iron Pipe Company, “TR-Flex” by U.S. Pipe and Foundry Company, “Super-Lock” by Clow Corporation, or approved equal. Fittings for use with restrained joint pipe shall be ductile iron and shall conform to ANSI/AWWA C110/A21.10 and C153/A21.53. Where bolts are required, they shall be corrosion resistant. Field cut restrained joints shall be installed in accordance with the manufacturer’s recommendations.

E. Fittings

Ductile Iron: Ductile iron fittings shall be standard body ANSI A21.10/AWWA C110 or compact body ANSI A21.53/AWWA C153. The rated working pressure shall be 350 psi. Sufficient quantities of gaskets, glands, bolts and nuts shall be furnished to provide for each socket opening. Bolts and nuts shall be alloy steel (Corten Type). All fittings shall be asphalt coated outside and cement lined and seal coated inside in accordance with ANSI A21.4/AWWA C104. Fittings must be manufactured in the United States.

F. Polyethylene Pipe (PE Pipe)

1. Pipe: AWWA C906, SDR11, PE 3408 High Density, DIPS, Cell Classification 345434C, in accordance with ASTM D3350 (Black with Blue Stripes).

2. Transition Fittings shall be a mechanical joint adapter (Harvey Adapter) fabricated from HDPE pipe conforming to ASTM 3350. The fitting shall have a pre-positioned stiffener and shall offer full axial restraint.

G. Casing

1. Casing shall be welded smooth steel pipe conforming to APL 5L, Grade B or ASA B36.10, coated inside and outside with asphalt or painted with two coats of bitumastic paint.

2. Minimum thickness of 0.375 inches is required.

3. Spacers shall be provided at manufacturer's recommended increments.

H. Polyethylene Encasement

1. Polyethylene wrap is to be used in open-cut construction for ductile iron pipe when a cathodic protection system is required.

2. Polyethylene encasement shall conform to AWWA C105.

3. Film shall be Class C-Black, minimum thickness of 0.008 inches (8 mils), and furnish a certificate of conformance of the material to the requirement of AWWA C105.

4. Tape shall have a pressure sensitive adhesive face capable of bonding to metal, bituminous coating, and polyethylene, minimum thickness of 8 mils, and a minimum width of 3 inches.

I. Detection Wire

1. A THW 14 insulated solid copper wire shall be placed over the center of PVC and PE pipe for the entire length including crossings.

2. Attach wire to all fixtures and appurtenances to ensure continuous flow of electrical current.

3. Splices in detection wire shall be installed in a direct bury splice kit manufactured by 3M or approved equal.

4. Detection wire and splice kit is to be included in unit price for either PVC or PE pipe.

J. Retainer Glands

1. Retainer glands and bell joint restraints shall be of the following manufacturer or approved equal:

Retainer Glands – UFR 1400 Ford or EBBA Megalug for Ductile Iron Pipe
Retainer Glands – UFR 1500 Ford or EBBA Megalug for PVC Pipe
Bell Joint Restraints – UFR 1390 Ford or EBBA Megalug for PVC and Ductile Iron Pipe

K. Marking Tape

All PVC pipe shall be marked using a nonmetallic tape buried at least 15 inches above the top of the pipe. Water mains shall be marked with blue tape. Tape shall be 3 inches wide minimum and on the Board's list of materials and approved manufacturers. After the tracer wire has been placed, the pipe trench shall be backfilled to approximately 15 inches over the top of the pipe then the nonmetallic tape shall be placed flat over top of pipe within trench. Backfill shall be carefully placed to a depth of 3 inches by hand to assure that the tape is secured in place over the pipe. It is the intent to provide a visible marker in the event of excavation near a water line.

2.03 WORKMANSHIP

A. Furnish pipe and fittings that are homogeneous throughout and free from visible cracks, holes, foreign inclusions, or other injurious defects. Provide pipe as uniform as commercially practical in color, opacity, density, and other physical properties.

PART 3 EXECUTION

3.01 PREPARATION

A. Less than 48 hour notice for approved disconnection to customers shall be the responsibility of the contractor.

B. Identify and protect above and below grade utilities and other underground facilities to remain.

C. Conform to applicable manufacturers installation specifications for types of pipe used.

D. Lay pipe to lines and grades shown on drawings. Establish the route for water lines along with highway and stream crossings.

E. Provide minimum 6 feet horizontal clearance between water mains and sewer lines running parallel and minimum 18 inch vertical clearance at crossings.

3.02 TRENCHING

A. Maintain a minimum cover for pipes eight (8") inches or less in diameter at 36" and for pipes ten (10") or greater at 48", except where required to meet existing water lines.

B. The bottom of the trench shall be excavated to a uniform grade and shall be free from obstructions, which would result in the weight of the pipe being concentrated at certain points.

C. Where subsurface obstructions are encountered in the trenching operations, the Contractor will be permitted to lay pipe above the obstruction if the minimum cover required can be obtained while providing at least three (3") inches thick clearance between the bottom of the pipe and the top of the obstruction.

D. Where the 6" minimum cover cannot be obtained above an obstruction, the Contractor will be required to lay the pipe under the obstruction. No additional compensation for additional depth of bury will be paid for constructing the line in this manner.

E. Maximum length of trench to be opened in advance of a section of completed water main shall be 200 feet.

F. The Engineer shall at his discretion limit the maximum length of trench opened in advance of the completed main.

G. The Contractor will be required to keep the sides of the trench as nearly vertical as possible by means of sheathing or bracing, as may be required to thoroughly support the sides of the excavation.

H. If sheathing is used, the bottom width of the trench in the clear shall be twelve (12") inches wider than the greatest horizontal diameter of the water pipe. Unless otherwise ordered by the Engineer, that portion of sheathing in the trench extending below the top of the water main shall not be withdrawn before more than six (6") inches of earth is placed above the top of the main. If the sheathing cannot be removed without injury

to the water main or to the adjoining structures, it shall be left in place, or it shall be cut where directed and the upper part shall be removed.

I. Excavated material shall be placed in such a manner that will not endanger the work or prevent obstruction of sidewalks or driveways. No street shall be closed to through traffic without the permission of the Engineer.

J. The Contractor shall take every precaution to protect existing structures and landscaping.

K. The Contractor shall give sufficient notice to the interested utility of his intention to remove or disturb any other pipe or conduit and shall abide by their regulations governing such work.

L. During construction operations the Contractor shall make all provisions to not disturb existing piping or conduit systems. If any existing systems are damaged, the Contractor shall be responsible for any and all repairs to the satisfaction of the Engineer.

M. If during construction operations a utility service line is broken, the Contractor shall repair the line at his own expense, or if preferred by the utility involved, shall pay the utility for utilizing their own forces. Delays for extended periods will not be tolerated, thus the Owner reserves the right to make repairs at the Contractor's expense without prior notification.

N. Mains shall be jack or bored under all concrete roadways and sidewalks except where specified or in special cases where no other practical method for installation is available. In the event the concrete surface is damaged during construction operations, repairs to the pavement shall be made by the Contractor at no additional cost to the Owner.

O. Lafayette City-Parish Consolidated Government Code of Ordinance Chapter 78, Article III, Division 2 shall be followed in all trenching and backfilling operations.

3.03 DEWATERING

A. The Contractor shall furnish all equipment necessary for pumping water accumulated in the trenches.

B. Trenches and other excavations shall be kept clear of water while pipe is being installed or concrete structures are being constructed.

C. No pipe or appurtenances shall be laid in water.

3.04 PIPE INSTALLATION

A. Excavate bottom of trench to uniform grade to achieve stable trench conditions and satisfactory compaction of foundation or bedding materials.

B. Where, in the opinion of the Engineer, the floor of the trench is not sufficiently stable to prevent vertical or lateral movement of the pipe after installation, the pipe

shall be laid on a timber foundation or the trench shall be excavated below grade and brought back to grade with suitable filling of limestone or select fill material, as directed.

C. Immediately prior to placement of embedment materials, the bottoms and sidewalls of trenches shall be free of loose or unsuitable soil.

D. Thoroughly clean interior of pipe before lowering into the trench while keeping pipe interior free of foreign matter during laying operations.

E. When work is not in progress, the ends of the pipe and fittings shall be sealed so foreign material cannot enter pipe.

F. The pipe shall be installed and backfilled in accordance with the manufacturer's specifications. Items of work not mentioned specifically herein shall be performed in compliance with the current revision of AWWA C605, "Standard for Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water."

G. Pipe laying operations shall not block, obstruct, or prevent streams, ditches, canals, culverts, conduits, or gutters from carrying their normal flows or of serving their normal function without the approval of the Engineer. Any disruption shall be restored by the Contractor.

H. The trench shall provide continuous support for the pipe without voids or soft spots under the pipe.

I. Concrete thrust blocks shall be provided at all fittings where a change of direction occurs or as specified by the Engineer for all pipe three (3") in diameter or greater. Thrust blocks shall be poured against undisturbed soil and shall not cover the bolts or nuts on the fittings. A plastic barrier shall protect bolts or nuts from being covered.

J. Every change in direction where a fitting or mechanical joint is used shall have three (3) forms of restraint within two (2) whole joints of the fitting. Restraints required are as such mega lugs, thrust blocks, dead man, bell joint restrainers, locking joint, all threaded rods or approved by LUS.

K. The water main shall be installed in steel casing where indicated in the Drawings, typically under state highways, railroads, or as indicated by the Engineer.

L. Pipe shall be laid beneath all ditches, sewers, culverts, pipes, conduits, drainage canals, tracks and similar structures. Regular pipe laying methods shall be used in all such cases except where special crossings are indicated.

M. The Contractor shall not operate any valves that will allow water to flow or stop the flow of water. These valves will be operated by the Lafayette Utilities System personnel **only**.

N. Water service to customers shall be maintained without interruption as much as possible. Interruption of service shall be allowed only at times agreed to by the Owner and with proper notice to the customer (at least one hour in advance).

O. The Owner may require that major connections which require lengthy interruptions to service be made during periods of low water use or that temporary service lines be provided by the Contractor at no additional cost to the Owner.

P. Assembly of fittings and other preparatory work shall be done in advance to reduce the off time and to keep interruption to a minimum.

3.05 BACKFILLING OF TRENCH

A. Perform backfill operations and restore surface as soon as practicable. Leave only the minimum length of trench open as necessary for construction.

B. Re-excavation of the trench for replacement of pipe, tapping, testing, or disinfecting shall be done by the Contractor at no additional cost to the Owner.

C. The Owner reserves the right to order any trench or trenches backfilled at any time after installation of pipe if the particular trench remaining open constitutes a public nuisance.

D. Outside of Public Right-of –Ways:

1. Compact excavated material around and to a depth of 12” above the pipe for the entire length of the trench to 90 percent of maximum standard proctor density in 6” to 8” lifts.

2. The remaining portion of the trench shall be backfilled in 12” lifts and thoroughly compacted leaving a slightly crowned condition, not to exceed 12” above natural ground.

E. Inside of Public Right-of-Ways:
Outside of Public Roadways:

1. Compact excavated material around and to a depth of 12” above the pipe for the entire length of the trench to 95 percent of maximum standard proctor density in 6” to 8” lifts.

2. The remaining portion of the trench shall be backfilled in 12” lifts and thoroughly compacted leaving a slightly crowned condition, not to exceed 12” above natural ground.

Underneath roadways, streets, shoulders, walks, and drives (as per details in the drawings):

1. Limestone shall be compacted in 12” lifts to 95 percent density up to 3” (min.) –12” (max.) above pipe.

2. A mechanical vibrator shall be used to compact the limestone.

3. The remainder of the trench shall be filled with fill-crete (188 lbs. of cement, 3010 lbs. of sand, and 46.2 gals. of water).

F. All excavated material shall be cleared from adjacent street surfaces, gutters, sidewalks, and lots. Salvaging and replacement of sod on lawns may be ordered by the Engineer at no additional cost to the Owner. All surplus excavated material shall be removed by the Contractor, and shall be disposed of at locations and in a manner approved by the Engineer.

3.06 FLUSHING OF WATER MAIN

A. As-built information shall be provided to LUS personnel prior to any flushing and testing.

B. The flushing process shall be performed in the presence of LUS personnel. The Contractor shall notify LUS personnel at least 48 hours prior to flushing of the water mains.

C. All water mains shall be flushed before testing and sampling of the water system.

D. Provide properly sized riser pipes for flushing when hydrant outlets are not convenient. LUS personnel shall approve size of riser pipes for flushing.

E. The duration of the flushing shall be determined in the field by the Engineer.

F. The size of the flushing outlet shall be as shown below:

Water Main Size	Size of Flushing Outlet
2”	2” Riser
4”	2” Riser
6”	One 4 ½” Hydrant Pumper Outlet or One 6” Riser
8”	One 4 ½” Hydrant Pumper Outlet or One 6” Riser
10”	One 6” Riser
12”	One 8” Riser
16”	One 12” Riser

3.07 HYDROSTATIC TESTING OF MAINS

A. The Contractor shall furnish all materials, equipment, and labor to satisfactorily test the pipe at no cost to Owner.

B. The Owner shall supply water for testing purposes.

C. The water mains shall be pressured to 150 psi and shall hold that pressure for two (2) hours.

3.08 DISINFECTION OF WATER LINES

A. All water lines and appurtenances shall be disinfected before placing in service.

B. Disinfection shall be performed in accordance with the latest revision of AWWA C651.

C. A solution of calcium hypochlorite, sodium hypochlorite , or liquid chlorine shall be used to obtain a solution of at least 50 mg/l of available chlorine throughout the entire piping system.

D. While the disinfectant is being applied to any section of the system, the water shall be allowed to flow at all extremities of the section until an orthotolidine test shows a deep orange color.

E. Allow the chlorine solution to remain in the pipe for minimum of 24 hours. Then tests shall be performed to determine that a chlorine residual of at least 5 mg/l remains in the system.

F. Repeat disinfection if chlorine residual is less than 5 mg/l.

G. Following disinfection, the lines shall be thoroughly flushed to remove the chlorine.

H. The Contractor shall be responsible to furnish taps, corporation stops, tubing, faucets, and labor to help obtain samples of water from the disinfected lines.

I. The disinfection process shall be made in the presence of Lafayette Utilities System personnel. The Contractor shall notify LUS Personnel at least 48 hours prior to testing of the water lines.

J. If bacteriological tests indicate that the water lines are not free of coliform organisms, the disinfection procedure shall be repeated on that part of the system until samples are proven to be free of contamination.

K. Disinfection shall be considered acceptable when reports indicate the lines are free of contamination and with the approval of the Engineer.

L. The Contractor will be responsible for removing all testing and flushing risers within 5 working days after notice of clear sample.

M. After all tests have been completed and risers removed, the corporation stops shall be plugged with a Mueller brass plug (No. H10033) or approved equal.

3.09 COOPERATING WITH LAFAYETTE UTILITIES SYSTEM (LUS)

A. The source of water shall be the public water system operated by the Lafayette Utilities System.

B. Connections to the water system shall be made in accordance with the plans and in cooperation with LUS personnel.

3.10 STORAGE OF MATERIALS

A. All water main pipe and appurtenances shall be stored in an appropriate stock yard upon receipt by the Contractor and shall be secured so foreign and contaminating substances do not enter the water line materials.

B. Pipe and fittings shall be placed on the job site only as needed and not in quantities greater than those to be installed in one working day.

3.11 CARE OF STREETS, SIDEWALKS & ROADS

A. Remove all excess materials, debris or other obstruction from streets or roads immediately after completing backfilling, at Contractor's expense.

B. Wash streets, sidewalks and roads daily to remove dust problem.

C. No cross streets, sidewalks or roads shall be wholly obstructed except by written permission from the Engineer.

D. If at any time the Contractor neglects to remove such material or obstruction and place streets, sidewalks and roads in suitable condition for traffic within twenty-four (24) hours after having received notice (written or verbal) from the Engineer, the work may be done by L.U.S., and the cost thereof charged to the Contractor and deducted from his final estimate.

E. Repair and replace streets, sidewalks, roads, ditches and culverts to the satisfaction of the Engineer and parties concerned.

3.12 PROTECTION AND CARE OF PUBLIC OR PRIVATE PROPERTY AND SERVITUDES

A. Continuously maintain and protect all underground and above ground structures, utilities, including the restoration of all public utilities, water mains, water services, gas mains, gas services, culverts, drains, ditches, curbs, sidewalks, landscaping and/or other facilities which may be damaged, to a condition at least equal to their original status, at no additional cost to L.U.S. In the event of damage to any facilities, the appropriate utility will be notified immediately. L.U.S. will repair damaged facilities at the Contractor's expense or require the Contractor to repair said damage.

B. All construction work under this contract on servitudes, right-of-way, private property or franchise shall be confined to the limits of such servitudes, right-of-way or franchise. All work shall be accomplished so as to cause the least amount of disturbance and a minimum amount of damage.

C. No trees or shrubbery shall be removed or trimmed without the consent of the Engineer. With such approval ornamental trees and shrubbery shall be carefully removed, with the earth surrounding their roots wrapped in burlap and replanted in their original positions within forty-eight (48) hours. All shrubbery or trees destroyed or damaged shall be replaced by the Contractor with material of equal quality at no cost to L.U.S.

D. All obstacles such as fences, markers, mail boxes, driveway culverts, etc. shall be removed by the Contractor and immediately replaced after the trench is backfilled in their original position and condition at no direct cost to L.U.S.

E. Maintain adequate drainage during the process of construction.

3.13 CLEAN-UP

A. Remove from the site all tools, equipment, temporary structures and surplus materials.

B. Dispose of all excess soil, waste, rubbish, debris or objectionable materials off the site and in a manner and a location that complies with local ordinances and laws and is acceptable to all parties concerned and is approved by the Engineer.

C. When disposal of excess soil is upon private lands, the Contractor shall be required to produce a written agreement with the private landowner stating the agreed terms and conditions.

D. The entire construction site shall be left clean and to the satisfaction of the Engineer.

END OF SECTION

SECTION 02530

WASTEWATER COLLECTION SYSTEM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Collection line piping, fittings, and accessories.

B. Manholes.

C. Pipe Testing.

1.02 DEFINITION

A. "L.U.S." shall refer to the Lafayette Utilities System (a Department of the Lafayette City-Parish Consolidated Government (LCPCG)) or their authorized representative.

1.03 REFERENCES

A. Where reference standards are specified throughout this section, the date of the standard is that in effect as of the Bid Date, or date of Owner-Contractor Agreement when there are no bids.

B. ASTM A 746 - Ductile Iron Gravity Sewer Pipe.

C. ANSI/ASTM D 1784 - Rigid Polyvinyl Chloride (PVC) Compounds.

D. ANSI/ASTM D 2241 - Polyvinyl Chloride (PVC) Plastic Pipe (SDR-PR).

E. ANSI/ASTM D 2321 - Recommended Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe.

F. ANSI/ASTM D 3034 - Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.

G. ASTM F 477 - Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

H. ANSI A21.11/AWWA C111 - Standard for Rubber-Gasket Joints for Ductile Iron and Gray Iron Pressure Pipe and Fittings.

I. ANSI A21.50/AWWA C150 - Thickness Design of Ductile Iron Pipe.

J. ANSI A21.51/AWWA C151 - Standard for Ductile Iron Pipe for Water or Other Liquids.

K. ASTM C 923 - Resilient Connectors Between Reinforced Concrete Manhole

Structures and Pipes.

L. Louisiana Standard Specifications for Roads and Bridges, Department of Transportation and Development, Office of Highways, 2000 Edition.

M. ASTM C 39 - Compressive Strength of Cylindrical Concrete Specimens.

N. ASTM C 150 - Portland Cement.

O. ASTM C 443 - Specification for Joints for Circular Concrete Sewer and Culvert Pipe Using Rubber Gaskets.

P. ASTM C 478 - Precast Reinforced Concrete Manhole Sections.

Q. ANSI/ASTM D 3212 - Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.

R. ANSI A21.4/AWWA C104 - Cement-Mortar Lining for Ductile Iron and Gray-Iron Pipe.

S. ASTM D 2564 - Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Pipe and Fittings.

T. ASTM D 2855 - Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings.

1.04 REGULATORY REQUIREMENTS

A. Observe and comply with all applicable federal, state and local laws, municipal ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the project.

B. Observe and comply with all applicable safety and health standards published by the Secretary of Labor under Section 107, Part 1585 of the Contract Work Hours and Safety Standards Act.

1.05 SUBMITTALS

A. Submit product data for pipe, fittings and accessories.

B. Submit when requested by the Engineer, manufacturer's printed instructions for delivery, storage, preparation, assembly, installation, adjusting and finishing.

C. Submit, if requested by the Engineer, within thirty days after signing the Contract, a list of all materials and equipment ordered for the project, the manufacturers or agents from whom ordered, catalog and type, quantity ordered and promised delivery date of each item. Any subsequent changes in this list shall be promptly brought to the attention of the Engineer.

1.06 PROJECT RECORD DOCUMENTS

A. Accurately record location of pipe runs, connections, manholes, and invert

elevations.

B. Reference measurements to appropriate datum control.

C. Document field changes of dimension and detail.

D. Submit construction record drawings as per L. U. S. standard format.

1.07 QUALITY ASSURANCE

A. Submit a certificate of compliance from the pipe, pipe coupling, fittings, and manhole manufacturers stating that the material complies with the specifications. Certificate shall include all applicable test result data and the date manufactured for each lot of material delivered to the project site. Certificate shall also show the date of the latest test.

B. Materials used on the basis of a certificate of compliance may be sampled and tested at any time. Materials used on said basis shall not relieve the Contractor of responsibility for incorporating material in the work which conforms to the plans and specifications. Such material not conforming to requirements will be rejected.

C. Each fitting, length of pipe, and manhole section shall be legibly marked with the name of the manufacturer, rating or class, type, service, schedule and specification number, in conformance with the applicable standard.

D. Where industry standard specifications, such as ANSI, ASTM or AWWA have been referenced for pipe and materials, the manufacturer or supplier shall furnish copies of the latest edition of the standard upon request by the Engineer.

1.08 QUALITY CONTROL

A. All testing that may be required by L.U.S. to determine the quality, fitness and suitability of materials shall be performed at the direction and upon the order of the Engineer, and at no expense to the Contractor provided the tests prove that the materials meet the specified requirements.

B. Where tests prove that materials do not meet the specified requirements, the Contractor shall bear the cost of that test and of all retesting until satisfactory results are achieved. L.U.S. will only pay for tests which demonstrate compliance with the specified requirements.

C. Samples of materials may be secured and tested whenever considered necessary by the Engineer.

D. The Contractor, at his own expense, shall deliver the materials for testing at the time and to the place designated by the Engineer.

1.09 STORAGE AND HANDLING

A. Store all materials and equipment in an appropriate stock yard upon receipt, in accordance with the manufacturer's recommendations, and in a manner that leaves the material and equipment accessible to Inspectors.

B. Store fittings and other appurtenances on pallets.

C. Replace damaged material.

1.10 PRE-CONSTRUCTION CONFERENCE

A. Within ten days of the date of the Notice to Proceed, the Contractor and his project superintendent shall meet with the representative of L.U.S. for a pre-construction conference.

B. Submit a proposed construction schedule at this meeting.

C. Location of the meeting to be designated by L.U.S.

D. Provide L.U.S. with a phone number where someone is available to take calls at all times, in case of emergency, trouble or other matters requiring the Contractor's attention.

1.11 COPIES OF PLANS AND SPECIFICATIONS FURNISHED

A. Contractor will be furnished with three (3) sets of plans and specifications for construction purposes.

B. Upon request, additional copies of plans and specifications may be obtained at the cost of reproduction.

1.12 UNIT PRICES

A. Method of Measurement:

1. Sewer Main: Measured by the linear foot actually installed according to size and incremental depth. Measurement will be horizontally from center to center of manholes and from center of manhole to end of pipe without deductions for fittings, manholes, length of sewer main designated to be jacked or bored or lengths of sewer main installed in casing. The depth of cut for the various sizes of pipe will be the average depth of cut between manholes measured along the center line of the trench. The average depth will be calculated from elevations taken approximately 50 feet apart on the ground or pavement before it is disturbed to the invert of the sewer pipe directly below. The average depth will be the summation of the depths taken, divided by the number of depths taken, from manhole to manhole. In irregular terrain, measurements shall be taken at such other spacing as may be necessary to determine a true average. In cases where the average determined is an exact foot, payment will be made under the pay item for which that exact foot is the upper limit.

2. Manholes: Manholes shall be measured by the actual number constructed at the incremental depths. Depths of the manholes will be measured from the invert of the lowest pipe to the top of the manhole cover. In cases where the depth is an exact foot, measurement and payment will be made under the bid item for which that exact foot is the upper limit. Measurement shall include all items used in the construction of manholes including cast iron

frame and cover, base and top, walls, and bedding material under the manhole base and under the connecting pipes as shown on the Typical Sewer Details.

3. Manhole Drop Inlet: Measured by the actual number installed and accepted per each at the depth indicated. Drop inlet shall include vertical pipe, bends, and tee.

4. 6" Service Line: Measured horizontally from end to end of service lines actually installed with no deductions in length for fittings, jacked or bored, or length of service installed in steel casing.

5. Service Riser: Measured according to size and linear foot installed, from the invert of the main to invert of the service line without deductions for fittings and as shown on the Drawings.

6. Fittings: Measured per each according to size and type actually installed. Only fittings designated as pay items will be measured for payment.

7. Embedment Material: Measured by the linear foot from end to end of each run of sewer main to be used in areas of unstable soil conditions. Cross sectional areas shall be as detailed in the Typical Sewer Detail drawings as Type II sewer foundation. Type I sewer foundation shall not be measured for payment; likewise, required Type II sewer foundation for sewer mains 12' or deeper shall not be measured for payment.

8. Connection to Existing Manhole: Measured per each connection to existing manhole actually installed.

9. Jacking or Boring (Sewer Main or Service Line): Measured, end to end along the centerline, by the linear foot according to the size and type of pipe.

10. Furnish and Install Steel Casing (Jack or Bore): Measured by the linear foot installed according to size and type of installation.

11. Furnish and Install Steel Casing (Open Cut): Measured by the linear foot installed according to size and type of installation.

12. Sheeting Left in Place: Measured per thousand board feet of sheeting left in place as ordered by the Engineer. Sheeting and bracing not required to be left in place shall be included in the cost of sewer main.

13. Stainless Steel Watertight Manhole Inserts: Measured per each including valve body and components.

B. Basis of Payment:

1. Sewer Main: Payment for furnishing and installing sewer main shall be based on the actual number of linear feet installed according to size and incremental depth.

2. Manholes: Payment for manholes shall be based on the actual number constructed at the incremental depths per each.

3. Manhole Drop Inlet: Payment shall be per each based on the actual number installed and accepted at the depth indicated.

4. 6" Service Line: Payment for service lines shall be paid for per linear of line installed and accepted.

5. Service Riser: Payment shall be per vertical linear foot installed including heavy wall sewer pipe, wye, bend at top of riser, and limestone encasement of the service riser.

6. Fittings: Payment shall be per each installed and accepted for the various sizes and types.

7. Embedment Material: Payment shall be by the linear foot of embedment material placed in poor soil conditions, as shown in the Drawings as Type II sewer main foundation.

8. Connection to Existing Manhole: Payment shall be per each and shall include all items necessary to tie sewer main to existing manhole.

9. Jacking or Boring (Sewer Main or Service Line): Payment shall be per linear foot of the various sizes and materials. The sewer main and service line shall be paid for under other items.

10. Furnish and Install Steel Casing (Jack or Bore): Payment shall be by the linear foot installed and accepted according to the size and type of pipe which includes the steel casing and installation by the jack or bore method.

11. Furnish and Install Steel Casing (Open Cut): Payment shall be by the linear foot installed and accepted according to size and type of pipe which includes the steel casing and installation by the open cut method.

12. Sheeting Left in Place: Payment for sheeting left in place shall be based on the actual sheeting ordered to be left in place by the Engineer and shall be paid for per thousand board feet.

13. Stainless Steel Watertight Manhole Inserts: Payment for manhole inserts shall be per each and shall include all components necessary to install the insert according to manufacturers instructions.

PART 2 PRODUCTS

2.01 SEWER PIPE

A. PVC:

1. a. Pipe (for depths up to 12 feet): ANSI/ASTM D 3034, SDR 35, 12454-B PVC cell classification in accordance with ASTM D 1784; additives and fillers shall not exceed 10 parts (by weight) per hundred of PVC resin in the compound.

   b. Pipe (for depths greater than 12 feet): ANSI/ASTM D 2241, SDR 26, 12454-B PVC cell classification in accordance with ASTM D 1784; additives and fillers shall not exceed 10 parts (by weight) per hundred of PVC resin in the compound.

2. Joints: Push on type joint in accordance with ASTM D 3212; flexible elastomeric seals (gaskets) in accordance with ASTM F 477.

3. Fittings: Same material and cell classification as pipe.

4. Solvent Cements: ASTM D 2564

B. Ductile Iron:

1. Pipe:ASTM A 746, thickness in accordance with ANSI A21.50 for Class 50 pipe wall thickness; asphalt coated outside and cement lined and seal coated inside in accordance with ANSI A21.4/AWWA C104.

2. Joints:Push on (boltless, single gasketed) similar to that known as "Super-Bell-Tite", "Fastite", "Tyton" or approved equal; or Mechanical Joint in accordance with ANSI A21.11/AWWA C111, corrosion resistant high strength low alloy steel bolts and nuts ("COR-TEN").

3. Fittings: Ductile iron, ANSI A21.10/AWWA C110.

C. Polyethylene Pipe (P.E. Pipe):

1. Pipe: PE 3408, minimum cell classification valves shall be 345434C in accordance with ASTM D3350, 160 psi pressure rating, SDR17.

2. Joints: Butt fusion

3. Fittings: Molded from a polyethylene compound having a cell classification equal to or exceeding the pipe compound; supplied by the same manufacturer of the pipe being supplied.

D. Joining Pipe of Different Material:

1. Connect pipe of dissimilar material with manufactured adapters specifically intended for this purpose. Devices shall be manufactured by Fernco Systems or approved equal.

2.02 CASING FOR JACKED, BORED AND OPEN TRENCH INSTALLATIONS

A. Welded standard smooth steel pipe conforming to ASA B36.10; precoated inside and out with an approved bitumen compound. Minimum pipe thickness shall be as follows:

INSIDE DIAMETER (Inches)	SMOOTH STEEL PIPE (Min. Wall Thickness, Inches)
4	0.237
6	0.280
8	0.322
10	0.365
12 - 36	0.375

2.03 MANHOLES

A. Manholes (Precast Shaft, Cone Top, and Base Pad Construction): conform to ASTM C478; integral base pad.

B. Watertight Connectors: ASTM C923, flexible watertight connectors, KOR-N-SEAL (NPC Systems, Inc.), Z-LOK XP (A-Lok Products, Inc.) or approved equal.

C. Frame and Cover: Size and type shown on Typical Sewer Details.

2.04 STAINLESS STEEL WATERTIGHT MANHOLE INSERTS

A. Insert and all components shall be manufactured from corrosion proof material suitable for atmospheres containing hydrogen sulfide and dilute sulfuric acid as well as other gases associated with wastewater collection systems.

B. The insert shall be manufactured of 304 stainless steel with a thickness of not less than 18 gage.

C. The insert shall have a configuration such that the lip will rest on the seating surface of the manhole frame.

D. In order to reduce excess weight accumulation, the insert shall not exceed 6 1/2" in overall depth.

E. The gasket shall be manufactured of close cell neoprene or approved equal. The gasket shall be compatible with the stainless steel insert to form a long lasting bond in wet or dry conditions.

F. The watertight manhole insert as specified above, upon installation as per manufacturer=s recommendations, shall not allow more than 1 gallon of inflow during a period of 24 hours.

G. The manhole insert shall have a handle of 3/16" minimum plastic coated stainless

steel cable attached to the insert body. The handle shall be attached with a No. 6 high grade stainless steel rivet. The cable shall be braided in a manner which resists cutting with common bolt cutters. The cable terminal and eye shall be stainless steel.

2.05 CONCRETE

A. Cement shall be Portland Cement conforming to ASTM C 150.

B. Test for compressive strength of concrete in accordance with ASTM C 39.

C. Concrete for Embedment: 3000 psi minimum at 28 days, five sacks of cement minimum per cubic yard, not more than 7 gallons of water per sack of cement.

D. Grout: One part Portland Cement, two parts mortar sand, and water as required for proper consistency; use within 30 minutes of mixing.

2.06 EMBEDMENT MATERIAL

A. A mixture of either gravel or stone with 35 percent (plus or minus) sand as verified by proof of material deliveries, conforming to the following requirements:

1. Gravel: Material from a source on the DOTD Qualified Products List conforming to the following gradation:

U. S. SIEVE	PERCENT PASSING
1-1 1/2”	95-100
No. 4	0-15
No. 200	0-2

2. Stone: Material from the DOTD Qualified Products List conforming to the following gradation:

U. S. SIEVE	PERCENT PASSING
1-1 ½”	95-100
¾”	40-85
No. 4	0-15

3. Sand: Non-plastic siliceous material conforming to the following gradation requirements:

U. S. SIEVE	PERCENT PASSING
½”	100
No. 4	75-100
No. 200	0-10

B. Limestone conforming to the following gradation requirements:

U.S. SIEVE	PERCENT PASSING (BY WEIGHT)
1-1/2"	100
1"	90-100
3/4"	70-95
3/8"	50-80
No. 4	35-65
No. 10	25-50
No. 40	10-26
No. 200	4-12

2.07 SAND

A. Non-plastic siliceous material conforming to the following gradation requirements:

U.S. SIEVE	PERCENT PASSING (BY WEIGHT)
1/2"	100
No. 10	75-100
No. 200	0-10

2.08 MORTAR SAND

A. Non-plastic siliceous material conforming to the following gradation requirements:

U.S. SIEVE	PERCENT PASSING (BY WEIGHT)
No. 4	100
No. 8	95-100
No. 100	0-25
No. 200	0-10

B. Percentage of foreign matter not to exceed the following:

1.	Coal or Lignite	0.25 percent
2.	Clay Lumps	0.50 percent

PART 3 EXECUTION

3.01 ALIGNMENT AND GRADE

A. Prior to excavation, the Engineer will provide alignment and location of manholes. Notify Engineer at least two working days prior to the time staking is required.

B. Uncover, relay and backfill installed pipe where horizontal and vertical alignment is determined by Engineer to be unacceptable or erroneous, at no cost to L.U.S.

3.02 EXCAVATION AND TRENCHING

A. Excavation shall include the removal, handling, rehandling, refill or backfilling, and disposal of any and all materials encountered in the work, and shall include all pumping, bailing, drainage and sheeting and bracing. It includes clearing and the removal of shrubbery and other obstructions not otherwise provided for.

B. Perform all excavation, of whatever substance encountered, to depths indicated on the drawings or established by field stakeout.

C. If the Engineer determines it is necessary to adjust, correct, relocate or in any way change the line and profile shown on the Plans, the Contractor shall perform the excavation and backfill required by said change under the terms of these specifications.

D. Fill all excavations beyond authorized depths and widths with compacted embedment material at no cost to L.U.S. Over-excavated trenches shall not be brought up to grade with excavated material.

E. All excavation shall be by open cut except where indicated otherwise in the Plans.

F. Width of the trench to a point two (2) feet above the top of the pipe installation shall not exceed the external diameter of the barrel of the pipe plus nine (9) inches on each side. Additional cost for special foundation and backfill material and requirements as a result of failure to confine the excavation to this width shall be borne by the Contractor.

G. Keep banks of trenches as nearly vertical as practical.

H. Where required to control trench width, protect adjacent structures and to safeguard employees, properly sheet and brace trench.

I. Where in the opinion of the Engineer, damage is liable to result from withdrawing sheeting, the sheeting will be required to be left in place. Neither the giving of such orders by the Engineer nor his failure or refusal to issue such orders shall in any way relieve the Contractor of the responsibility for damages to pavements or structures.

J. When embedment material is not required, lay pipe on a firm, undisturbed, native earth foundation.

K. Prevent surface ground water from flowing into the excavations.

L. Remove all water accumulated in the trenches or other excavations by pumping or other approved methods, at no cost to L.U.S., prior to laying pipe.

M. Stockpile material suitable for backfilling a sufficient distance back from the edges of the excavation to avoid overloading and to prevent slides or cave-ins.

N. Control banks of all excavated areas to prevent movement of soil in areas

supporting existing foundations, slabs, pole lines, pipelines or other structures. If, as a result of such excavation or through fault or neglect of the Contractor, the earth or ground under such structures is disturbed, corrective measures, as approved by the Engineer, shall be taken by and at the expense of the Contractor.

O. Keep all drains, gutters, culverts, etc. for surface drainage open, or if they are unavoidably closed, make other provisions for this drainage.

P. Length of the trench to be opened or the area of surface to be disturbed and unrestored at any one time will be limited by the Engineer with regard to both expeditious construction and the convenience and comfort of persons residing in the neighborhood or frequenting the street in question.

Q. Trenches left open during non-working hours shall be properly protected from accidental entry.

3.03 EMBEDMENT

A. Typical sewer foundations are as shown on the Typical Sewer Details.

B. All pipe shall be bedded in a Type I Foundation or as otherwise stated herein, in the Plans, or as determined in the field.

C. Where cuts to inverts of sewer mains are twelve (12) feet or more, Type II foundation shall be required.

D. Where the bottom of the trench is not sufficiently stable or firm to prevent vertical or lateral displacement of the pipe after installation, the Engineer may direct the Contractor to provide a Type II foundation.

3.04 MANHOLE INSTALLATION

A. Construct precast manholes to proper alignment and elevation as shown in the Plans and in accordance with the Typical Sewer Details.

B. Provide minimum of six (6) inches clear between the outer surface of the manhole and the embankment or timber sheeting.

C. Set metal frames as shown in standard details.

D. Invert channels shall be smooth, accurately shaped and in accordance with L.U.S. template and the Typical Sewer Details.

E. All pipe connections to manholes shall be installed using watertight connectors as per Article 2.03(B).

F. Manhole drop inlets and services into manholes shall be constructed as shown on the Typical Sewer Details with materials meeting all requirements of these specifications.

3.05 PIPE INSTALLATION

A. Where a certain pipe material is specified on the Plans, only that material can be used. Where the term "Sewer Pipe" is shown on the plans or in the proposal, it shall be interpreted to mean any of the specified pipe materials meeting the requirements of this section, as the Contractor elects, of the dimension shown on the plans.

B. Install pipe in accordance with the manufacturer's recommendations and in accordance with the specifications herein. In addition, install PVC pipe in accordance with ASTM D 2321. In the event there is a conflict, consult with Engineer for clarification.

C. Install solvent weld cap on the new line into the first manhole constructed immediately upstream of the existing manhole to prevent sewer gases from entering the work area and to prevent drainage into the existing system.

D. Thoroughly clean interior of pipe before lowering into the trench. Keep pipe interior clean and free of foreign matter during laying operations.

E. Do not lay pipe in unsuitable weather conditions. Stabilize wet trench conditions before laying pipe.

F. Plug open ends of pipe and fittings when work is not in progress.

G. Replace pipe found to be defective, before or after laying, with new pipe by and at expense of the Contractor.

H. Use embedment material for pipe bedding where required.

I. Grade pipe bedding by hand to provide uniform pipe bearing for its entire length and to provide proper grade and alignment.

J. Provide bell or coupling holes at each joint to permit proper joint assembly and pipe support.

K. Lay pipe with spigot end pointing in direction of flow.

L. Walking or working on the completed sewer pipe, except as may be necessary in tamping or backfilling shall not be permitted until the trench has been backfilled to a height of at least one foot above the top of the pipe.

M. Check each joint of pipe for line and grade before the next succeeding joint is placed.

N. Maintain proper alignment of pipe during haunching and initial and final backfilling operations.

O. Keep the sewer line pumped dry at all times.

3.06 SERVICE RISERS

A. Install service risers as indicated on the Typical Sewer Details at locations shown on the Plans or designated in the field by the Engineer.

B. For sewer mains 8" or larger, the tee shall be a short-body ductile iron tee conforming to AWWA C153.

3.07 WYE BRANCHES OR TEES

A. Furnish wye branches or tees with connection of the size specified, securely and permanently fastened to the barrel of the pipe in the process of manufacture.

B. Wyes and tees shall be given an inclination above a horizontal line and shall be properly bedded.

C. All wyes and tees shall conform to the specifications and test standards of the pipe it is to be installed on.

3.08 CONNECTION TO EXISTING MANHOLES

A. Connection to existing manholes shall be made above the existing manhole base.

B. Manhole penetrations shall be cored as shown in standard details.

C. Provide watertight connectors at tie-in to the manhole.

D. Cap new sewer pipe from existing system at first manhole constructed immediately upstream from existing system tie-in.

E. Where the connection has to be made at the same elevation as the existing pipe, the base shall be broken in the area where the connection is to be made and the new base shall conform to the requirements set forth in these specifications.

3.09 BACKFILLING

A. Where compaction density is specified, maximum density shall be determined in accordance with requirements of Louisiana DOTD Designation: TR 418 and TR 401.

B. Upon completion of joints and approval of Engineer, place acceptable material, free from stones, hard clay lumps, or other hard substances under the haunches of the pipe and up to the spring line of the pipe. Place initial backfill, in not more than six (6) inch uniform loose lifts, to a point twelve (12) inches above the top of the pipe. Compact each stage by hand or mechanical tamping to obtain a minimum of 85% maximum density.

C. Avoid displacement of the pipe in placement of backfill about the haunches.

D. Take care to avoid contact between the pipe and compaction equipment.

E. Backfill trenches for mains and services beneath existing pavement as shown in the Typical Sewer Details.

F. Compact remainder of backfill over and above 12" above the surface of the pipe for mains and services laid within the right-of-way as follows:

1. Backfill with select excavated site materials in not more than twelve inch (12") uniform loose layers with each layer mechanically compacted to a minimum 90% of maximum density.

2. Within state highway right-of-way, the compaction requirements shall be 100% of the density of the surrounding undisturbed material, compacted in uniform loose layers of not more than twelve inches (12").

3. Slightly overfill the trench with backfill to create a crowned condition but not to exceed 6".

G. Compact remainder of backfill over and above 12" above the surface of the pipe for mains and services laid outside the right-of-way as follows:

1. Backfill with select excavated material, in not more than eighteen (18) inch uniform loose lifts, to the elevation 24" below the finished ground surface.

2. Compact each layer of the material to eliminate all voids and to obtain a soil density equivalent to the existing undisturbed surrounding soil.

3. Compact the remaining top two feet of the trench backfill, in not more than twelve (12) inch uniform loose lifts, to obtain a minimum of 90% of maximum density.

4. Slightly overfill the trench with backfill to create a crowned condition but not to exceed 6".

H. The Contractor shall be responsible for obtaining suitable compaction of all trench backfill, including that in proposed streets, parking areas or other surfaced locations and shall be responsible for the failure of any surfacing due to trench settlement.

I. Compaction will be verified through compaction tests ordered by the Engineer at no expense to the Contractor, except as stated herein. If the test results indicate insufficient compaction, the cost for that compaction test and of all retesting shall be borne by the Contractor until satisfactory results are achieved. L.U.S. will pay only for those tests which prove that the specified compaction has been achieved.

J. Avoid damage to pipe during compaction.

K. Backfill material shall contain no stumps or roots and shall be free of lumber, trash, or other debris.

L. Use special backfill, with Engineer's approval, where the excavated material is not suitable for backfilling the trench and obtaining the required compaction. At the

Contractor's option, limestone may be used for special backfill at no additional cost to L.U.S.

M. Maintain trenches in good and safe condition during construction and during one year warranty period.

3.10 CASING INSTALLATION

A. Clean and coat weld joints with approved bitumen compound after joining and before installation.

B. Install casing as to prevent the formation of a waterway below the obstruction traversed.

C. Casing shall have even bearing throughout its length and shall slope toward one end.

D. Provide casing lengths to meet requirements of Plans or as established by the Engineer.

E. Seal ends of the casing to prevent entrance of earth and groundwater.

F. Provide polyethylene or stainless steel casing spacers attached to the sewer pipe to prevent damage to pipe and bell joints during installation and to provide proper long-term line support, at no cost to L.U.S. Skid arrangement to be in accordance with manufacturer's recommendations. Spacers shall be manufactured by Advance Products and System, Inc. or approved equal.

3.11 JACKING OR BORING

A. Install pipe by means of a boring machine, auger, jack or by other means satisfactory to the Engineer.

B. In the event the jacking or boring operations result in injury or damage to railroad tracks or pavements, repairs shall be the responsibility of the Contractor and shall be done at no cost to L.U.S.

C. Any overcutting of the borehole shall be remedied by pressure grouting the entire length of the installation.

D. Backfill boring pits to the bottom of the pipe with limestone at no direct cost to L.U.S.

E. Schedule jacking or boring operations such that no pits shall be left open at the end of the day.

3.12 EXISTING STRUCTURES

A. Existing structures shall be defined as all above and below ground level structures, including all pipelines, poles, tracks, roads, culverts, sidewalks, drains, cables,

wires, conduits, vaults, manholes, landscaping, and other appurtenant facilities, whether owned or operated by public bodies, private individuals, corporations, firms or companies.

B. Protect all existing structures from damage during construction.

C. Utility facilities shown on the Plans are approximate locations and do not include service locations. There is no expressed or implied guarantee as to the accuracy of the various utilities or any omissions.

D. The Contractor shall verify the locations of all utilities and follow OSHA Law Section 1926.651 at no cost to L.U.S. Final project location will be determined in the field by the Engineer upon the Contractor's verification of all utilities.

E. In no case shall the Contractor receive additional compensation due to the location of existing utilities in relation to the final location of the proposed lines and appurtenances.

F. Notify all utilities or other interested parties prior to starting work and advise them of any adjustments required.

G. Contractor shall be responsible for investigating and informing himself of the condition, character, and extent of all structures which may be encountered during construction.

H. Perform work in a manner to prevent interference with or damage to existing structures. Any damages done by the Contractor shall be his responsibility and all repairs shall be made immediately to the satisfaction of L.U.S.

I. L.U.S. and/or his agents shall not be responsible for any damages to or any costs incurred as a result of any delays due to existence, removal, adjustment or repair to any structures mentioned herein, shown on the Plans or encountered during construction.

3.13 FLUSHING SEWER LINES

A. Water flush and thoroughly clean all sewer lines prior to acceptance by L.U.S.

3.14 TESTING SEWER LINES

A. General:

1. Test sewer lines by low pressure air testing and television equipment. Deflection tests may also be performed as described in paragraph (D) below.

2. Test manholes by air vacuum testing, visual inspection, and by infiltration. Manhole leakage will not be acceptable.

3. Repair and retest manholes and sections of sewer lines which fail to meet

the specified tests.

4. Do not remove plugs installed on the new system until the system has been accepted.

5. Furnish all equipment, labor and materials required for making the test.

B. Low pressure air testing

1. Clean the interior of the pipe immediately prior to testing.

2. Furnish test plugs, air compressor, test gages, stop watch and personnel for conducting the test.

3. The Engineer has the option to have the Contractor's testing equipment independently checked and certified for accuracy.

4. All pneumatic plugs shall be tested before being used in the actual test installation.

   a. One length of pipe shall be laid on the ground and sealed at both ends with the pneumatic plugs to be checked.

   b. Air shall be introduced into the plugs to 25 psig.

   c. Pressurize the sealed pipe to 5 psig.

   d. The plugs shall hold against this pressure without bracing and without movement of the plugs out of the pipe.

5. After pneumatic plugs are checked by the above procedure, place the plugs in the line at each manhole and inflate to 25 psig.

6. Introduce low pressure air into the sealed line until the internal air pressure reaches 4 psig greater than the average back pressure of any ground water that may be over the pipe.

7. Allow at least two minutes for the air pressure to stabilize.

8. After the stabilization period (3.5 psig minimum pressure in the pipe), disconnect the air hose from the control panel to the air supply.

9. The portion of the line being tested shall be termed "Acceptable" if the time required in minutes for the pressure to decrease from 3.5 to 2.5 psig (greater than the average back pressure of any ground water that may be over the pipe) shall not be less than the time shown for the given diameter in the following table:

PIPE DIAMETER IN INCHES	MINUTES

4	2.0
6	3.0
8	4.0
10	5.0
12	5.5
15	7.5
18	8.5
21	10.0
24	11.5

10. If ground water is known to be present over the pipe, the Contractor shall install a one-half inch diameter capped pipe nipple, approximately 10" long, through the manhole wall directly over one of the sewer lines entering the manhole. This is to be done at the time the sewer line is installed. Immediately prior to the performance of the test, the ground water shall be determined by removing the pipe cap, blowing air through the pipe nipple into the ground so as to clear it, and then connecting a clear plastic tube to the pipe nipple. The hose shall be held vertically and a measurement of the height in feet of water over the invert of the pipe shall be taken after the water has stopped rising in this plastic tube. The height in feet shall be divided by 2.3 to establish the pounds of pressure that will be added to all readings. (For example, if the height of water is 11.5 feet above the invert of the pipe, then the added pressure will be 11.5/2.3 or 5 psig. This increases the 3.5 psig to 8.5 psig, and the 2.5 psig to 7.5 psig.) The allowable drop of one pound and the timing remain the same. In no case should the starting test pressure exceed 9.0 psig. Recap and seal the pipe nipple to prevent any future infiltration.

11. In lieu of (10) above, if the ground water level can be readily determined during the installation of the manhole, and jointly agreed upon by the Contractor and L.U.S., the height of the ground water above the invert of the sewer pipe can be used in determining the pounds of pressure to be added to all readings.

C. Television Testing

1. Prior to putting each system into service, the line will be visually inspected by television equipment operated by the L.U.S. Wastewater Collection Division. The Contractor shall be responsible for cleaning the system prior to inspection by television equipment. If rejected, the Contractor shall pay at current rates for television equipment operation until proper flushing and/or pipe installation has been achieved.

D. Deflection Test

1. If during the operation of the television equipment by L.U.S. there is suspicion of deflection of the sewer pipe, the Engineer reserves the right to require the Contractor to perform a deflection test on that section of pipe at the Contractor's expense.

2. No pipe shall exceed a deflection of 5%.

3. Test for deflection using a mandrel with a diameter equal to 95% of the inside diameter of the pipe.

4. Perform test without mechanical pulling devices.

5. Should any deflection test fail, L.U.S. reserves the right to require the Contractor to perform deflection tests on any or all additional pipe at no cost to L.U.S.

E. Manhole Air Vacuum Test

1. Air vacuum testing of manholes shall be performed on at least 20% of the manholes, minimum of one (1) per project. The selection of which manhole(s) to be vacuum tested shall be determined by the Engineer.

2. Test manholes immediately after assembly of the manhole and the connecting pipes and before any backfill is placed around the manhole.

3. Plug lift holes.

4. Plug pipe openings, taking care to securely brace the plugs and the pipe.

5. Perform test using an inflatable compression band, vacuum pump and appurtenances specifically designed for vacuum testing manholes.

6. After the testing equipment is in place, a vacuum of 10 inches of Hg shall be drawn on the manhole. The manhole will be considered to have passed the test if the vacuum does not drop more than 1 inch of Hg in one minute.

7. If the manhole fails the initial test, the Contractor shall locate the leakage and make proper repairs, and retest until a satisfactory test result is obtained.

8. If any manhole fails the vacuum test, the Engineer reserves the right to require the Contractor to test any or all additional manholes at the Contractor's expense.

F. Manhole Infiltration Test

1. Construct a minimum 2' deep by 2' wide trench around the manhole.

2. Fill the trench with water and drill 3/4" (minimum) holes 5' deep (or the depth of the manhole). These holes shall circle the manhole at 6" intervals.

3. Two hours later the trench shall be refilled with water.

4. Up to two hours after the second filling, the Engineer will check the

manhole for infiltration.

5. The manhole will be considered to have passed the test if no infiltration is detected. Repair and retest manholes failing the above test.

G. Visual Inspection

1. After the manholes have been backfilled and prior to final acceptance of the project, any signs of leaks or weeping visible from the inside of the manhole shall be repaired by the Contractor and the manhole made watertight.

3.15 MAINTENANCE OF TRAFFIC

A. Refer to "Louisiana Department of Highways Maintenance Traffic Controls Handbook" (for state highway right-of-way) and "The Work Area Traffic Control Handbook" (for City-Parish streets).

B. Conduct operations as to minimize interference with public travel and inconvenience to the public and to property owners.

C. Provide and maintain, at Contractor's expense, suitable bridges, detours or other temporary facilities for the accommodation of public or private travel, as directed by the Engineer.

D. Give twenty-four (24) hours notice to owners of private driveways prior to interfering with them.

E. Keep local fire protection authorities informed at all times of the location of construction operations and fire lanes. Maintain access for fire-fighting equipment as requested by the Fire Department.

F. Maintain traffic on all streets during construction, except where suitable detours or other arrangements are agreed upon. LCG Traffic and Transportation shall be given a minimum 4 day notice of any detours or disruptions in traffic patterns.

G. Provide motorized rubber wheel road grader on site upon completion of backfilling of all excavations in roadways and streets. Maintain all streets and roadways in a satisfactorily condition approved by the Engineer for the duration of the contract.

H. Contractor shall have someone available to take calls at all times. Provide L.U.S. with a night phone number to call so that the Contractor may be advised of any emergency, trouble or other matter requiring his attention.

3.16 CARE OF STREETS, SIDEWALKS & ROADS

A. Remove all excess materials, debris or other obstruction from streets or roads immediately after completing backfilling, at Contractor's expense.

B. Wash streets, sidewalks and roads daily to remove dust problem.

C. No cross streets, sidewalks or roads shall be wholly obstructed except by written permission from the Engineer.

D. If at any time the Contractor neglects to remove such material or obstruction and place streets, sidewalks and roads in suitable condition for traffic within twenty-four (24) hours after having received notice (written or verbal) from the Engineer, the work may be done by L.U.S., and the cost thereof charged to the Contractor and deducted from his final estimate.

E. Repair and replace streets, sidewalks, roads, ditches and culverts to the satisfaction of the Engineer and parties concerned.

3.17 PROTECTION AND CARE OF PUBLIC OR PRIVATE PROPERTY AND SERVITUDES

A. Continuously maintain and protect all underground and above ground structures, utilities, including the restoration of all public utilities, water mains, water services, gas mains, gas services, culverts, drains, ditches, curbs, sidewalks, landscaping and/or other facilities which may be damaged, to a condition at least equal to their original status, at no additional cost to L.U.S. In the event of damage to any facilities, the appropriate utility will be notified immediately. L.U.S. will repair damaged facilities at the Contractor's expense or require the Contractor to repair said damage.

B. All construction work under this contract on servitudes, right-of-way, private property or franchise shall be confined to the limits of such servitudes, right-of-way or franchise. All work shall be accomplished so as to cause the least amount of disturbance and a minimum amount of damage.

C. No trees or shrubbery shall be removed or trimmed without the consent of the Engineer. With such approval ornamental trees and shrubbery shall be carefully removed, with the earth surrounding their roots wrapped in burlap and replanted in their original positions within forty-eight (48) hours. All shrubbery or trees destroyed or damaged shall be replaced by the Contractor with material of equal quality at no cost to L.U.S.

D. All obstacles such as fences, markers, mail boxes, driveway culverts, etc. shall be removed by the Contractor and immediately replaced after the trench is backfilled in their original position and condition at no direct cost to L.U.S.

E. Maintain adequate drainage during the process of construction.

3.18 CLEAN-UP

A. Remove from the site all tools, equipment, temporary structures and surplus materials.

B. Dispose of all excess soil, waste, rubbish, debris or objectionable materials off the site and in a manner and a location that complies with local ordinances and laws and is acceptable to all parties concerned and is approved by the Engineer.

C. When disposal of excess soil is upon private lands, the Contractor shall be required to produce a written agreement with the private landowner stating the agreed terms and conditions.

D. The entire construction site shall be left clean and to the satisfaction of the Engineer.

END OF SECTION

SECTION 02532

WASTEWATER FORCE MAINS

PART 1 GENERAL

1.01 WORK INCLUDES

A. The work covered by this section of the specifications consists of furnishing all labor, supervision, equipment, tools, appliances and all materials and in performing all operations in connection with the installation of sewage force mains, complete, in accordance with the specifications and the applicable drawings.

1.02 REFERNCES

A. ANSI/ASTM D 1784 Rigid Poly (Vinyl Chloride) (PVC) Compounds.

B. ANSI/ASTM D 2241 Poly (Vinyl Chloride) (PVC) Plastic Pipe (SDR-PR).

C. ANSI/ASTM D 3139 Joints for Plastic Pressure Pipe Using Flexible Elastomeric Seals.

D. ANSI/ASTM D 1248 Polyethylene Plastics Molding and Extrusion Materials.

E. ANSI/ASTM D 3350 Polyethylene Plastics Pipe and Fittings Materials.

F. ANSI/AWWA C 111/A21.11 Rubber-Gasket Joints for Ductile Iron and Gray Iron Pressure Pipe and Fittings.

G. ANSI/AWWA C 151/A21.51 Ductile Iron Pipe for Water or Other Liquids.

H. DOTD Designation: TR 401 – Method of Test for the Determination of In-Place Density.

I. DOTD Designation: TR 418 – Method of Test for Moisture-Density Relationships.

J. DOTD Designation: TR 423 – Procedure for the Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes.

1.03 PROTECTION

A. Locate, maintain, and protect above and below grade utilities and other underground facilities remaining within the construction area.

B. Protect and maintain trench excavations by cribbing, sheathing, shoring, and bracing as necessary for protection of Work, existing foundations, utilities, underground facilities, other structures, and the safety of personnel. Responsibility for the design, installation, and maintenance of cribbing, sheathing, and shoring required by job conditions is the obligation of the Contractor.

C. Prevent surface water from entering trench.

D. Adequate pumping equipment shall be on hand to remove any surface or groundwater from trench.

E. Protect plants, lawns, bench marks, existing structures, fences, sidewalks, pavement, and curbs from excavation equipment and vehicular traffic.

F. Access to hydrants, valve boxes, fire and police call boxes which are not part of the Work.

1.04 QUALITY ASSURANCE

A. Submit a certificate of compliance from the pipe manufacturer stating chemical and physical properties of materials used.

B. Verify that survey benchmarks and intended elevations are as shown on the Drawings.

1.05 PROJECT RECORD DOCUMENTS

A. Accurately record location of pipe runs, valves, and changes in invert elevations.

1.06 STORAGE OF PIPE AND FITTINGS

A. Store pipe and fittings in accordance with manufacturer's recommendations.

B. Any damaged pipe shall be replaced by the Contractor.

1.07 UNIT PRICES

A. Method of Measurement:

1. Force Main: Measured by the linear foot according to size, along the centerline of the pipe installed and accepted without deductions for fittings, length of force main designated to be jacked or bored, or length of force main installed in steel casing.

2. Jacked or Bored Force Main: Measured by the linear foot along the

centerline length according to size installed and accepted.

3. Force Main Tie-in to Manhole: Measured per each installed and accepted.

4. Force Main Tie-in to Lift Station: Measured per each installed and accepted.

5. Furnish and Install Steel Casing: Measured by the linear foot installed according to size and type of installation.

B. Basis of Payment:

1. Force Main: Paid for by the actual number of linear feet installed and accepted, according to size of pipe.

2. Jacked or Bored Force Main: Paid for by the actual number of linear feet installed and accepted according to size of pipe. This item is to cover the additional cost of installing this pipe by the jacking or boring method.

3. Force Main Tie-in to Manhole: Paid for per each installed and accepted.

4. Force Main Tie-in to Lift Station: Paid for per each installed and accepted.

5. Furnish and Install Steel Casing (Jack or Bore) or (Open Cut): Paid for by the linear foot furnished, installed, and accepted according to size and type of installation.

PART 2 PRODUCTS

2.01 PIPE MATERIALS:

A. Force Main:

1. Ductile Iron (DI)

a. Pipe shall be designed in accordance with ANSI Specification A21.50 (AWWA C-150) for 200 psi water working pressure.

b. Pipe shall be manufactured in accordance with ANSI Specification A21.51 (AWWA C-151), latest revision, except the minimum nominal wall thickness shall be as shown on the following table:

SIZE	THICKNESS	SIZE THICKNESS

6"	.25	12"	.31
8"	.27	14"	.33
10"	.29	16"	.34

c. All pipe beyond the valve box shall be asphalt-coated outside and ceramic epoxy lined inside. Epoxy ceramic lining shall be PROTECTO 401 as manufactured by US Pipe & Foundry Company, or approved equal, and shall be installed in accordance with manufacturer's recommendations.

d. The following joint types shall be used, conforming to ANSI A21.11:

1. Mechanical Joint (Type III)

2. Push-On (boltless, single-gasketed) joint similar to that known as "Super-Bell-Tite", "Fastite", "Tyton", or approved equal.

3. Submarine, flexible, ball and socket joint (for underwater installation).

e. Fittings: Ductile iron; Manufactured in strict accordance with AWWA C153, AWWA C110 and AWWA C111. Fitting shall be asphalt coated outside and ceramic epoxy lined inside. Epoxy ceramic lining shall be PROTECTO 401 as manufactured by US Pipe & Foundry Company, or approved equal, and shall be installed in accordance with the manufacturer's recommendations.

2. PVC Pipe:

a. Pipe shall conform to ASTM 2241, 160 psi working pressure, standard dimension ratio SDR 26, shall be made from clean, virgin, Type I, Grade I, PVC compound in accordance with ASTM D 1784.

b. Clean, reworked material generated from the manufacturer's own pipe production may be used.

c. Joint material shall be push-on type in accordance with ANSI/ASTM D 3139 and assembled with a non-toxic lubricant.

d. Fittings smaller than 3" shall be the same material as pipe with 160 psi working pressure rating. Fittings 3" and larger shall be ductile

or cast iron with restrained mechanical joints in accordance with ANSI/AWWA C111/A21.11 respectively. All fittings shall be asphalt-coated outside and cement-lined to standard thickness and seal coated inside in accordance with ANSI Standard A21.4.

e. Laying lengths shall be 20 feet (plus or minus 1").

f. A THW 14 insulated solid copper wire shall be placed above the center of all PVC pipe for its entire length. This wire must be connected from the discharge pipe inside the pump station to the ring of the discharge manhole. Splices in detection wire shall be installed in a direct bury splice kit manufactured by 3M or approved equal.

g. Marking Tape

All PVC pipe shall be marked using a nonmetallic tape buried at least 15 inches above the top of the pipe. Water mains shall be marked with blue tape. Tape shall be 3 inches wide minimum and on the Board's list of materials and approved manufacturers. After the tracer wire has been placed, the pipe trench shall be backfilled to approximately 15 inches over the top of the pipe then the nonmetallic tape shall be placed flat over top of pipe within trench. Backfill shall be carefully placed to a depth of 3 inches by hand to assure that the tape is secured in place over the pipe. It is the intent to provide a visible marker in the event of excavation near a water line.

3. Polyethylene Pipe (P.E. Pipe):

a. Pipe: PE 3408, minimum cell classification values shall be 345434C in accordance with ASTM D 3350, 160 psi pressure rating, SDR 11.

b. Joints: Butt fusion.

c. Fittings: Molded from a polyethylene compound having a cell classification equal to or exceeding the pipe compound; supplied by the same manufacturer of the pipe being supplied.

B. Sample of pipe and physical and chemical data sheets shall be submitted to the Engineer for approval and his approval shall be obtained before pipe is purchased.

C. The pipe shall be homogeneous throughout and free from cracks, holes, foreign inclusions or other defects.

D. At the option of the owner, manufacturers may be disqualified if they do not have proper experience in the manufacture of the material specified.

2.02 CASING FOR JACKED, BORED, AND OPEN TRENCH INSTALLATIONS

A. Welded standard smooth steel pipe conforming to ASA B36.10 or API Standard 5L; pre-coated inside and out with an approved bitumen compound; minimum thickness shall be as follows:

INSIDE DIAMETER (INCHES)	SMOOTH STEEL PIPE (Min. Wall Thickness, Inches)
4	0.237
6	0.280
8	0.322
10	0.365
12-36	0.375

2.03 WATERTIGHT CONNECTORS

A. Connectors shall meet ASTM C923, shall be KOR-N-SEAL flexible watertight connectors as manufactured by NPL Systems, Inc., or approved equal.

PART 3 EXECUTION

3.01 PREPARATION

A. Identify and protect above and below grade utilities and other underground facilities to remain.

B. Pipe shall be installed in accordance with the manufacturer's recommendations.

C. The Owner reserves the right to change the location of the pipe within the streets and sewer-ways as may be required by the Engineer at the time of construction.

D. Force mains shall be installed with a clear distance of not less than 6', horizontally and 18" vertically from water lines.

E. Pipe shall be installed with lettering facing upward.

3.02 TRENCHING

A. The trench shall be excavated to the depth established by the Engineer and under no condition shall the cover over the pipe be less than thirty-six (36) inches, forty-eight (48) inches of cover for 12" pipe and above.

B. Depth of cover over pipe at specific locations to avoid other utilities or obstructions shall be as indicated on the plans or as authorized by the Engineer.

C. The bottom of the trench shall be excavated to a uniform grade and shall be free from obstructions which would result in the weight of the pipe being concentrated at certain points.

D. Where unknown subsurface obstructions are encountered in the trenching, the Contractor will be permitted to lay pipe above the obstruction if the minimum cover required can be obtained while providing a cushion between the bottom of the pipe and the top of the obstruction of at least six (6) inches. Where this minimum cover cannot be obtained, the Contractor will be required to lay pipe under the obstruction and he will receive no additional compensation for constructing the line in this manner.

E. Stockpile excavated material in a manner that will not endanger the Work or prevent obstruction of sidewalks and driveways.

F. Verify excavated material is a usable soil and suitable for backfilling, otherwise remove non-conforming material from the site and replace with usable soil.

G. Remove excess excavated material from the site.

H. Remove water by pumps from the trench until the pipe has been installed and the backfill has been placed to a sufficient height to prevent pipe flotation.

3.03 PIPE FOUNDATION

A. Maintain uniform pipe support over its entire length.

B. Provide bell holes at each joint to permit proper joint assembly and uniform pipe support.

C. Do not use blocking to change pipe grade or to intermittently support pipe across excavated sections.

D. Install concrete thrust blocks at changes in direction.

3.04 BACKFILLING

A. In backfilling all trenches, the excavated materials shall be thoroughly tamped and compacted around and to a depth of six (6) inches above the pipe for the entire length of the trench, due care being exercised so as not to damage the pipe or pile connections in the tamping operation.

B. The remaining portion of the trench shall be backfilled and thoroughly compacted for the entire length of the trench and left in a slightly overfilled and crowned condition.

C. The method of compacting trenches shall be strictly in accordance with the manufacturers' recommendations, and as approved by the Engineer.

D. Exercise due care so as not to damage the pipe during compaction operations.

E. Reshape ditches and ground surfaces to original contours to assure proper drainage.

3.05 JACKING OR BORING

A. Begin work at the outfall end of the pipe whenever possible.

B. Excavate adequate size pits when conducting operations for jacking or boring. Use sheathing and bracing when necessary.

3.06 FORCE MAIN TIES TO MANHOLES OR LIFT STATIONS

A. Connect force main to manholes or lift stations at locations indicated in the Drawings.

B. Provide watertight connector at force main tie-in.

C. Force main tie-in shall be installed as shown on standard details.

D. The Contractor shall repair and coat the inside surfaces of the receiving manhole or lift station. Refer to LUS Civil Engineering Construction Specifications section 02535.2.17.B for applicable coating systems.

3.07 TESTING

A. Mains shall be tested to hydrostatic pressure to 100 psi and shall hold that pressure for one (1) hour.

3.08 CASING INSTALLATION

A. Install casing as to prevent the formation of a waterway below the obstruction.

B. Ends of casing shall sealed.

C. Spacers shall be installed inside of casing pipe.

3.09 CARE OF STREETS, SIDEWALKS & ROADS

A. Remove all excess materials, debris or other obstruction from streets or roads immediately after completing backfilling, at Contractor's expense.

B. Wash streets, sidewalks and roads daily to remove dust problem.

C. No cross streets, sidewalks or roads shall be wholly obstructed except by written permission from the Engineer.

D. If at any time the Contractor neglects to remove such material or obstruction and place streets, sidewalks and roads in suitable condition for traffic within twenty-four (24) hours after having received notice (written or verbal) from the Engineer, the work may be done by L.U.S., and the cost thereof charged to the Contractor and deducted from his final estimate.

E. Repair and replace streets, sidewalks, roads, ditches and culverts to the satisfaction of the Engineer and parties concerned.

3.10 PROTECTION AND CARE OF PUBLIC OR PRIVATE PROPERTY AND SERVITUDES

A. Continuously maintain and protect all underground and above ground structures, utilities, including the restoration of all public utilities, water mains, water services, gas mains, gas services, culverts, drains, ditches, curbs, sidewalks, landscaping and/or other facilities which may be damaged, to a condition at least equal to their original status, at no additional cost to L.U.S. In the event of damage to any facilities, the appropriate utility will be notified immediately. L.U.S. will repair damaged facilities at the Contractor's expense or require the Contractor to repair said damage.

B. All construction work under this contract on servitudes, right-of-way, private property or franchise shall be confined to the limits of such servitudes, right-of-way or franchise. All work shall be accomplished so as to cause the least amount of disturbance and a minimum amount of damage.

C. No trees or shrubbery shall be removed or trimmed without the consent of the Engineer. With such approval ornamental trees and shrubbery shall be carefully removed, with the earth surrounding their roots wrapped in burlap and replanted in their original positions within forty-eight (48) hours. All shrubbery or trees destroyed or damaged shall be replaced by the Contractor with material of equal quality at no cost to L.U.S.

D. All obstacles such as fences, markers, mail boxes, driveway culverts, etc. shall be removed by the Contractor and immediately replaced after the trench is backfilled in their original position and condition at no direct cost to L.U.S.

E. Maintain adequate drainage during the process of construction.

3.11 CLEAN-UP

A. Remove from the site all tools, equipment, temporary structures and surplus materials.

B. Dispose of all excess soil, waste, rubbish, debris or objectionable materials off the site and in a manner and a location that complies with local ordinances and laws and is acceptable to all parties concerned and is approved by the Engineer.

C. When disposal of excess soil is upon private lands, the Contractor shall be required to produce a written agreement with the private landowner stating the agreed terms and conditions.

D. The entire construction site shall be left clean and to the satisfaction of the Engineer.

END OF SECTION

SECTION 02535

SUBMERSIBLE SEWAGE LIFT STATION

PART I GENERAL

1.01 SECTION INCLUDES

A. The work covered by this section of the specifications consists of furnishing all labor, plant, equipment, appliances and materials for installing an automatic, submersible sanitary sewage pumping station, complete with all necessary accessories, controls and equipment.

B. The station shall be installed in accordance with the contract drawings and specifications and the installation instructions of the manufacturers.

1.02 COORDINATION

A. Coordinate pumps and motors with electrical work as specified in Division 16-Electrical.

B. Review installation procedures under other Sections and coordinate with the Work related to this Section.

C. Be aware that certain areas of the pump station are considered Class I, Division I, Group C and D "hazardous" areas, as defined in Articles 500 and 501 in the National Electrical Code. Special wiring techniques, materials, and equipment must be used in such areas. All equipment used in hazardous areas must be suitable for use in such areas.

D. All equipment shall be designed and arranged to comply fully with provisions of NFPA 820, "Fire Protection in Wastewater Treatment and Collection Facilities", relative to hazardous environments. All wiring methods, enclosures, options and accessories required to comply fully with NFPA 820 shall be included in the bid.

1.03 REFERENCES

A. ANSI/ASTM C76 – Reinforced Concrete Culvert, Storm Drain and Sewer Pipe.

B. ASTM C923 – Resilient Connectors Between Reinforced Concrete Manhole Structures and Pipes.

C. ANSI/AWWA C151/A21.51 – Standard for Ductile Iron Pipe for Water or Other Liquids.

D. ANSI/AWWA C111/A21.11 – Standard for Rubber-Gasket Joints for Ductile Iron and Gray Iron Pressure Pipe and Fittings.

E. ANSI/AWWA C115/A21.15 – Standard for Flanged Ductile Iron and Gray Iron Pipe with Threaded Flanges.

F. ANSI/AWWA C110/A21.10 – Standard for Ductile Iron and Gray Iron Fittings, 3 In. through 48 In., for Water and Other Liquids.

G. ASTM A53 – Pipe, Steel, Black and Hot-Dipped, Zinc Coated Welded and Seamless.

H. ASTM A123 – Zinc (Hot Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip.

I. ASTM A153 – Zinc Coating (Hot Dip) on Iron and Steel Hardware.

J. ASTM A276 – Stainless and Heat Resisting Steel Bars and Shapes.

K. ASTM A307 – Carbon Steel Externally Threaded Fasteners.

L. ASTM A666 – Austenitic Stainless Steel, Sheet, Strip, Plate, and Flat Bar for Structural Applications.

M. ASTM C150 – Portland Cement.

N. AASHTO M198 – Joints for Circular Concrete Sewer and Culvert Pipe Using Flexible Watertight Gaskets.

O. DOTD Standard Specifications Section 805 – Structural Concrete.

P. DOTD Standard Specifications Section 902 – Portland Cement Concrete for Minor Structures.

Q. DOTD Standard Specifications Section 1006.05 – Concrete Pipe Joints.

R. DOTD Standard Specifications Section 1008.07 – Asphaltic Varnish.

1.04 PERFORMANCE AND QUALITY ASSURANCE

A. Furnish and install wastewater pumps capable of handling raw sewage in accordance with the Specifications and as shown on the Drawings.

B. All materials used shall be new, high grade, and with properties best suited to the work required.

C. In order to ensure equipment compatibility, one manufacturer shall be responsible for providing all wastewater pumping equipment, including pump, motor ~~access frame~~ and guides.

D. Pumping equipment provided under this section shall be a standard product in regular production by manufacturers whose products have proven reliable in similar service.

E. The Contractor shall retain overall responsibility for equipment coordination, installation, testing, and operation.

1.05 WARRANTY

A. The Contractor shall furnish a written guarantee from the pump manufacturer which shall warrant the pumps and motors against defects in workmanship and materials for a period of five (5) years to commence from date of recordation of acceptance of the project by LUS. The contractor shall make arrangements as necessary to provide an extended warranty from the manufacturer to comply with the contractual warranty requirements.

B. The Contractor shall furnish a written guarantee covering all other parts and equipment for a period of one (1) year from the date of acceptance by LUS. It shall be warranted that all parts and equipment are free from defects in design, materials and workmanship.

C. Replacement parts of all components found to be defective shall be furnished and installed by the Contractor at no additional cost to LUS during the guarantee period.

D. The Contractor shall furnish to LUS at least three (3) hard copies and an electronic copy of instructions for installation, maintenance and operation of the pumps and components, together with parts lists and pump performance curves.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store equipment off the ground and in accordance with manufacturers

recommendation.

1.07 SUBMITTALS

A. Three (3) hard copies of all shop drawings and operating manuals shall be submitted.

B. At the time of submission, Contractor shall in writing call Engineer's attention to any deviations that the Shop Drawings may have from the requirements of the Contract Documents.

C. Engineer will review and approve with reasonable promptness Shop Drawings, but his review and approval shall be only for conformance with the design concept of the Project and for compliance with the information given in the Contract Documents. The approval 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 Engineer and shall return the required number of corrected copies of Shop Drawings. Contractor shall direct specific attention in writing or on resubmitted Shop Drawings to revisions other than the corrections called for by Engineer on previous Submittals. Contractor's stamp of approval on any Shop Drawing shall constitute a representation to LUS and Engineer that Contractor has either determined or verified all quantities, dimension, field construction criteria, materials, catalog numbers and similar data or he assumes full responsibility for doing so, and that he has reviewed or coordinated each Shop Drawing with the requirements of the work and the Contract Documents.

D. No related work shall be commenced until the Shop Drawing(s) has been approved by Engineer. A copy of each approved Shop Drawing shall be kept in good order by Contractor at the site and shall be available to Engineer.

E. Engineer's approval of Shop Drawings shall not relieve Contractor from his responsibility for any deviations from the requirements of the Contract Documents unless Contractor has in writing called Engineer's attention to such deviation at the time of submittal and Engineer has given written approval to the specific deviation, nor shall any approval by Engineer relieve Contractor from responsibility for errors or omissions in the Shop Drawings.

1.08 LIFT STATION STARTUP FIELD TESTS

A. Contractor shall ensure that the wet well is free of mud and all debris prior to the lift station start-up field test.

B. Start-up field tests shall be conducted by the pump manufacturer's factory trained start-up representative. The start-up test shall be conducted in the presence of the design engineer, representatives of the LUS Lift Station Maintenance Section and Civil Engineering Section, and the contractor.

C. A start-up test shall be conducted on each pump and shall consist of continuous operation for a period equivalent to drawdown of one half the total volume of the wet well.

D. The test shall be performed with the motor fully loaded and the wet well water level held above the pump/motor assembly.

1.09 UNIT PRICES

A. Method of Measurement:

1. Submersible Sewage Lift Station: Measured on a lump sum basis installed and accepted.

B. Basis of Payment:

1. Submersible Sewage Lift Station: Paid for on a lump sum basis for lift station installed and accepted which includes the wet well and valve box structures, bedding material, piping, pumps and pump installation, valves and valve installation, access frames and covers, vent pipes, electrical control box foundation, electrical components, and all other appurtenances necessary for construction of the lift station in accordance with the Drawings and these Specifications. Such payment also constitutes full compensation for installation, equipment, tools, labor, supervision, incidentals, and all work necessary to complete the sewage lift station.

PART 2 PRODUCTS

2.01 WET WELL AND VALVE BOX

A. Concrete pipe used for the wet well and outside valve box shall be standard strength reinforced concrete pipe conforming with all requirements of the "Standard Specifications for Reinforced Concrete Culvert Pipe", ASTM Designation C-76 for Class III, Wall B. Circular reinforcement shall be utilized, ASTM A615-82 and the supplementary requirement S1, Grade 60. Use No. 14 or 16 gauge wire, tie wire and supply chairs, bolsters, bar supports, and spacers as necessary for reinforcement support.

B. All concrete pipe joints shall be made watertight by using a profile gasket for single step joints. Profile gasket shall be Type 288-4G as manufactured by Press-Seal Gasket Corporation.

C. All penetrations of the concrete pipe shall be cast-in-place or cored.
D. Watertight connectors shall be ASTM C923, KOR-N-SEAL, flexible watertight connectors as manufactured by NPL Systems, Inc. or approved equal.

E. Provide Class A concrete under the provisions of DOTD Standard Specification 901.

F. Grout shall be one part portland cement, two parts mortar sand, and water as required for proper consistency; to be used within 30 minutes of mixing.

G. The quick connect installed in the valve box shall be a 4" Camlock Type F, aluminum, male camlock x male pipe thread, unless otherwise noted on drawings. The Cam shall be fitted with a Camlock dust cover.

H. Piping and fastening appurtenances which will be in contact with wastewater after installation shall be shop primed then painted with an epoxy phenolic coating system, or approved equal, as specified in section 2.17.

I. Internal surfaces of the wet well shall incorporate antimicrobial admixtures into the concrete wet well sections, as specified in section 2.17.

2.02 PIPE, VALVES, AND FITTINGS

A. Pipe 3 inches and larger within and between the wet well and valve box shall be ductile iron, ANSI/AWWA C151/A21.51 with flanged or restrained mechanical joint ends in accordance with ANSI/AWWA C110/A21.10 AND ANSI/AWWA C111/A21.11, respectively. All ductile pipe shall be ceramic epoxy lined inside. Epoxy ceramic lining shall be PROTECTO 401 as manufactured by US Pipe & Foundry Company, or approved equal, and shall be installed in accordance with the manufacturer's recommendations.

B. Flanged fittings shall conform to ANSI A21.10 (AWWA C110) or ANSI B16.1 Specifications. Gaskets for all flanged joints shall be full-faced, 1/8" solid rubber. Ductile iron fittings shall be manufactured in strict accordance with AWWA C153, AWWA C110 and AWWA C111. Fittings shall be asphalt coated outside and ceramic epoxy lined inside. Epoxy ceramic lining shall be PROTECTO 401 as manufactured by US Pipe & Foundry Company, or approved equal, and shall be installed in accordance with the manufacturer's recommendations.

C. Gate valves over 2" shall conform to the latest edition of AWWA Specification C509, and shall have a non-rising stem, iron body, iron wedge encapsulated with molded rubber and "0"-ring seals, Mueller 2360 Series Resilient Wedge Gate Valve, Catalogue No. 2360-6 Flanged Ends, or equal.

D. Gate valves 2" and under shall be bronze, with rising stem, double disk with screwed ends (Crane Bronze Gate Valve, Class 150, Rising Stem, Threaded Ends, Figure 4310B, or equal). All gate valves shall be furnished with operating handwheels.

E. Check valves shall be iron body, bronze mounted, swing type spring and lever check valves with flanged ends, (Meuller Catalogue No. A-2602-6-02, or approved equal). Check valve shall comply with AWWA C508.

F. Check valves 2" and under shall be bronze, swing type spring and lever check valves with screwed ends (Crane 1700 Series Bronze Check Valve, Class 125, Threaded Ends, Figure 1707, or equal).

G. Measuring and sensing devices shall require a ball valve with brass body and stainless steel ball.

2.03 PUMP CONSTRUCTION

A. The pumps shall be fitted with impellers of the non-clog design, constructed of a material suitable for continuous submergence in raw sewage.

B. The impeller shall be a closed, single or two vane type, capable of passing 3” solids and easily removable.

C. Pump casings shall be fitted with a wear-ring system that will provide efficient sealing between the volute and impeller. Pumps impellers shall be easily removable.

D. The pump shafts shall be of high grade alloy steel, accurately machined and ground to exact size, and shall be isolated from the pumped liquid.

E. Double mechanical pump shaft seals shall be provided to prevent leakage. The seals shall not require maintenance nor adjustment; however, the seals shall be easily inspected and replaceable.

F. The seals shall be oil lubricated from a oil chamber. The seal system shall not rely upon the pumped media for lubrication.

G. The shaft sealing system shall be capable of operating submerged to depths of, or pressures equivalent to 50 feet. No seal damage shall result from operating the pumping unit out of its liquid environment.

H. Pump fasteners shall be of 303 stainless steel or better.

2.04 MOTORS

A. Pump motors shall be of the sealed submersible type, having a nameplate rating that exceeds the maximum horsepower required by the pumps.

B. Motors shall be sized in accordance with N.E.M.A. design Class B, and incorporate Class F insulation materials to withstand a continuous operating temperature of 155°C (311°F).

C. All pump motors shall be designed for continuous duty and shall be non-over loading over the full range of the pump curve.

D. Motors shall be capable of sustaining a minimum of fifteen (15) starts per hour. Lubrication and cooling systems, double mechanical seals, double sealed roller bearings, and other components shall be adequately designed for the stated operating conditions.

E. Motors and pumps shall be capable of unsubmerged operation for a minimum period of at least one (1) hour without damage to the units.

F. Motors shall be provided with thermal overload protection and two moisture detection sensors. The moisture detection sensors shall be wired internally to the control cable at the top of the motor.

G. Comply with the National Electrical Code (N. E. C.) requirements for Class 1, Group C and D, Division 1 locations.

2.05 MOTOR CABLE

A. The special pump motor multi-conductor cable shall be suitable for submersible pump application and shall comply with the National Electrical Code (NEC) requirements for Class I, Division 1 Hazardous (Classified) Locations. This shall be indicated by a code or legend permanently embossed on the cable.

B. The flexible cable shall be of a type listed for extra-hard usage. It shall contain a grounding conductor having a continuous identifying marker readily distinguishing it from other conductors (i.e., motor phase conductors, seal failure probe conductors, over-temperature conductors) in an approved manner.

C. Cable shall be connected to terminals of supply conductors in an approved manner and

be sized according to NEC ampacity tables (for 125% of load).

D. Cable shall be supported by clamps or other suitable means that will prevent tension on the terminal connections.

E. Cable shall be provided with suitable CG hub-type seals where the flexible cord leaves the wet well conduit and where it enters the intermediate junction box.

F. The flexible cable must be removable without entering the wet well.

G. The cable entry water seal design shall be such that precludes specific torque requirements to insure a watertight and submersible seal.

H. Epoxies, silicones or other secondary sealing systems shall not be required or allowed.

I. The cable entry junction box and motor shall be separated by a sealing device which shall isolate the motor interior from foreign materials gaining access through the pump top.

2.06 PUMP REMOVAL

A. Lift station shall be furnished with a submersible discharge connection system to permit removal and installation of the pump without the necessity of an operator entering the wet well. The design must insure an automatic and firm connection of the pump to the discharge piping when lowered into position.

B. Pump Mounting Base:

1. A separate mounting plate shall be furnished for each pump. These plates shall include adjustable guide rail supports and discharge elbow with flange to align with pump hydraulic sealing flange.

2. The discharge base elbow shall be furnished by the pump manufacturer. The discharge elbow shall have a foot for anchoring to the wet well floor and a means for firmly supporting the guide rails.

3. Contractor shall verify location of anchor bolts prior to pouring wet well base.

4. The design and mass of the discharge elbow shall be sufficient for rigidly supporting the eccentric load of the pump unit and discharge piping.

5. The discharge of each pump shall be fitted with a hydraulically operated sealing flange.

6. When the pump is in operation, pressure shall provide a leak-proof seal. When pump is idle, pressure shall be removed so that pump can be removed from sump with no mechanical contact of sealing flanges.

7. Complete weight of pump to rest on bottom support plate, no weight to be supported on guide rails or discharge elbow.

8. The discharge elbow outlet shall connect to the discharge piping riser.

9. The elbow outlet shall have ANSI, 125 pound flange dimensions and drilling, of the size indicated on the construction drawings.

10. Plates and fittings shall be cast iron with stainless steel hardware.

C. Guide Bracket:

1. A sliding guide bracket shall be an integral part of the pump unit.

2. The design of the bracket shall obtain a pure vertical shearing action at the pump to discharge flange face when connecting or disconnecting to pump to the discharge elbow. The bracket design shall obtain a wedging action at the flange faces as the final alignment of pump to piping occurs.

D. Guide Rails:

1. Each pumping unit support shall be equipped with two -2" (minimum) type 316 stainless steel dual guide rail system sized to fit the discharge elbow and guide bracket, as recommended by manufacturer's specifications.

2. The dual guide rails shall extend from the pump up to the access frame at the top of the wet well.

3. Intermediate stainless steel supports shall be installed to stiffen the pump guide rails (at maximum of 10 foot intervals). Supports shall be secured to the wet well wall utilizing Type 316 stainless steel wedge anchors.

E. Lifting Cable:

1. Provide a stainless steel cable/chain for each pump/motor assembly, sized according to manufacturer's recommendations, for installing and removing the entire assembly without failure.

2. Provide a means for attaching the other end of the cable to the wet well access frame.

F. Wire Hanger:

1. The cable wire hanger shall be as per the detail in the plans.

2. Three quarter inch aluminum rods and one-quarter inch thick aluminum shall be used to fabricate the rack.

3. All hardware shall be stainless steel.

4. Cables shall be supported on the wire hanger by stainless steel cable grips.

5. The wire hanger needs to be clear of pump guide system and discharge piping (gravity and/or force main), and beam path of ultrasonic transducer.

6. The wire hanger shall be readily accessible from main hatchway.

2.07 ACCESS FRAMES AND COVERS

A. Wet Well:

1. An access assembly shall be installed in the wet well cover capable of supporting a live load of 150 pounds per square foot.

2. Size of clear opening shall accommodate both pumps with a minimum opening of 36” x 48”.

3. Single or double access doors are acceptable; single doors shall open toward the valve box; double doors shall open towards the front and back of site layout. Double doors are required on wet wells with internal diameters greater than 72”.

4. Cover assembly and hardware shall be aluminum and shall be supplied with upper guide bearing brackets, stainless steel safety chain hook, hinged and hasped covers, level sensor cable holders, automatic lock when opened 90 degrees, and shall be lockable.

5. The wetwell access hatch shall be fitted with a hinged grating panel to provide a system for fall through protection. The safety system shall be manufactured by Halliday Products, Inc. or approved equal.

6. Proper clearance for pump removal shall be assured by the Contractor. The actual clear opening of the wet well access hatch frame cover shall provide a minimum of 3-1/2 inches clearance behind the pump opposite the discharge and a minimum of 2-1/2 inches clearance on the side of the pump.

B. Valve Box:
   1. Construction and materials shall be same as for wet well cover. Access assembly will be a double door assembly. Access assembly shall be sized to provide full access to valve box.

2.08 PRESSURE GAUGES

A. The contractor shall furnish and install, as indicated on the plans, a 4" diameter pressure gauge with 1/2" inch male connection on lower back and 1/2" gate or stainless steel needle shut off valve.
B. Pressure gauge shall be as manufactured by Tel-Tru Manufacturing Company, Model 30 or approved equal. Pressure range of each gauge shall be as per drawings.
C. Each gauge shall be equipped with a diaphragm seal protector as manufactured by Tel-Tru Manufacturing, Model M - Mini seal for up to 4 1/2" gauges or approved equal.
D. Gauges shall be glycerin filled. All components of gauges shall be non-corrosive (i.e. stainless steel or other acceptable nonferrous material).

2.09 ANCHOR BOLTS

A. All assembly and anchor bolts, nuts, and washers shall be stainless steel. Bolts shall conform to ASTM A276, Type 430; nuts shall conform to ASTM A276, Type 302. Washers shall conform to ASTM A666, Type 302 or 304.

2.10 MISCELLANEOUS

A. All hardware and appurtenances shall be a minimum type 316 stainless steel unless a higher grade is called out.
B. Stainless steel fabrications to be in accordance with ASTM specifications applicable to the type of component or hardware.
C. Provide Reliner modular inside drop system with stainless steel straps by Duran, Inc. (800-504-8008) or approved equal. The straps shall be installed every 2’ starting 2’ from the invert of the wet well using 3/8” by 3”(minimum) stainless steel concrete anchors. The bowl size shall be determined considering the incoming pipe diameter at full flow in accordance with manufacturer’s recommendations.

D. A four inch aluminum quick-connect shall be installed in the valve box (Cam-Locks or approved equal), unless otherwise noted on drawings.

2.11 BEDDING MATERIAL

A. Stone material shall consist of 100 percent stone and shall conform to the following gradation:

U.S. Sieve	Percent Passing
1 1/2"	100
1"	90-100
3/4"	70-100
No. 4	35-65
No. 40	12-32
No. 200	5-12

B. The fraction of stone passing the No. 40 sieve shall be non-plastic.

C. Location & thickness to be as shown on plan detail.

2.12 STRUCTURAL CONCRETE

A. Concrete used in construction of the foundations shall have a minimum compressive strength of 4,000 psi at twenty-eight (28) days when tested in accordance with AASHTO Designation T22.

B. Forms for concrete structures shall be designed and built so as to be mortar-tight, sufficiently rigid to prevent pressure distortion, and capable of being removed without injuring the concrete. Forms shall not be removed until the concrete has obtained sufficient strength to support the load imposed.

C. Steel reinforcing bars shall be new billet stock, Grade 60 conforming to ASTM Specification A-615 and deformed to conform to ASTM Specification A-305. Splicing of bars will not be permitted without approval of the Engineer. Bent bar reinforcement shall be cold bent to the shapes shown on the plans. All bends shall be made around a pin having a diameter not less than six times the minimum thickness of the bar. All reinforcement shall be free from loose rust scale or other coatings that will destroy or reduce the bond. All reinforcement shall be inspected and approved by the Engineer before placing concrete.

D. Curing of the finished concrete surfaces shall be by covering within twelve (12) hours with

canvas, burlap, straw or sand, which shall be kept wet by sprinkling for at least three (3) days.

E. Completed concrete that will be left exposed shall be finished by rubbing the exposed surfaces with Carborundum or other abrasive to a smooth surface and to the removal of all form marks. Non-exposed surfaces shall have the form finish, except that all defects and holes shall be corrected. All edges or corners shall be chamfered as indicated on the Plans or as directed by the Engineer.

2.13 DOMESTIC WATER SUPPLY

A. The Contractor shall provide a Metro Code approved water service (the Metro Code fee shall be the responsibility of the Contractor).

B. Reduced Pressure Zone Backflow Preventers: A reduced pressure zone backflow preventer shall be installed at each cross-connection to prevent back siphonage and backpressure backflow of hazardous materials into the potable water supply. The assembly shall consist of a pressure differential relief valve located in a zone between two positive seating check valves and captured springs. Back siphonage protection shall include provision to admit air directly into the reduced pressure zone via a separate channel from the water discharge channel. The assembly shall include two tightly closing shutoff valves before and after the valve and test cocks and an FDA approved epoxy- coated strainer. The assembly shall have stainless steel internal parts and removable bronze seats. Gate valves shall have resilient seats and non-rising stems. Assembly shall have a fusion bonded epoxy coated cast iron body rated for 150 psi. The assembly shall meet the requirements of ASSE Std. 1013 and AWWA. C511. The valve shall be a Watts Regulator Company Series LF909 or pre-approved equal.

C. The 1" water riser with hose bib shall be located within the lift station site to the left of the main gate unless otherwise directed.

D. The Contractor shall furnish and install the water meter box as approved by LUS.

2.15 ELECTRICAL

A. See Division 16000 and the drawings for Electrical and Pump Controls.

B. The electrical system shall be installed as shown on the plans, and as required in these specifications and shall conform to the requirements of the National Electrical Code (latest edition) for a Class I, Division 1 location, the applicable local codes, and the rules and regulations of the local utility.

C. The electrical service, as shown on the plans, (100-A or 200-A, depending on the motors) shall be provided by LUS up to the sewage pump station equipment rack as part of this Contract, as well as a 100-A (or 200-A) service-side meter disconnect and meter base. The Contractor shall mount the meter base upon the equipment rack and provide all conduit and wiring from the weather-head or pad-mounted transformer.

D. It is to be expressly noted that the Contractor shall furnish and install all electrical wiring, fixtures, and connections required for the complete hookup of the pump station, including conduit, conductors, bulbs, etc. as required.

E. All wiring in the pump station shall be color coded as indicated on the wiring diagram. Wiring diagrams matching the unit wiring shall be provided to LUS.

2.16 ACCEPTABLE PUMP MANUFACTURERS

A. Fairbanks Morse

B. Flygt

C. Gorman Rupp

D. Hydromatic

E. Goulds

F. ABS

G. Yeomans

2.17 PAINTING

A. Piping and Fastening Appurtenances.
   a. Piping and fastening appurtenances shall be coated with Carboline 187 Epoxy Phenolic System or an approved equal. Carboline 187 Epoxy Phenolic System shall consist of two (2) coats, 4.0 – 6.0 mils DFT each. The first coat shall be Red color number 274-0500 and the finish /topcoat color shall be Gray color number 274-C703
   b. A "Stripe Coat" shall be applied to all flanges, appendages, etc. during the application of both coats. In the event of a spray application (preferred), a "stripe coat" is defined as an application of the given coating material to all edges, seams and other difficult to reach, see or hard to coat surfaces. These areas shall be given special attention (even by brush/roller application if needed), thinned as necessary to insure adequate mils DFT are applied. Immediately after the application of the said stripe coat, the full and overall application of the given coat is then applied, i.e. in a wet-to-wet mode.
   c. The pipe shall be clean, dry and decontaminated prior to abrasive blasting. Surfaces to be coated shall be cleaned per SSPC-SP1. Following this process, the surfaces shall be abrasive blasted to meet SSPC-SP5 cleanliness standard to obtain a 1.5 – 3.0 mil anchor profile.
   d. Field touchup of pipe coating:
      i. All shop coats shall be touched-up and completed at welds or joints after field erection. Surfaces shall be properly prepared per the following procedure for all field repairs of welds and coating system damages:
         - Clean, dry and decontaminate the surfaces to be repaired per SSPC-SP1.
         - Clean surfaces per SSPC-SP2 and/or SSPC-SP3 – Hand/Power Tool Cleaning as needed.
         - All edges of existing, tightly adhered coatings shall be feather-edged to provide a beveled/smooth transition configuration for the coating to be applied. All discolored coatings surrounding weld burns shall be removed to a point where the existing coating are sound (typically 1" – 2" from the weld seam).
         - Apply a coat of Carboline's Carbomastic 15 (or Carbomastic 15 FC for temperatures below approximately 80 deg. F) to obtain 6.0 – 8.0 mil DFT.
         - Apply a finish/topcoat of Carboline's Phenoline 187 Finish Topcoat color Gray number 274—C703.
         - All priming and finish/topcoat shall be applied as per manufacture's Product Data Sheet (PDS).

B. Wetwell Internal Surfaces
    a. Wetwell internal surfaces shall Incorporate an antimicrobial admixture into the concrete wet well sections. The antimicrobial admixture shall be ConShield dosed at a rate of one (1) gallon per cubic yard, Xypex Bio San C500 at a rate of 1% by weight of total cementitious materials, or pre-approved equal.
    b. Joint Sealing, plugging and patching repairs shall be made with Xypex Megamix II with Bio-San or approved equal.
    c. Surface preparation, plugging, patching and coating application shall be performed in accordance with manufacturer's recommendations.
    d. Coating thicknesses shall be as recommended by the manufacturer of the product utilized.

PART 3 EXECUTION

3.01 PREPARATION

A. Verify orientation of pumps, access openings and site layout.

B. Verify location of influent and effluent lines.

C. Verify location of electrical conduit.

D. Installation of the pumping equipment shall conform to the manufacturer's instructions and recommendations and reviewed shop drawings.

3.02 EXCAVATION, BACKFILL, AND GRADING

A. The Contractor shall excavate to the depths required to install the structures in accordance with the drawings, keeping the limits of excavation to within two (2) feet of the neat lines of foundations wherever possible.

B. Excavation beyond the required depths and widths shall be filled with suitable materials at no extra cost to LUS.

C. Excavated material shall be stockpiled for use in backfilling. It shall be placed a safe distance from the excavation without overloading the undisturbed soil.

D. The excavation shall be accomplished in a manner to protect adjacent structures and to safeguard workmen.

E. It shall be the responsibility of the Contractor to install underpinning, shoring, sheeting

or other protection where needed to protect facilities and workmen.

F. All existing structures, pipes and foundations which are to be incorporated into the final work shall be adequately protected or shall be replaced by the Contractor.

G. Surface water shall be directed away from the excavation by grading and/or constructing ditches or berms.

H. The Contractor shall submit his proposed excavation plan to the Engineer in writing before commencement of the work.

I. The method of construction adopted shall be subject to approval of the Engineer, but such approval shall not relieve the Contractor of his responsibility for the safety and adequacy of his construction procedures.

J. Prior to placing backfill, all trash, debris and timber shall be removed from the trench or excavation. The backfill shall be made from suitable materials.

K. Backfill shall be placed in layers not to exceed 8 inches in depth and shall be compacted by mechanical tamping or rolling, or by other methods proposed in writing by the Contractor and approved by the Engineer.

L. Fill shall be compacted to 90% maximum density in accordance with ASTM 1557 (modified proctor).

M. Final lift station slab elevation shall be two feet (2') above the one hundred (100) year flood elevation Fill material and grading of site as shown on plans shall be included as lump sum payment for pump station.

N. All affected areas of the project site shall be graded to the elevations, contours, and shapes as required on the drawings. All roots, trash, and debris shall be removed. The earth shall be finished to be free of humps, ridges and depressions.

3.03 WET WELL AND VALVE BOX INSTALLATION

A. Excavate to depths required to install the structures in accordance with the Drawings. Maintain limits of excavation to 3 feet of the lines of foundations as much as possible.

B. Holes shall be predrilled in wet well and valve box to receive watertight connectors at influent lines.

C. Provide foundation bedding as indicated on the Drawings.

D. Erect wet well precast pipe sections with watertight joints as indicated in the Drawings.

E. Access frames and covers shall be installed in the pre-cast concrete top, assuring correct orientation and location with regard to hinges, direction of opening, components, and accessories.

3.04 WET WELL TIGHTNESS TESTING

A. Prior to backfilling wetwell, a hydrostatic test shall be performed on the wetwell structure in accordance with ACI 350.1R-01.

3.05 PUMPS, PIPING, VALVES, AND ACCESSORIES INSTALLATION

A. Attach the upper guide brackets to the access frame.

B. Install anchor bolts, nuts, and washers for mounting pump base to wet well floor in accordance with pump manufacturers instructions.

C. Position pump mounting base and discharge elbow on the floor on the wet well.

D. Install guide rails between upper guide brackets and discharge elbow with intermediate brackets.

E. Insure guide system is properly aligned and level and anchored according to manufacturers instructions.

F. While pumps are being lowered onto the guide rail system, a check shall be made between the volute flange and discharge elbow flange.

G. After pump base is grouted into place, install all piping in accordance with manufacturers instructions and the Drawings.

H. Install pressure gauges on discharge piping at the location as indicated in the Drawings.

I. Install inside drop system as per manufacturers instructions.

3.06 FENCE, DRIVEWAY AND SURFACING

A. The Contractor shall furnish and install a 6-foot cedar or chain link fence (as called for

by the engineer) around the perimeter of the pump station site in accordance with the details shown on the construction drawings and specifications contained within Section 02830. The fence shall be fitted with extension arms and three strands of barbed wire along its top rail (as called for by the engineer).

B. The Contractor shall provide 8-inch thick limestone surfacing with geotextile fabric for entire lift station site. A 6-inch thick concrete driveway shall be provided to the pump station as seen on the lift station site plan. Compaction shall be to a uniform density of at least 95% of maximum density at optimum moisture. The site shall be graded to drain and swale side ditches shall be constructed as necessary to carry the drainage run-off to the main road ditch.

C. The Contractor shall furnish and install pipe culverts in the location and of the type and size as shown on the construction drawings. Reinforced concrete pipe shall conform to the requirements of ASTM Designation C-76 for Class III, Wall B (Table III) pipe.

3.07 ELECTRICAL

A. Install electrical equipment, controls, and accessories in accordance with the provisions of Division 16000 and the Drawings.

END OF SECTION

SECTION 02720

CULVERTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Furnishing and installation of culverts.

1.02 REFERENCES

A. ANSI/ASTM C76 – Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.

B. AASHTO M198 – Joints for Circular Concrete Sewer and Culvert Pipe Using Flexible Watertight Gaskets.

C. DOTD Standard Specifications Section 1006.05 – Concrete Pipe Joints.

D. DOTD Standard Specifications Section 1019 – Geotextile Fabric (Plastic Filter Cloth).

E. DOTD Designation: TR401 – Method of Test for the Determination of In-Place Density.

F. DOTD Designation: TR418 – Method of Test for Moisture-Density Relationships.

G. DOTD Designation: TR423 – Procedure for the Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes.

1.03 CLASSIFICATIONS AND TESTS

A. Maximum Density: To be determined in accordance with DOTD Designation: TR418.

B. In-Place Density: To be determined in accordance with DOTD Designation: TR401.

C. Soil Classification: To be determined in accordance with DOTD Designation: TR423.

1.04 SAMPLES

A. Frequency for testing will be determined by the Engineer.

B. Submit a certificate of compliance from pipe manufacturers.

1.05 UNIT PRICES

A. Method of Measurement:
1. Culverts: Measured by the linear foot using the following methods:

a. Pipe not confined by fixed structures: Measured by the number of joints at the nominal length of each joint.
b. Pipe confined by fixed structures: Measured along the pipe between the termini of pipe in structure walls.
c. Pipe confined by a fixed structure on one end and unconfined at the other end: Measured along the pipe from the terminus of pipe in the structure wall to the unconfined end of pipe.

2. Plastic Filter Cloth: Plastic filter cloth will not be measured for payment.
3. Incidentals: Preparation, furnishing and hauling materials, excavation, dewatering, trench supporting, backfill, compaction, labor, tools and all incidentals necessary to complete the items in accordance with the Drawings and this Section will not be measured for payment but included in the price bid for the above items.

B. Basis of Payment:
1. Culverts: Paid for by the linear foot according to type and size.

PART 2 PRODUCTS

2.01 USABLE SOILS

A. Under roadways, parking areas, aprons, curbs, drives, walks, and shoulders:
1. Classes A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-3, & A-4 in accordance with DOTD TR423; Liquid Limit less than 35 and Plasticity Index of 15 or less, but greater than 6.

B. In open fields, lawns, unimproved rights of way, or neutral grounds, which are free from traffic:

1. Classes A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-3 & A-4 in accordance with DOTD TR423; Liquid Limit less than 35 and a Plasticity Index of 15 or less, but greater than 6.
2. Classes A-4, A-6 & A-7 in accordance with DOTD TR423; Plasticity Index of 35 or less.

C: Free of large lumps, large rock, tree stumps and other objectionable material.

2.02 MORTAR SAND

A. Non-plastic siliceous material conforming to the following gradation requirements:

U.S. SIEVE	**PERCENT PASSING**
No. 4	100
No. 8	95-100
No. 100	0-25
No. 200	0-10

B. Percentages of foreign matter not to exceed the following:

1. Coal or Lignite 0.25 percent

2. Clay Lumps 0.50 percent

2.03 DRAINAGE PIPE MATERIALS

A. Reinforced Concrete Pipe: ASTM C76, Class III, with Wall Type A, B, or C; diameter as required in the Drawings.

B. Reinforced Concrete Pipe Joints: Bell and spigot or tongue and groove end joints meeting the requirements of AASHTO M198.
1. Type 1 joints for joining pipe under drives and for side drains.
2. Type 2 joints for joining pipe used for cross drains under roadways, including turnouts.
3. Type 3 joints for joining pipe used for closed storm drain systems. Refer to Subsection 1006.05(a) of DOTD Standard Specifications for joint type descriptions.

C. Gasket Materials:
1. Rubber: AASHTO M198, Type A; lubricant as specified by manufacturer.
2. Flexible Plastic: AASHTO M198, Type B; gasket and primer to be from a source on the DOTD QPL.

2.04 PLASTIC FILTER CLOTH

A. Plastic Filter Cloth: Geotextile fabric meeting the requirements of DOTD Section 1019.

PART 3 EXECUTION

3.01 PREPARATION

A. Identify required lines, levels, contours, and datum.

B. Protect above and below grade utilities and other Underground Facilities to remain.

C. Verify with Engineer areas to be undercut.

D. Verify type of material for maintaining subgrades lowered at the direction of Engineer.

E. Verify character of subgrade before installation.

F. Beginning of installation means acceptance of substrate.

3.02 DEPTH OF FOUNDATION SUBGRADES

A. Elevations shown on the Drawings for soil subgrades of drainage pipes shall be considered as approximate and the Engineer may order, in writing, changes in dimensions or elevation of such subgrades as he deems necessary in order to secure a satisfactory foundation. Additional compensation will not be provided for additional excavations required.

3.03. EXCAVATION

A. Excavate subsoil to depths indicated on the Drawings and to a width sufficient for proper joining of pipe sections and thorough compaction of backfill material under and around pipe, undercut, as directed, soft areas of subgrade not capable of insitu compaction or incapable of properly supporting the pipe.

B. Dispose of material not satisfactory for backfill.

3.04 TRENCHING

A. The Contractor shall perform trench excavation of whatever substance encountered to the depths indicated on the plans. Proper enlargements shall be made at each bell to distribute the load to the barrel of the pipe. Muck or other unsuitable material shall be removed and replaced with suitable material as ordered by the Engineer at no extra cost to the Owner.

B. The trench shall be excavated so that the walls are as nearly vertical as possible to a minimum width which will provide working room to obtain specified compaction. Where required to safeguard employees or adjacent structures, the sides of the trench shall be properly sheathed and braced.

C. Where, in the opinion of the Engineer, damage is liable to result from withdrawing the sheathing, the sheathing will be required to be left in place.

D. Any water accumulated in the trenches shall be removed at no additional cost to the Owner prior to laying pipe. During excavation, material suitable for backfilling shall be stockpiled in an orderly manner, a sufficient distance from the edge of the excavation to avoid over loading and to prevent slides or cave-in. Trenching shall not be in more than three hundred (300') feet ahead of pipe laying.

3.05 INSTALLATION - PIPE

A. Bring subgrade to the proper elevation along the length of pipe to be installed and grade to provide uniform support for the full length of the pipe.

B. Provide bell holes at each joint to permit proper joint assembly and uniform pipe support.

C. Begin pipe installation from the downstream end of the system.

D. Provide mechanical pipe puller for joining pipes over 36 inches in diameter.

E. Place bell or groove ends facing upstream in the system.

F. Install pipe and seal joints watertight; join such that ends are fully entered and inner surfaces are flush and even.

G. Wrap Type 2 and Type 3 joints with plastic filter cloth for a minimum of 12 inches on sides of joint, lapping a minimum of 10 inches. Secure cloth at end section of each pipe by means of a non-corroding plastic strap having a minimum breaking strength of 380 lbs., and secure the ends with a self-sealing buckle. Prior approval

of this product by the Engineer will be required before installation.

3.06 BACKFILLING

A. Conduits shall be inspected before backfill is placed and any found to be damaged or out of required alignment or grade shall be removed and relaid or replaced, at the Contractor's expense; and any conduits damaged or out of the required alignment or grade due to backfill operations or other cause shall be removed and relaid or replaced, at the Contractor's expense. At the time of final acceptance, all conduits installed or extended by the Contractor shall be cleaned of all debris and soil to the invert elevation of the conduit.

B. As soon as the joints are complete and checked, backfill material free of large lumps, clods, or rock shall be deposited evenly on both sides of the pipe in layers not exceeding eight inches (8") thick. Each layer shall be compacted by use of approved mechanical tampers to maximum density requirements in Section 3.07, determined in accordance with the requirements of AASHTO Method T-99. Backfilling shall proceed in this manner to a point twelve inches (12") above the top of the pipe.

C. On surfaced streets or in areas designated by the Engineer to be surfaced, backfilling from a point twelve inches (12") above the top of the pipe to street grade shall be accomplished by depositing the backfill material in layers not exceeding eight inches (8") in thickness and tamping each layer with approved mechanical tampers to a maximum density shown in Subsection 3.07, determined in accordance with the requirements of AASHTO Method T-99. In the event the material excavated during the trenching operation has a high moisture content, this material shall be dried to backfilling. If unsuitable material for backfilling is encountered in a given location, suitable trench or roadway excavation from other locations on the project shall be used in the backfill operation. If part of the trench lies in an area designated to be surfaced and paralleling the centerline of the roadway, the total width of the trench shall be compacted as designated in this paragraph.

D. In unsurfaced areas and where the pipe is too deep to be compacted in one foot (1') layers by the wheels of the heavy equipment, at the option of the Contractor with approval of the Engineer, the backfill above a point twelve inches (12") above the top of the pipe and two feet (2') below ground surface may be accomplished by blading the material into the trench and using water to tamp. Compaction of the last two feet (2') of backfill may be accomplished by driving heavy equipment over the trench. The Contractor shall fill to grade, all trenches in which settlement of backfill occurs for the duration of the Contract and maintenance period.

E. The Contractor shall be required at his own expense, to remove all excess materials, debris or other obstructions from the streets or roads immediately after the backfilling has been completed. No cross streets, sidewalks or roads shall be wholly obstructed, except by special permission from the Engineer. If at any time, the Contractor neglects to remove such materials or obstructions and place streets, sidewalks, and roads in suitable condition for traffic within twenty-four (24) hours after having received written notice from the Engineer, the work may be done by the Owner, and the cost thereof charged to the Contractor and deducted from his final estimate. The Contractor shall repair or replace streets, sidewalks, roads and

culverts to the satisfaction of the Engineer and parties concerned.

F. All fences, markers, mail boxes, street signs or other temporary obstacles shall be removed by the Contractor and immediately replaced after the trench is backfilled, in their original position. The Contractor shall notify the Engineer and property owner at least twenty-four (24) hours in advance of any work done on easements or rights-of-way.

G. It is expressly understood that the Contractor shall restore all easements and rights-of-way to a condition equal to its original condition, and in a condition satisfactory to the property owners and the Engineer.

H. Trenching, backfilling and hauling excess material as specified herein shall be considered as incidental to the work and will not be measured or paid for under these items.

3.07 SCHEDULE OF LOCATIONS

A. The paragraphs below identify location and the minimum compacted density expressed as a percentage of maximum density and optimum moisture in comparison with that determined in accordance with DOTD Designation: TR418

B. Under paved areas: 95 percent.

C. Within five feet of paved areas: 90 percent.

D. Under headlands and agricultural loading areas: 90 percent.

E. Non-Load bearing areas: 85 percent.

END OF SECTION

Section 02731

TESTING & GROUTING OF SEWER PIPE JOINTS

Revised 10/00

PART 1 - GENERAL

1.01 SUMMARY

This item shall govern for the testing and grouting of sewer pipe joints on line sections selected by Lafayette Utilities System. Testing and grouting of pipe joints shall be used to identify those sewer pipe joints that are defective (allowing extraneous water and/or soil to enter the sewer system) and that can be successfully sealed by an internal pipe joint sealing process. The lines considered are those in which the pipe barrel is in good condition and is not deteriorated by hydrogen sulfide gas.

1.02 REFERENCES

The publications listed below form a part of this section to the extent referenced:

1.02.1 AMERICAN PUBLIC WORKS ASSOCIATION (APWA)

APWA R 806567-01 (1980) - Assessment of Sewer Sealants

1.02.2 NATIONAL ASSOCIATION OF SEWER SERVICE COMPANIES (NASSCO)

NASSCO (1988) - Recommended Specifications for Sewer Collection System Rehabilitation

1.03 DEFINITIONS

"Test Medium" - A fluid (maximum viscosity of 2 centipoise) shall be used as the test medium. Both liquid (usually water) and air are acceptable, but the test procedure is different for each.

1.04 SYSTEM DESCRIPTION

1.04.1 Joint Testing

The technique for sewer pipe joint testing is used to test the integrity of individual pipe joints. Testing cannot be performed and will not be required on cracked or broken pipe, building sewers, or sections of pipe between joints. Testing will not be required on joints which are visibly leaking.

1.04.2 Joint Sealing

It is the intent of the sewer pipe joint sealing work to seal sewer pipe joints which have any leakage utilizing the internal joint sealing method. It is realized that this method may only be used on sewer pipe sections in sound physical condition. Longitudinally cracked or broken pipe will not be sealed. When bell cracks or chips are evident from pipe section offset, sealing may be undertaken where the offset is small enough to allow proper seating of the sealing packer on both sides of the joint to be sealed.

1.05 SUBMITTALS

1.05.1 Construction Schedule

The Contractor shall submit a schedule of operations to the LUS Project Inspector as further detailed in Section 00800, "Supplementary Conditions", Article 7.

1.05.2 MSDS Sheets

Contractor shall submit all data requested in this specification prior to beginning work under this contract. This data consists of the Material Safety Data Sheets for all products to be used, manufacturer's printed instructions for delivery, storage, preparation, application, physical properties, chemical resistances, etc.

1.05.3 Product & Equipment Data

Contractor shall submit equipment manufacturer's operational manuals and guidelines to the LUS Project Inspector for review. Contractor shall strictly follow such instructions unless otherwise directed by the Owner.

1.05.4 Joint Testing and Joint Sealing Report Form

Prior to commencing any work under this project, the Contractor shall submit to the Engineer for approval, a Joint Testing and Joint Sealing Report with the specified information as described in Section 3.03.5 of these specifications.

1.06 QUALITY ASSURANCE

1.06.1 Regulatory Requirements

A. Observe and comply with all applicable federal, state and local laws, municipal ordinances, and the rules and regulations of all authorities having jurisdiction over the construction of the project.

B. Observe and comply with all applicable safety and health standards published

by the Secretary of Labor under Section 107, Part 1585 of the Contract Work Hours and Safety Standards Act.

C. Observe and comply with all applicable safety procedures for entering manholes as adopted by LUS in publication "Confined Space Entry".

D. Observe and comply with all applicable procedures in the "Work Traffic Control Handbook" for work within the roadway or adjacent to the roadway. The closure of a lane requires notification and approval of LCPCG Traffic Engineering (291-8545). Contractor shall obtain approval at least 24 hours prior to closure. Refer to Supplementary Conditions, Article 20, "Provisions for Traffic".

E. Observe and comply with all applicable OSHA standards.

1.06.2 Pre-Construction Conference

A. Within ten (10) days of the date of the Notice to Proceed and each subsequent work authorization, the contractor and his project superintendent shall meet with the Owner's Representative for a pre-construction conference and shall begin construction within ten (10) working days following the conference, unless otherwise directed by the Project Engineer.

B. Contractor shall furnish all submittals at this conference. Contractor shall also provide Owner with a phone number where someone is available to take calls at all times, in case of an emergency, trouble or other matters requiring the Contractor's attention.

1.07 DELIVERY, STORAGE, AND HANDLING

1.07.1 Delivery Requirements

Have products delivered to the site in manufacturer's original, unopened, labeled containers.

1.07.2 Handling Requirements

A. Handle materials and equipment in accordance with manufacturer's recommendations.

B. Provide equipment and personnel necessary to handle products by methods to prevent damage to products or packaging.

1.07.3 Storage Requirements

Contractor shall store and protect materials in accordance with manufacturer's recommended procedures.

1.08 PROJECT/SITE CONDITIONS - Not Used

1.09 SEQUENCING & SCHEDULING - Not Used

1.10 WARRANTY - Not Used

1.11 MAINTENANCE - Not Used

PART 2 - PRODUCTS

2.01 MANUFACTURERS - Not Used

2.02 CHEMICAL SEALING MATERIALS

2.02.1 General

All chemical sealing materials used in the performance of the work specified must have the following properties and characteristics:

A. While being injected, the chemical sealant must be able to react/perform in the presence of water (groundwater).

B. The cured material must withstand submergence in water without degradation.

C. The resultant sealant (grout) formation must prevent the passage of water (infiltration) through the sewer pipe joint.

D. The sealant material, after curing, must be flexible as opposed to brittle.

E. In place, the sealant formation shall be able to withstand freeze/thaw and wet/dry cycles without adversely affecting the seal. Note: This primarily applies to storm sewers which are shallow and sometimes dry.

F. The sealant formation must not be biodegradable.

G. The cured sealant should be chemically stable and resistant to the mild concentrations of acids, alkalis, and organics found in normal sewage.

H. Packaging of components materials must be compatible with field storage and handling requirements. Packaging must provide for worker safety and minimize spillage during handling.

I. Mixing of the component materials must be compatible with field operations and not require precise measurement of the ingredients by field personnel.

J. Cleanup must be done without inordinate use of flammable or hazardous chemicals.

K. Residual sealing materials must be easily removable from the sewer line to prevent reduction of blockage of the sewage flow.

In September 1980, the APWA published "Assessment of Sewer Sealants" under EPA Grant No. R806567-01 (Office of R & D, U.S. EPA, Cincinnati, OH 45268). This report describes performance attributes for a sewer sealant, many of which are listed above.

2.02.2 Acrylamide Base Gel Sealing Material

Avanti International's AV-100 Chemical Grout, or pre-approved equal shall be used in the performance of the work specified and shall have the following properties and characteristics:

A. A minimum of 10% acrylamide base material by weight in the total sealant mix. A higher concentration (%) of acrylamide base material may be used to increase strength or offset dilution during injection.

B. The ability to tolerate some dilution and react in moving water during injection.

C. A viscosity of approximately 2 centipoise which can be increased with additives.

D. A constant viscosity during the reaction period.

E. A controllable reaction time from 10 seconds to 1 hour.

F. A reaction (curing) which produces a homogeneous, chemically stable, nonbiodegradable, firm, flexible gel.

G. The ability to increase mix viscosity, density and gel strength by the use of additives.

H. An acute oral toxicity in rats (LD50) of 294 milligrams per kilogram of body weight for the un-reacted base material.

I. Additional additives may be required for the grout which could consist of root inhibitor and/or non-shrink chemical and/or latex.

2.03 MANUFACTURED UNITS - Not Used

2.04 EQUIPMENT

2.04.1 Joint Testing Equipment

The basic equipment used shall consist of a television camera, joint testing device (such as a packer), and test monitoring equipment. The equipment shall be constructed in such a way as to provide means for introducing the test medium, under pressure, into the VOID area created by the expanded ends of the joint-testing device and means for continuously measuring the actual static pressure of the test medium at and within the VOID area only.

VOID pressure data shall be transmitted electrically from the VOID to the monitoring equipment. Example: via a TV picture of a pressure gauge located at the VOID, or via an electrical pressure transducer located at the VOID.

All test monitoring shall be above ground and in a location to allow for simultaneous and continuous observation of the television monitor and test monitoring equipment by the Lafayette Utilities System. A calibration test (calibration equipment to be furnished by Contractor) shall be observed and reported at the beginning of each day in the presence of the Lafayette Utilities System.

2.04.2 Joint Sealing Equipment

The basic equipment shall consist of a closed-circuit television system, necessary chemical sealant containers, pumps, regulators, valves, hoses, etc., and joint sealing packers for the various sized of sewer pipes. The packer shall be cylindrical and have a diameter less than the pipe size and have cables attached at each end to pull it through the line. The packer device shall be constructed in a manner to allow a restricted amount of sewage to flow. Generally, the equipment shall be capable of performing the specified operations in lines where flows do not exceed the maximum line flows for joint testing/sealing.

2.05 COMPONENTS - Not Specified

2.06 ACCESSORIES - Not Specified

2.07 MIXES - Not Used

2.08 FABRICATION - Not Used

2.09 SOURCE QUALITY CONTROL - Not Used

PART 3 - EXECUTION

3.01 EXAMINATION - Not Used

3.02 PREPARATION - Not Used

3.03 PROCEDURES

3.03.1 Joint Testing Procedures

Each sewer pipe joint which is not visibly leaking shall be individually tested at a test pressure equal to ½ psi per vertical foot of pipe depth (not exceeding a test pressure of 10 psi) in accordance with one of the following procedures:

A. Test pressure to be approved by Owner on each individual line.

B. The testing device shall be positioned within the line in such a manner as to straddle the pipe joint to be tested.

C. The testing device ends (end elements or sleeves) shall be expanded so as to isolate the joint from the remainder of the line and create a VOID area between the testing device and the pipe joint. The ends of the testing device shall be expanded against the pipe with sufficient pressure to contain a minimum of 10 psi within the VOID without leakage past the expanded ends.

D. Water or an equivalent liquid shall then be introduced into the VOID until a pressure equal to or greater than the required test pressure is observed with the VOID pressure monitoring equipment. If the required test pressure cannot be developed (due to joint leakage), the joint will have failed the test and shall be sealed as specified.

E. The flow rate of the test liquid shall then be regulated to a rate at which the VOID pressure is observed to be the required test pressure. A reading of the test liquid flow meter shall then be taken. If the flow rate exceeds 1/4 gallon per minute (due to joint leakage), the joint will have failed the test and shall be sealed as specified. Test pressure shall be 4 psi over ambient ground water pressure.

F. A fluid (maximum viscosity of 2 centipoise) shall be used as the test medium. Both liquid (usually water) and air are acceptable, but the test procedure is different for each.

3.03.2 Joint Sealing Procedure

A. Joints showing visible leakage or joints that have failed the joint test specified, shall be sealed as specified. Joint sealing shall be accomplished by forcing chemical sealing materials into or through faulty joints by a system of pumps, hoses, and sealing packers.

B. The packer shall be positioned over the faulty joint by means of a measuring device and the closed-circuit television camera in the line. It is important that the procedure used by the Contractor for positioning the packer be accurate to avoid over-pulling the packer and thus not effectively sealing (grouting) the intended joint. The packer ends (end elements or sleeves) shall be expanded using controlled pressure. The expanded ends shall seal against the inside periphery of the pipe to form a VOID area at the faulty joint, now completely isolated from the remainder of the pipe line. Into this isolated area, sealant materials shall be pumped through the hose system at controlled pressures which are in excess of 4 psi above ambient groundwater pressures. The pumping unit, metering equipment, and the packer device shall be designed so that proportions and quantities of materials can be regulated in accordance with the type and size of the leak being sealed.

C. Jetting or driving pipes from the surface that could damage or cause undermining of the pipe lines shall not be allowed. Uncovering the pipe by excavation of pavement and solid (which would disrupt traffic, undermine adjacent utilities and structures, and cause further damage to the pipe lines being repaired) shall not be allowed.

3.03.3 Joint Sealing Verification

Upon completing the sealing of each individual joint, the packer shall be deflated until the VOID pressure meter reads zero pressure, then reinflated and the joint retested as specified. Should the VOID pressure meter not read zero, the Contractor shall clean his equipment of residual grout material or make the necessary equipment repairs/adjustments to produce accurate VOID pressure readings. Joints that fail to meet the specified test criteria shall be resealed and retested until the test criteria can be met in order to receive payment.

3.03.4 Residual Sealing Material

Residual sealing materials that extend into the pipe, reduce the pipe diameter, or restrict the flow shall be removed from the joint. The sealed joints shall be left reasonably “flush” with the existing pipe surface. If excessive residual sealing materials accumulate in the line the manhole section shall be cleaned by the Contractor to remove the residual materials.

3.03.5 Records

A. Joint Testing Records

Records shall be kept of joint testing performed in each manhole section. The records shall identify the manhole section tested, the test pressure used, the location (footage) of each joint tested, and a statement indicating the test results (passed or failed) for each joint tested.

B. Joint Sealing Records

Complete records shall be kept of joint sealing performed in each manhole section. The records shall identify the manhole section in which the sealing was done, the location of each joint sealed, and the joint sealing verification results and quantity of materials used.

3.04 FIELD QUALITY CONTROL - Not Used

3.05 ADJUSTING - Not Used

3.06 CLEANING - Not Used

3.07 DEMONSTRATION - Not Used

3.08 PROTECTION - Not Used

3.09 SCHEDULES - Not Used

3.10 MEASUREMENT

The work will be measured by the number of joints tested and the number of joints grouted in a line section. Only those line sections included on a work directive issued by the Lafayette Utilities System shall be considered for measurement.

3.11 PAYMENT

All work performed and measured as provided under "Measurement" will be paid for as the number of joints actually tested and the number of joints actually grouted at the unit price bid, which price shall be full compensation for joint testing and joint grouting and for furnishing all labor, tools, equipment and incidentals necessary to complete the work.

END OF SECTION

Section 02732

CLEANING AND TELEVISION INSPECTION

Revised 11/2010

PART 1 - GENERAL

1.01 ***SUMMARY***

1.01.1 The goal of this project is to characterize the condition of the sewer lines and to identify serious structural defects and significant sources of I/I for the purpose of prioritizing and cost estimating rehabilitation work.

1.02 ***REFERENCES*** - Not Used

1.03 ***DEFINITIONS***

1.03.1 "Major Blockage" - A blockage (structural defect, collapse, protruding service connection, debris) which prohibits manhole-to-manhole cleaning, TV inspection or rehabilitation procedures.

1.03.2 "Linear Foot" - Being one foot. In these specifications used to denote that the unit of measurement relating to the length of a sewer line or stub out.

1.03.3 "Internal Pipe Inspection" - The television inspection of a sewer line section. A TV camera is moved through the line at a slow rate and a continuous picture is transmitted to an aboveground monitor.

1.03.4 "Hydraulic Cleaning" - Techniques and methods used to clean sewer lines with water, e.g. water pumped in the form of a high-velocity spray and water flowing by gravity or head pressure. Devices include high-velocity jet cleaners, cleaning balls, and hinged-disc cleaners.

1.03.5 "Easement Jetter" – Easement jetters are self-propelled machines with a hydraulically powered hose reel. They have no source of water other than from the jet truck. They are driven through gates to access backyard manholes. The jet truck is parked in the street, and its jet hose is connected to the easement machine. Water is pumped from the jet to the easement jetter, and the easement jetter hose reel operates independently from the main jet.

1.03.6 "Debris" - Soil, rocks, sand, grease, roots, etc., in a sewer line excluding items mechanically attached to the line such as protruding service connections, protruding pipe, joint materials, and the like.

1.03.7 "Inspector" - The Owner's on-site representative responsible for inspection and acceptance, approval, or rejection of work performed as set forth in these specifications.

1.03.8 "Television Inspection Report" - A form that is filled out by each television operator for any television inspection effort that is submitted to the Owner.

1.04 *SYSTEM DESCRIPTION*

1.04.1 The intent of sewer line cleaning is to remove any internal deposits, sludge, dirt, and broken pipe, etc., from the existing line sections for clear viewing of the interior surface of the pipe during CCTV inspection at locations selected by the Lafayette Utilities System. Manholes and sewer lines selected for cleaning or preparatory cleaning shall be cleaned using the most cost-effective method as determined by the evaluation of accumulated information.

The primary objective of the Closed Circuit Television Inspection is to visually examine the interior of the pipes to determine the location and severity of any breaks or obstacles, the quantities of infiltration/inflow, and the location of service connections. This item shall govern for the closed circuit televising and video taping of existing lines selected by the Lafayette Utilities System.

1.05 *SUBMITTALS*

1.05.1 Prior to Fieldwork Commencement

The Contractor shall submit the following for acceptance by the Engineer prior to beginning the field tasks:

A. Contractor's Health and Safety Plan

B. Schedule of operations as further detailed in Section 00800, "Supplementary Conditions", Article 7

C. Field Inspection Form to be used

1.05.2 Weekly Submittals

The following information shall be submitted to the Engineer on a weekly basis:

A. List of manholes that cannot be located, that appear to be buried, or that cannot be opened

B. List of any additional manholes that were not noted on the maps provided to the Contractor by the Engineer

C. Submit a forecast of the area to be inspected the following week

D. Hard copy of inspection forms (can allow for a 1 week offset)

E. Photographs and video of pipes and defects (can allow for a 1 week offset).

One (1) videotape & one (1) DVD or two (2) DVDs of each line section shall be submitted. The videotapes & DVDs submitted become the property of the Owner and will be retained by such.

F. Conditions observed during the previous week of which the Engineer should be made aware (potential structural failures, massive surcharge conditions, possible blockages, etc.)

G. Corrected maps showing actual field conditions and locations

1.06 ***QUALITY ASSURANCE***

1.06.1 Qualification Requirements

Use experienced personnel to operate cleaning equipment and devices.

1.06.2 Regulatory Requirements

Acceptance of sewer cleaning work is subject to successful completion of the television inspection. If videotape inspection shows solids, sand, grease, grit or other debris remaining in the line, the cleaning is considered unsatisfactory. Repeat cleaning, inspection, and videotaping of the sewer line until cleaning is acceptable by the Owner's Project Inspector.

1.06.3 Pre-Construction Conference

A. Within ten (10) days of the date of the Notice to Proceed and each subsequent work authorization, the Contractor and his project superintendent shall meet with the Owner's Representative for a pre-construction conference and shall begin construction within ten (10) working days following the conference, unless otherwise directed by the Project Engineer.

B. Contractor shall furnish all submittals at this conference. Contractor shall also provide Owner with a phone number where someone is available to take calls at all times, in case of an emergency, trouble or other matters requiring the Contractor's attention.

PART 2 - PRODUCTS

2.01 ***MANUFACTURERS*** - Not Used

2.02 ***MATERIALS*** - Not Used

2.03 ***MANUFACTURED UNITS*** - Not Used

2.04 ***EQUIPMENT***

2.04.1 Cleaning Equipment

Selection of the equipment used shall be based on the conditions of lines and location of lines at the time the work commences. The equipment shall be capable of removing dirt, grease, roots, rocks, sand, and other materials and obstructions from the sewer lines. The equipment which is expected to be used for the majority of the cleaning work on this project is a high-velocity sewer cleaner. An easement jetter may be necessary when sewer lines fall in backyard easements.

2.04.2 Video Equipment

The television camera used for the inspection shall be one specifically designed and constructed for such inspection. Select and use video equipment that will produce color videotape and DVD with Fast Forward Capability.

2.04.3 Videotape & DVDs

A videotape recording and/or DVD recordings of each line section shall be made by the Contractor and supplied to the Owner. This recording shall provide a complete "color" video picture and audio record of the entire inspection.

Provide videotape in VHS format, recorded at Standard Play (SP). Permanently label each tape and DVD with the following information:

Project Name.: _____
Contractor's Name: _____
Inspection Type: [ ] Pre-Inspection [ ] Post-Inspection
Tape No: _____ Date Taped: ____/____/____ Date Submitted: ____/____/____

2.05 ***COMPONENTS***

2.05.1 Video System

A. The television camera, television monitor, and other components of the video system shall produce a "color" picture quality to the reasonable satisfaction of the Owner; and if unsatisfactory, the equipment shall be replaced with satisfactory quality producing equipment.

B. Lighting for the camera shall minimize reflective glare. Lighting and camera quality shall be suitable to provide a clear, in-focus picture of the entire periphery of the pipe for all but submerged conditions encountered during the work.

C. The camera shall be equipped with a rotating head to reveal the condition of the lateral lines connected to the sewer line being televised.

D. The camera shall be operative in 100% humidity conditions.

E. The camera may be self-propelled (Crawler) or shall be mounted on skids suitably sized (adjustable) for each pipe diameter to be investigated. The Contractor's equipment shall be capable of traversing sewers that may contain light offsets, sediment and debris.

2.06 ***ACCESSORIES***

2.06.1 Other equipment which might be necessary and shall be available includes bucket machines, rod machines, hydraulic root cutters, vacuum trucks, and balling equipment appropriate to the need.

PART 3 - EXECUTION

3.01 ***EXAMINATION***

3.01.1 Use of Easement Jetter

It shall be the Contractor's responsibility to verify site conditions prior to commencing any work activities. Site conditions include, but are not limited to, traffic flow (traffic management) and manhole accessibility.

The Contractor shall be due additional compensation as approved by LUS for cleaning using the easement jetter in which the sewer to be inspected is in a backyard easement where access with the flusher truck alone is not possible. The intent of this bid item is to provide compensation to the Contractor for inspections in backyard easements as deemed appropriate by the Engineer. It is the Contractor's responsibility to request approval of payment of this item prior to beginning work.

3.01.2 Do not begin cleaning until both the upstream and the downstream manholes have been checked for flow monitors and other mechanical devices.

3.01.3 Non-Standard Working Hours

The Contractor shall be due additional compensation as approved by LUS for inspections which must be performed after standard working hours as requested by LUS. Standard working hours shall be defined as Monday through Friday from 7:00 a.m. to 5:00 p.m. The intent of this additional bid item is to provide compensation to the Contractor for work that cannot be performed during standard working hours, such as sewer lines that exhibit high flow or have numerous businesses connected to it. It is the Contractor's responsibility to request approval of payment of this item prior to beginning work.

3.02 *PREPARATION*

3.02.1 Traffic Control

Traffic control shall be provided by the Contractor in accordance with Section 00800, "Supplementary Conditions", Article 20.

3.02.2 Sewage Bypassing

When required, it is the Contractor's responsibility to provide sewage bypassing while performing television inspections in high flow situations. However, LUS reserves the right to provide for the bypassing of the sewage. Said work performed by the Contractor shall be paid for in accordance with Specification Section 02743, "Bypass Pumping". It is the Contractor's responsibility to request approval of payment of this item prior to beginning work.

3.02.3 Cleaning

During cleaning operations, satisfactory precautions shall be taken to ensure that the water pressure created does not cause damage to or flooding of public or private property. Do not surcharge any sanitary sewer to an elevation that could cause overflow of sewage into area waterways, homes or buildings, or onto the surface. When high-velocity cleaning equipment is used, install a suitable sand trap, weir, dam or suction device in the downstream manhole so that solids and debris are trapped for removal.

3.03 *CLEANING AND TELEVISION INSPECTION PROCEDURES*

3.03.1 Cleaning

The Contractor shall be responsible for cleaning of any and all lines prior to

televising. If the cleaning of the entire section cannot be successfully performed from one manhole, the equipment shall be re-setup at the other manhole and cleaning again attempted. If again successful cleaning cannot be performed, it will be assumed that a major blockage exists and the cleaning effort shall be abandoned until an excavation and point repair can be made and the cleaning operation can be resumed.

As part of sewer cleaning, the Contractor shall scour debris- or grease-laden manhole walls with a high-velocity water gun. If the impact of the high-velocity water appears to be weakening the structural integrity of the manhole wall, the Contractor shall discontinue the scouring on the questionable manhole and notify the Owner's designated representative. Any existing debris, sand, dirt, gravel, brick, and/or concrete in the manhole shall be removed and is considered part of the cleaning process. If results of the cleaning are favorable, the Contractor will proceed with the TV inspection.

3.03.2 Debris Disposal

All sludge, dirt, sand, rocks, grease, and other solid or semi-solid materials resulting from the cleaning operation shall be removed at the downstream manhole of the section being cleaned. Passing materials from pipe segment to pipe segment, which could cause line stoppages, accumulations of sand in wet wells, or damage to pumping equipment, shall not be permitted. The Contractor shall not be responsible for removing mortar or other material which is securely attached to the pipe walls or joints. This does not refer to mortar or material at pipe entrances.

A. Materials collected during cleaning operations shall be removed by the Contractor from the site and properly disposed of. These materials shall be removed from the site at the end of each workday. Under no circumstances shall the Contractor be allowed to accumulate these materials on the site of work beyond the stated time, except in totally enclosed containers and as approved by the Owner.

B. The Owner shall furnish sites for disposal of materials removed from the sewer system and there shall be no cost to the Contractor for disposal of the materials at the designated site. The disposal site shall be the South Wastewater Treatment Plant located at 231 W. Bayou Parkway.

3.03.3 Television Inspection

A. Immediately after cleaning, videotape the sanitary sewer line to document the condition of the line and to locate existing service connections. Notify the Owner 24 hours in advance of any television inspection so that the Owner's Project Inspector may observe inspection operations.

B. The camera shall be moved through the line section in either direction at a moderate rate, stopping when necessary to permit proper documentation of the sewer's condition or to turn the camera head to the lateral connections to examine their condition. In no case will the television camera be pulled at a speed greater than 30 feet per minute. Manual winches, power winches, TV cable, and powered rewinds or other devices that do not obstruct the camera view or interfere with proper documentation of the sewer conditions shall be used to move the camera through the sewer line. If, during the inspection operation, the television camera will not pass through the entire line section, the Contractor shall set up his equipment so that the inspection can be performed from the opposite manhole. This "reverse" inspection shall be conducted the same day immediately following the original inspection. If again, the camera fails to pass through the entire line section because of an obstruction, the inspection shall be considered complete and no additional inspection work will be required.

C. When manually operated winches are used to pull the television camera through the line section, telephones or other suitable means of communication shall be set up between the two manholes of the line section being inspected to insure good communication between members of the crew.

D. The camera shall pan each joint and be stopped a minimum of 10 seconds at each broken pipe, root intrusion, other defect or adversity.

E. The camera shall pan around each lateral to show condition of connection, and then slowly zoom to the furthest visible point.

F. All recordings shall have an audio descriptive narration by the CCTV operator/inspector as the recordings are being produced. The operator shall clearly identify in the audio all important features: i.e., inspection form header identification information, all breaks, roots, or other defects. The audio portion of the composite signal shall be sufficiently free from electrical interference and background noise to provide complete clarity and comprehension of the oral report. In no case shall dubbing of the audio portion be acceptable after the survey. The video recording and the monitoring equipment shall have the capability to instantly review both video and audio quality of the video tape productions at all times during the television survey.

G. The pipe diameter shall be obtained by physical measurement in the upstream (or downstream) access structure. Pipe material, i.e., RCP, VCP, CMP, shall also be verified.

H. The upstream pipe depth shall be obtained by physical measurement from the invert of the pipe being inspected to the rim of the manhole ring and documented in tenths of a foot. The downstream pipe depth shall also be

obtained by physical measurement from the invert of the pipe being inspected to the rim of the manhole ring and documented on the inspection report form.

I. The camera lens must be kept clean and clear and any fogging over due to oil, grease, or other material or debris that obscures the lens shall be cleaned off before proceeding with the recording operation. If debris or other obstructions cause reduced visibility, Contractor shall make reasonable attempts to clear the lens of the camera before continuing the inspection.

J. The importance of accurate distance measurements is emphasized. Measurement for location of defects shall be below ground by means of a meter device. Marking on the cable, or the like, which would require interpolation for depth of manhole, will not be allowed. Accuracy of the distance meter shall be checked and recorded by use of a walking meter, roll-a-tape, or other suitable device, and the accuracy shall be satisfactory to the Owner. Footage readings shall be shown on the video monitor and taping at all times.

3.03.4 Recap Form

A log shall be maintained and submitted to Owner, inclusive of the date the work was performed, the location of the manholes and sewer lines televised, the lengths of the lines televised, reversals, the line size, the distance between joints, all bid items used for each line, and the total water used for the day as per metering device. Included with this Recap Form will be the Inspection Report Form and the corresponding photographs described below.

3.03.5 Photographs

The Contractor shall produce, for each major pipe defect observed, a color, high-quality still picture from a computer generated printout for inclusion with the Inspection Report Form. The pipe defect pictures shall be submitted digitally in jpeg format. The picture file name will contain the upstream manhole number, followed by an underscore, the downstream manhole number, followed by an underscore, then the number of the picture in sequence starting with number one (1) for each line segment, stub out, or fitting. [For example: (first picture) 4129_4128_1, (second picture) 4129_4128_2]. The next line segment shall be the same. [For example: (first picture) 4128_4127_1, (second picture) 4128_4127_2, (third picture) 4128_4127_3]. The file name will contain no spaces between numbers or underscores. Each line segment picture shall be numbered consecutively beginning with number one (1).

3.03.6 Video Tape (VHS format) & DVD or 2DVDs

A. A video tape and DVD or 2 DVDs recording each line section or stub out

section shall be made by the Contractor and supplied to the Owner and this recording shall provide a complete "color" video picture and audio record of the entire inspection. This recording shall be compressed, and have fast forward capability. The TV unit shall have the capability of displaying on the video tape and DVD written information concerning the pipe inspected. Provide tapes and DVDs, with fast forward function**,** of a quality sufficient for the Owner's Project Inspector to evaluate the condition of the sanitary sewer, locate the sewer service connections, and verify cleaning. If quality is not sufficient, re-tape the sanitary sewer segment and provide a new tape, DVD and report at no additional cost to the Owner. Camera distortion, inadequate lighting, dirty lens and blurred or hazed pictures will be causes for rejection of tape, DVD, and associated line segment.

B. All Tapes and DVDs shall be labeled with the inspection date and numbered consecutively beginning with number one (1) to the end of the contract. The label shall contain the file name of each line segment. The file name for each line segment shall contain the upstream manhole number, followed by an underscore, the downstream manhole number, followed by an underscore, then the date. For example: 4129_4128_yyyymmdd. The DVDs shall be individually protected in a slim line case or protective sleeve.

C. Videotapes and DVDs submitted become the property of the Owner and will be retained by such.

D. Contractor shall maintain the master originals of all videotapes, DVDs, and Television Inspection Reports submitted, until final acceptance of the Contract.

3.03.7 Data Reporting

For each line section inspected, provide a completed Television Inspection Report. This final report shall stand alone as a resource which assesses the condition of the entire line segment. The Contractor shall electronically input and record the data into the Contractor's complete system and deliver the data to the Owner. The data produced shall indicate the internal condition of the line section, the deviations in line and grade, abnormal conditions of the pipe barrel and joints, building sewer connection locations, and the location and estimated quantity of each source of infiltration and inflow. The report is a written narrative of pipe defects, sags and service connection locations and conditions, indexed to the footage counter. Fill out the Television Inspection Report as follows:

A. The Header Section shall include:

1. "Video Contractor Information" - The Video Contractor's name & address.

2. "Line Segment Number" - Indicate the manhole number at the starting point and the manhole number at the ending point. (5543 - 5542)

3. "Lift Station" - The lift station that the line section is located in as shown on the work authorization.

4. "UP Depth" - The depth, measured from the top of the manhole frame of the upstream manhole to the invert of the upstream pipe, in feet and tenths of a foot.

5. "DN Depth" - The depth, measured from the top of the manhole frame of the downstream manhole to the invert of the downstream pipe, in feet and tenths of a foot.

6. "Pipe Diameter" - The diameter of the pipe being televised.

7. "Pipe Material" - The material type of the pipe being televised.

8. "Surveyed Length" - The length of the line segment, in feet. The length shown on the Television Inspection Report must be the same as the length shown on the videotape. Also, the length on the top portion of the Television Inspection Report shall match that shown on the bottom portion of the Television Inspection Report.

9. "Cleaned Length" - The actual length of the portion of line segment that was cleaned.

10. "Work Authorization Length" – (W. A. Length) The printed length of the line segment that is approved on the Work Authorization list.

11. "Total Measured Length" – the actual measured length taken with the use of a tape measuring device or roll-a-tape and measured from manhole cover to manhole cover on the surface of the ground.
12. "Weather" - The existing weather conditions at the time that the videotape was made. (e.g., Cloudy).

13. "Location" - The type of location that covers the majority of the line segment. Example: Easement, Street, Shoulder of Street, Coulee Crossing, Railroad Crossing, Itc.

14. "Tape Number" - Each videotape produced must have a tape number for identification, affixed to the cassette label.

15. "DVD Number" – Each DVD produced must have a DVD number for identification, affixed to the DVD label.

16. "Taping Date" - The date the videotape was produced (same as the date shown on the display screen).

17. "Street Name" - The street name which the line segment falls on.

18. "Comments" - Indicate the extent of deterioration ("L" for light; "M" for medium; and "H" for heavy), reverse set-ups, whether line was dye-flooded, concrete removal, root removal, etc. Used for any miscellaneous information which helps describe conditions where there is no applicable location designated for data entry.

B. The Code Input Section shall include the following:

1. "Footage and/or Distance" - Show the footage readings.

2. "Clock Position" - Show the clock position, with 12 o'clock straight up, of each defect (e.g. 12:00, 3:00). Also show the clock position of each service connection and state the condition of the connection. Include the distance the connection is protruding into the pipe, when appropriate, and the type of connection, such as "plumber service", "break-in".

3. "Codes and Description" - Show the code number along with a written observation description. Example: AMH – Access Point, RFJ – Roots, Fine: Joint. The code and its description may be in the same column or in a separate column, but MUST be displayed next to each other and on the same line.

4. "Picture No." - Record the number as previously described in 3.03.5 (Photographs) and placed in its own column or in the remarks column and will be on the same line of its corresponding distance, code, and written observation description. It is recommended that pictures have its separate column so as to allow for needed remarks.

5. "Water Level" - Indicate the beginning of a sag and the end of a sag. There will be no "continuous" observation code used for sags.

6. "Roots" – There will no "continuous" observation used for roots.

3.04 *FIELD QUALITY CONTROL*

3.04.1 Do not under any circumstances; allow sewage or solids removed in the cleaning process to be released onto streets or into ditches, catch basins, cleanouts, storm drains, or sanitary or storm sewer manholes.

3.04.2 Acceptance of sewer cleaning work is subject to successful completion of the television inspection. If the television inspection shows solids, soil, sand, grease,

grit, or other debris remaining in the line or manhole, cleaning will be considered unsatisfactory. Repeat cleaning, inspection, and videotaping of the sewer line until cleaning is judged satisfactory by the Owner's Project Inspector.

3.04.3 Required information as designated in Section 3.03.7 – "Data Reporting" of this specification shall be completed in full on the report before submitting to Lafayette Utilities System. If any information is found to be missing or incorrect, the Contractor shall be responsible for completing and/or correcting all required information before the project will be accepted by Lafayette Utilities System.

3.05 *SCHEDULES*

A schedule must be provided to the Project Engineer 24 hours before beginning work on the project. The Contractor is required to determine his own method of construction and detailed work sequence, within the terms of the Contract.

3.06 *MEASUREMENT*

3.06.1 Cleaning

The cleaning of sanitary sewer mains will be measured on a linear-foot basis for the quantity actually cleaned which was included on the work authorization issued by the Owner.

3.06.2 TV Inspection

The television inspection of sanitary sewer mains will be measured on a linear-foot basis for the quantity actually television inspected which was included on the work authorization issued by the Owner.

3.06.3 Use of Easement Jetter

The use of an easement jetter shall be measured as one (1) each per line segment.

3.07 *PAYMENT*

3.07.1 Cleaning

All work performed and measured as provided under "Measurement" will be paid for as "Clean (Size) Sewer" at the unit price bid, which price shall be full compensation for cleaning, and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

3.07.2 TV Inspection

All work performed and measured as provided under "Measurement" will be paid

for as "Television Inspection, (Size) sewer" at the unit price bid, which price shall be full compensation for television inspection of the actual length inspected, and for furnishing all labor, tools, equipment and incidentals necessary to complete the work. "Additional Set Up for TV Inspection" shall be paid to the Contractor when the Contractor is not able to complete inspection on a line section because of an obstruction; and, the Contractor sets up his equipment at the opposite manhole of the line section in an attempt to complete the inspection.

3.07.3 Use of Easement Jetter

Payment to the Contractor for cleaning sewer lines using an easement shall be made under the bid item "Use of Easement Jetter" per line segment inspected as approved by the Project Engineer.

3.07.4 Non-Standard Working Hours

Payment to the Contractor for inspections performed after standard working hours shall be made under the bid item "Inspection of Sewers during Non-Standard Working Hours" per line segment as approved by the Project Engineer.

END OF SECTION

Section 02739

DYE-WATER FLOODING

Revised 12/06

PART 1 - GENERAL

1.01 ***SUMMARY***

This term shall govern for dye-water flooding at locations selected by the Lafayette Utilities System. Dye-water flooding is a technique used to trace and identify specific defects which are causing or could cause soil infiltration/inflow, soil erosion and degradation to the sewer system or other underground utilities or surface structures.

1.02 ***REFERENCES*** - Not Used

1.03 ***DEFINITIONS*** - Not Used

1.04 ***SYSTEM DESCRIPTION***

1.05 ***SUBMITTALS***

1.05.1 MSDS Sheets

Contractor shall submit all data requested in this specification prior to beginning work. This data consists of the Material Safety Data Sheets for all products to be used, manufacturer's printed instructions for delivery, storage, preparation, application, physical properties, chemical resistances, etc. Contractor shall follow all recommended procedures outlined by the manufacturer.

1.05.2 Dye-Water Flooding Report Form

Prior to commencing work under this project, the Contractor shall submit for approval a Dye-Water Flooding Report Form as specified in Section 3.03.2.

1.06 ***QUALITY ASSURANCE***

1.06.1 Regulatory Requirements

Advance notification must be given to DEQ (262-5584), Public Works Drainage Department (291-8517), and the Fire Department's Hazardous Materials Response Team (291-8716) of the use of any dye product(s).

PART 2 - PRODUCTS

2.01 ***MANUFACTURERS*** - Not Used

2.02 ***MATERIALS***

2.02.1 Dye

Uranine Conc, Uranine 75% MIL-D, or pre-approved equal shall be used .

PART 3 - EXECUTION

3.01 ***EXAMINATION*** - Not Used

3.02 ***PREPARATION*** - Not Used

3.03 ***DYE-WATER FLOODING PROCEDURES***

3.03.1 Dye-water flooding is accomplished by flooding the ground surface or a storm drain line section with dyed-water to simulate a storm-water runoff condition. The ground surface and/or storm drain line sections on both sides of the sewer shall be flooded prior to TV inspection. Dye-water flooding will often be accomplished in conjunction with TV inspection. **Dye-water flood 30 minutes prior to and continuously throughout work in each line segment.**

3.03.2 Dye-water Flooding Report Form

The results of dye-water flooding shall be recorded on a Dye-water Flooding Form. Form shall be approved by Lafayette Utilities System prior to commencing work under this project. The information recorded on this form shall include location of manhole or line flooded, lines plugged, location(s) flooded along this line, location(s) leaks were observed in sewer or drain pipe, and any other pertinent information regarding the test results which would effect a rehabilitation decision.

3.03.3 Photographs

Photographs shall be taken of the dye-water flooding in progress and, when possible, photographs shall be made of the leaks located. These photographs shall be submitted along with the Dye-Water Flooding Report Form. Contractor shall submit all recorded data and photographs in this specification when requested by Lafayette Utilities System. The photographs shall be a digital file in MPEG format. The picture will contain the upstream manhole picture number, then an

underscore, then the downstream manhole number. Each disc shall be labeled Dye-Water flooding, with the date, and numbered beginning with number one and continue numbering each disc consecutively to the end of the project.

3.04 ***MEASUREMENT***

The work will be measured as one (1) line segment for each dye-water flooding test completed. Only those dye-water flooding tests included on a work directive issued by the Lafayette Utilities System shall be considered for measurement.

3.05 ***PAYMENT***

All work performed and measured as provided under "Measurement" will be paid for as "Dye-water Flooding" at the unit price bid, which price shall be full compensation for dye-water flooding as specified under "Dye-Water Flooding Procedure", and for furnishing all labor, tools, equipment and incidentals necessary to complete the work.

END OF SECTION

Section 02741

OBSTRUCTION REMOVAL

PART I - GENERAL

1.01 *SUMMARY*

1.01.1 This item shall govern for all plant, labor materials and equipment necessary for the removal of obstruction(s) to the free and unimpeded flow of wastewater through sanitary sewer mains, and to allow for rehabilitation of the existing pipe by any method. The following obstructions shall be removed by remote device by one of the following methods:

A. Protruding taps: Service lines that protrude more than one inch (1") into the sewer main.

B. Roots from sewer pipe joints at locations selected by the Lafayette Utilities System.

PART 2 - PRODUCTS

2.01 *EQUIPMENT*

2.01.1 Protruding Taps - A power driven cutting device shall be utilized.

2.01.2 Root Removal - Equipment used for root removal shall be mechanical devices such as rodding machines, expanding root cutters and porcupines, and hydraulic procedures such as high pressure jet cleaners.

PART 3 - EXECUTION

3.01 *METHODS*

3.01.1 Protruding Taps - The protruding tap shall be cut so that the protrusion is no greater than 3/4". Damage to the existing sewer line or service line will result in no payment for this method and a point repair shall be performed, at no additional cost to the Owner. When a protruding tap is encountered in a pipe, the Contractor shall notify the Lafayette Utilities System before proceeding with the removal process. If a protruding tap cannot be repaired by internal cutting, which method is not possible through no fault of the Contractor, the Contractor

shall notify the Owner and the Owner will provide a crew to perform a point repair to correct the problem.

3.01.2 Root Removal - Special precautions should be exercised to assure removal of visible roots from the joint area which could prevent the sealing of a grouting packer or could effect other rehabilitation of the pipe. The use of remote devices such as rodding machines, expanding root cutters and porcupines, and hydraulic procedures such as high pressure jet cleaners shall be used, if required. Select a device that is adequately sized to remove the roots. When roots are encountered in a pipe, the Contractor shall notify the Lafayette Utilities System before proceeding with root removal. All roots removed from the joint area shall be removed from the downstream manhole of the line section containing the roots.

3.02 *FIELD QUALITY CONTROL*

3.02.1 The work shall be performed in a manner which will not damage the pipe, manholes or access points and the working area. The Contractor shall repair any damage and restore the working area at his expense.

3.03 *CLEANING*

3.03.1 All roots, broken pipe, and debris created by the removal process shall be removed from the downstream manhole of the line section. These materials shall be disposed of from the site not less often than once at the end of each work day. The Owner shall furnish sites for disposal of materials removed from the sewer system and there shall be no cost to the contractor for disposal of the materials at the designated site. The disposal site shall be the South Wastewater Treatment Plant located at 231 W. Bayou Parkway.

3.04 *MEASUREMENT*

3.04.1 Root Removal - The work will be measured by the length of each line section (defined manhole to manhole) that roots were removed in and in which was included on a work authorization issued by the Lafayette Utilities System.

3.04.2 Removal of protruding taps shall be measured as completed and accepted in place, per each.

3.05 *PAYMENT*

3.05.1 All work performed and measured as provided under “Measurement” will be paid for as “Root removal (size) sewer” at the unit price bids, which price shall be full compensation for root removal as specified in these specifications under “Methods”, and for furnishing all labor, tools, equipment, and incidentals

necessary to complete the work.

3.05.2 All work performed and measured as provided under “Measurement” will be paid for as “Remote cutting of protruding tap” at the unit price bids, which price shall be full compensation for removal as specified in these specifications under “Methods”, and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

END OF SECTION

Section 02743

BYPASS PUMPING

PART I - GENERAL

1.01 *SUMMARY*

1.01.1 The intent of sewer bypass pumping is to reduce or eliminate the flow from sewer lines for clear viewing of all interior walls of the pipe. This item shall govern for bypass pumping sewage flow around a line section when directed by the Lafayette Utilities System.

1.02 *REFERENCES* - Not Used

1.03 *DEFINITIONS*

1.03.1 "Bypass Pumping" - The installation and operation of bulkheads, plugs, hoses, piping, and pumps to maintain sewage flow and prevent backup and overflow.

1.04 *SYSTEM DESCRIPTION*

1.04.1 Bypass pumping provides continuous sewer service to the users of the sanitary sewer system while maintenance or construction operations are in progress by diverting flow when necessary around the construction location and pumping it to a downstream manhole. Maintain sewage flow to prevent backup or overflow onto streets, yards, and unpaved areas or into buildings, adjacent ditches, storm sewers, and waterways. Do not divert sewage outside of the sanitary sewer system.

1.04.2 Any time the bypass pump(s) is operating, an experienced operator shall be on site to monitor the operation, adjust pump speed, valves, etc., make minor repairs to the system and report problems.

1.05 *SUBMITTALS*

1.05.1 Construction Schedule

The Contractor shall submit to the Project Engineer, a schedule with the specified information as described in Section 00800, "Supplementary Conditions," Article 22, "Construction Schedule."

1.05.2 Product Data

The Contractor shall submit to the Project Engineer the manufacturer's operational manuals and guidelines for the equipment used. Contractor shall strictly follow such instructions unless otherwise directed by the LUS Project Inspector.

1.06 ***QUALITY ASSURANCE***

Quality Assurance requirements are described in Section 00800, "Supplementary Conditions," Article 9, "Subcontracts."

1.07 ***DELIVERY, STORAGE, AND HANDLING*** - Not Used

1.08 ***PROJECT/SITE CONDITIONS*** - Not Used

1.09 ***SEQUENCING AND SCHEDULING***

1.09.1 If the Owner is operating or maintaining bypass pumping in the construction area, the Contractor shall coordinate with the Owner's Engineer, as necessary.

1.09.2 The Contractor shall cease bypass pumping operations when directed by the Owner's Engineer or Inspector.

PART 2 - PRODUCTS

2.01 ***MANUFACTURERS*** - Not Used

2.02 ***MATERIALS***

2.02.1 Design piping, joints, and accessories must be of sufficient capacity to control the flow.

2.03 ***MANUFACTURED UNITS*** - Not Used

2.04 ***EQUIPMENT***

2.04.1 When pumping and bypassing is required, the Contractor shall supply the pumps, conduits, and other equipment to divert the flow of sewage around the manhole section in which work is to be performed.

2.04.2 Pumps shall be self-priming type or submersible electric, in good working order, with a working pressure gauge on the discharge.

PART 3 - EXECUTION

3.01 *EXAMINATION*

3.01.1 Maximum Depth of Flow

When sewer line depth of flow at the upstream manhole of the manhole section being worked on is above the maximum allowable for television inspection, the flow shall be reduced to the level shown below by plugging or blocking of the flow, or by pumping and bypassing of the flow as specified.

Depth of flow shall not exceed that shown below for the respective pipe sizes as measured in the manhole when performing television inspection:

A. 6" - 10" Pipe 20% of pipe diameter

B. 12" - 24" Pipe 25% of pipe diameter

C. 27" - up Pipe 30% of pipe diameter

3.02 *METHODS*

3.02.1 The methods used in the isolation of Sanitary Sewer Reaches are described as follows:

A. Isolation by Bypass Pumping - The Contractor shall be required to provide adequate pumping equipment and force main in order to maintain continuous sewage flow. Under no circumstances shall flow be interrupted or stopped. The location of the pump(s), force main, discharge points, etc., shall be approved by the Owner. The Contractor shall provide adequate sized pumps and hoses to bypass sewage flow at peak flow time. The Owner shall approve of the Contractor's proposed pump and hose sizes before installation of the equipment. The bypass shall be made by plugging the line at an existing upstream manhole and pumping the flow into a downstream manhole or adjacent sanitary sewer system.

B. Isolation by Plugging - This may be accomplished by installing an inflatable, tightly fitting pneumatic plug in the pipe at the upstream manhole of the line being worked or by other approved methods. The plug shall be so designed that all or any portion of the sewage can be released. During TV inspection, flow shall be reduced to within the limits specified in part 3.01.1, "Maximum Depth of Flow." After the work has been completed, flow shall be restored to normal.

3.03 ***FIELD QUALITY CONTROL***

3.03.1 When flow in a sewer line is plugged, blocked, or bypassed; sufficient precautions must be taken to protect the sewer lines from damage that might result from sewer surcharging. Further, precautions must be taken to insure that sewer flow control operations do not cause flooding or damage to public or private property being served by the sewers involved.

3.03.2 In the event of accidental spill or overflow, immediately stop the discharge and take action to clean up and disinfect the spill. Promptly notify the Owner's Engineer so that required reporting can be made to the Environmental Protection Agency (EPA) by the Owner's Engineer.

3.04 ***CLEANING***

3.04.1 When bypass pumping operations are complete, piping shall be drained into the sanitary sewer prior to disassembly.

3.05 ***SCHEDULES***

The Contractor is required to determine his own method of construction and detailed work sequence, within the terms of the Contract.

3.06 ***MEASUREMENT***

3.06.1 The work will be measured by the actual setup of bypass pumping equipment at each location which was included on a work authorization issued by the Lafayette Utilities System, and by the actual number of hours bypass pumping occurs. When multiple lines are bypassed using one (1) pump, work will be measured as one (1) setup and only hours of actual bypass operation shall be paid.

3.07 ***PAYMENT***

3.07.1 All work performed and measured as provided under "Measurement" will be paid for as "Set-up of Bypass Pump" at the unit price bid, and "Operation of Bypass Pump" at the unit price bid, which price shall be full compensation for bypass pumping specified in Part 3.02, under "Methods," and for furnishing all labor, tools, equipment, incidentals, and supervision to set-up and operate the pumping and bypassing system.

END OF SECTION

Section 02744

CURED-IN PLACE PIPE

PART I - GENERAL

1.01 *SUMMARY*

1.01.1 Approved methods and materials for the rehabilitation of deteriorated gravity sewer lines by the Cured-In-Place Pipe (CIPP) method.

1.02 *REFERENCES*

Where reference standards or specifications are specified throughout this section, the date of the standard is that in effect as of the Bid Date, or the date of the Owner-Contractor Agreement when there are no bids.

This specification references Insituform Technologies, Inc., National Liner®, Nova Pipe™, Reynolds Inliner, LLC, and Suncoast ® Liner, Standard Test Methods which are made a part hereof by such reference and shall be the latest editions and revisions thereof. Test methods of other approved equal processes shall be reviewed for approval by LUS. ASTM F 1216 shall govern when this specification does not address installation methods and materials.

ASTM D 543 - Test Method of Resistance of Plastics to Chemical Reagents

ASTM D 790 - Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Material

ASTM D 5813 - Standard Specification for Cured-In-Place Thermosetting Resin Sewer Pipe.

ASTM D 3681 - Standard Test Method for Chemical Resistance of Fiberglass (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe in a Deflected Condition

ASTM D 5199 - Standard Method for Measuring Nominal Thickness of Geotextiles and Geomembranes.

ASTM F 1216 - Standard Practice of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube.

1.03 *DEFINITIONS*

1.03.1 “LUS” - Shall refer to the Lafayette Utilities System, a department of the Lafayette City-Parish Consolidated Government (LCPCG) or their authorized representative.

1.03.2 "CIPP" - Shall refer to Cured-In-Place Pipe. A hollow cylinder consisting of a fabric tube with cured (cross-linked) thermosetting resin. Interior or exterior plastic coatings, or both, may be included. The CIPP is formed within an existing pipe and takes the shape of and fits tightly to the pipe.

1.03.3 "Delamination" - The separation of layers of CIPP.

1.03.4 "Dry Spot" - An area of fabric of the finished CIPP which is deficient or devoid of resin.

1.03.5 "Inversion" - The process of turning the calibration hose inside out by the use of water pressure or air pressure.

1.04 *SYSTEM DESCRIPTION*

1.04.1 It is the intent of this specification to provide for the reconstruction of existing sewer lines by forming a new pipe within an existing, structurally deteriorated pipe, which has generally maintained its original shape. The cured-in-place pipe (CIPP) shall provide flow capacity equal to or greater than the original pipe's flow capacity when new. The installation of the CIPP shall be accomplished by the Insituform Process, the National Liner Process, or an approved equal process. This process is defined as the reconstruction of sewer lines by installation of a thermosetting resin impregnated, flexible felt fiber tube, having an impermeable inner surface. The resin impregnated tube is formed to the host pipe by means of a water column. Curing is accomplished by circulating hot water (or other approved fluid) throughout the length of the inverted tube in accordance with the specified curing schedule supplied by the resin manufacturer. The thermosetting resin cures into a hard impermeable coating which serves as the surface of the new pipe. The CIPP shall extend the full length of the original pipe - with a minimum of six inches protruding into the upstream and downstream manhole. The CIPP shall provide a structurally sound, joint-less, close-fitting pipe that when cured is mechanically bonded to the host pipe.

1.05 *SUBMITTALS*

1.05.1 Construction Schedule

The Contractor shall prepare and submit to the Project Engineer, 24 hours before beginning work on the project, a detailed and practical schedule of operations as further described in Section 00800, "Supplementary Conditions", Article 7.

1.05.2 Product Data

This data consists of the Material Safety Data Sheets for all products to be used, manufacturer's printed instructions for delivery, storage, preparation, application,

curing and finishing, physical properties, chemical resistances, etc. Contractor shall follow all recommended procedures outlined by the manufacturer.

1.05.3 Test Data

The test data generated during the project - including but not limited to video taped inspection and physical tests - shall be submitted upon completion of the project.

1.06 *QUALITY ASSURANCE*

1.06.1 Pre-Qualification Requirements

A. Bid proposals must be labeled clearly on the outside of the bid envelope, defining the product(s) and installer being proposed. Bids submitted on products that have not been pre-approved will be rejected.

B. A bidder may propose an alternate method of CIPP instead of the procedure described in this Specification. Such a proposal will be accepted by LUS provided that it has been approved by the Project Engineer as an equal, to the method described in this Specification, and that the approval was granted a minimum of ten (10) days prior to the bid opening.

C. Pre-approval of products shall be classified as Commercially Acceptable. To be considered Commercially Acceptable, the product must demonstrate full compliance with the following requirements.

1. For a product to be considered Commercially Acceptable, a minimum of 250,000 linear feet or 1,000 line sections of successful wastewater collection system installations in the United States with a minimum of 25,000 linear feet of 24" or larger diameter installations must be documented to assure commercial viability. In addition, the Product shall have been in service within the wastewater collection system of the Owner (or some other city, town, or parish within the State of Louisiana, Texas, or Mississippi) for a minimum of three (3) years.

D. No product will be allowed to be bid or installed without submittal of test data supporting the following product performance requirements. Test samples shall be prepared so as to simulate installation methods and trauma of the product.

1. Chemical Resistance - The CIPP shall meet the minimum chemical resistance requirements listed below. CIPP samples for testing shall be of tube and resin system similar to that proposed for actual construction. It is required that CIPP samples with and without plastic coating meet these chemical testing requirements.

a. Chemical resistance tests should be completed in accordance with Test Method D 543 with the chemical solutions shown in the Table below. Exposure should

be for a minimum of one month at 73.4°F (23°C). During this period, the CIPP test specimens should lose no more than 20% of their initial flexural strength and flexural modulus when tested.

Minimum Chemical Resistance Requirements for Domestic Sanitary Sewer Applications

Chemical Solution	*Concentration, %*
Nitric acid	5
Tap water (pH 6-9)	100
Phosphoric acid	10
Sulfuric acid	10
Gasoline	100
Vegetable oil	100
Detergent	0.1
Soap	0.1

2. Long-term properties - Third party testing of a 10,000 hour external loading test, conducted in a wet environment to simulate field conditions, shall be used to verify long-term design values. A minimum of eighteen (18) restrained pipe samples shall be tested, with the results extrapolated to provide 50-year data.

3. Flow characteristics - The in-service Product shall provide full flow capacity equal to at least 100% of the host pipe's original capacity. Installer shall provide at least one in-ground flow test, verified by a third party, which measures flow characteristics of the product in uncleaned, in-service sewers.

4. Strain-corrosion testing - Glass fiber reinforced products shall submit strain corrosion test data performed in accordance with ASTM D 3681 without failure in 18 samples when exposed to 1.0 N sulfuric acid at the following strain levels for the time periods shown in the table below:

Hours	*# of Samples*	*Min. Strain %*
10	4	0.72
100	5	0.69
1,000	5	0.67
10,000	4	0.64

5. External hydrostatic pressure testing - Third party testing of external hydrostatic loading capacity of at least ten (10) restrained pipe samples shall be conducted to verify the design enhancement factor, K.

6. Soil loading - Third party soil cell testing of the product shall be provided to demonstrate structural capacity and verify design techniques.

E. The design method used for the product must be submitted for review and approval. Physical properties used in design equations must be validated by independent testing of product samples from ten (10) previous projects. Physical values derived from laboratory samples will not be allowed.

F. To be considered for approval, the Installer shall submit all ASTM Standards for installation and/or materials on the proposed Product.

G. The Installer shall provide detailed installation procedures and specific procedures for rehabilitation of mainlines, rehabilitation of service laterals, internal reestablishment of laterals, and installation of new service connections on lined pipe.

H. The Installer shall submit a narrative description of typical modes of failure for the proposed Product. This narrative should include typical and suggested means of repair along with a brief description of both the causes of the potential failure and effectiveness of proposed repairs.

I. The Installer shall submit a narrative description of limitations of the proposed Product. Narrative should include a minimum of suitable diameter ranges, degree of host pipe integrity required, job site installation limitations, depth limitations, required obstacle removal, point repairs, etc.

1.06.2 Regulatory Requirements

A. Observe and comply with all applicable federal, state and local laws, municipal ordinances, and the rules and regulations of all authorities having jurisdiction over the construction of the project.

B. Observe and comply with all applicable safety and health standards published by the Secretary of Labor under Section 107, Part 1585 of the Contract Work Hours and Safety Standards Act.

C. Observe and comply with all applicable safety procedures for entering manholes as adopted by LUS in publication “Confined Space Entry”.

D. Observe and comply with all applicable procedures in the “Work Traffic Control Handbook” for work within the roadway or adjacent to the roadway. Refer to Supplementary Conditions, Article 24, “Provisions for Traffic”.

E. Observe and comply with all applicable OSHA standards. Particular attention is drawn to those safety requirements involving work on an elevated platform and the use of steam.

F. Contractor shall notify property owners connected to the sewer line to be rehabilitated at least twenty-four (24) hours prior to beginning work on the sewer line.

G. Contractor shall notify the property owner when normal use of sewage factilities can be resumed.

1.06.3 Pre-Construction Conference

A. Within ten (10) days of the date of the Notice to Proceed and each subsequent work authorization, the Contractor and his project superintendent shall meet with the LUS Representative for a pre-construction conference and shall begin construction within ten (10) working days following the conference, unless otherwise directed by the Project Engineer.

B. Contractor shall furnish all submittals at this conference. Contractor shall also provide LUS with a phone number where someone is available to take calls at all times, in case of an emergency, trouble or other matters requiring the Contractors's attention.

1.07 ***DELIVERY, STORAGE, AND HANDLING***

1.07.1 Delivery Requirements

Have products delivered to the site in manufacturer's original, unopened, labeled containers.

1.07.2 Handling Requirements

A. Handle materials and equipment in accordance with manufacturer's recommendations.

B. Provide equipment and personnel necessary to handle products by methods to prevent damage to products or packaging.

1.07.3 Protection Requirements

Store and protect materials in accordance with manufacturer's recommendations and requirements of these Specifications.

1.08 ***PROJECT/SITE CONDITIONS*** - Not Used

1.09 ***SEQUENCING AND SCHEDULING*** - Not Used

1.10 ***WARRANTY***

1.10.1 Contractor shall warrant the CIPP finished product for a duration of twelve (12) months following final acceptance. During this warranty period, any defects which will affect the integrity or strength of the CIPP shall be repaired at the Contractor's expense in a manner satisfactory to LUS or the Project Engineer.

PART 2 - PRODUCTS

2.01 ***MANUFACTURERS***

2.01.1 Approved manufacturers are as indicated below:

A. Insituform Technologies, Inc.

B. National Liner®

C. NovaPipe™

D. Reynolds Inliner, LLC

E. Suncoast ® Liner – Approved combination: AOC resin combined with Applied Felts Tube

2.02 ***MATERIALS***

2.02.1 Pre-liner:

A. The pre-liner shall be of a similar size as the host pipe's equivalent diameter (plus a minimum of one-inch) and length. The pre-liner shall be a non-porous film material that is continuous over the entire length of the inversion and have the required tensile strength to withstand the applied installation stresses and not create holes in the film coating. The material shall have sufficient heat resistance to withstand the elevated interface temperature at the CIPP tube/host pipe wall during the procedure and not blister or pinhole. The pre-liner shall exhibit moderate to good resistance to styrene monomer and shall offer no structural integrity or wall thickness to the CIPP pipe when tested, as stated within ASTM D5813, Section 8.1.2.

2.02.2 Flexible Tube:

A. Provide flexible tube manufactured and fabricated under manufacturer's quality-controlled conditions. The flexible felt fiber shall be fabricated to a size that when installed, it will conform to the internal circumference of the existing sewer specified by LUS and produce the specified cured thickness and physical properties. An allowance shall be made for some circumferential stretching.

B. The minimum length shall be that deemed necessary by the Contractor in accordance with the manufacturer's recommendations to effectively span the distance from the inlet to the outlet of the respective manholes including sufficient material for sealing at manholes and product sampling (when required). The Contractor shall verify the lengths in the field before impregnation of the tube with resin. Individual inversion runs can be made over one or more manhole sections as determined by the Contractor and approved by the authorized representative of LUS.

C. The outside of the tube, before installation shall have an impermeable plastic coating. This coating will form the inner layer of the finished pipe and is required for enhancement of corrosion resistance, flow and abrasion properties.

D. These layers, which constitute the pipe wall, must be such that when the thermosetting resin cures, the total wall thickness must be homogeneous with no internal layer of plastic which might weaken the pipe wall and allow internal shear. When cured, the CIPP must form a mechanical bond with the host pipe or conduit.

E. Tube material shall be in accordance with Section 5.1 of ASTM F 1216-89 and/or the latest revision of the aforementioned specification.

2.02.3 Resin

A. The Contractor shall furnish a general purpose, unsaturated resin and a compatible catalyst system as specified by the resin manufacturer. Resin shall be a polyester resin, epoxy vinyl ester resin or an approved equal resin as approved by LUS.

B. The resin manufacturer shall provide the Contractor with the recommended curing cycle and shall submit the same to the LUS Project Engineer for his approval as specified in Part 1.05, "Submittals".

2.02.4 CIPP

A. The CIPP when cured shall have the following minimum values when tested in accordance with ASTM F 1216 by an independent testing laboratory approved by the Project Engineer:

PHYSICAL CHARACTERISTIC	MINIMUM VALUE	TEST METHOD
Flexural Strength	4,500 psi	ASTM D 790 Mod.
Modulus of Elasticity (8" - 12")	250,000 psi	ASTM D 790 Mod.
Modulus of Elasticity (>12")	400,000 psi	ASTM D 790 Mod.
Chemical Resistance	Loss not to exceed 20% of the above values after one year	ASTM D 543

B. The CIPP shall be fabricated from materials which when cured will be chemically resistant to withstand internal exposure to domestic sewage, unless otherwise notified by the Project Engineer. In industrial area where sewers are subject to possible organics and inorganics other than normal domestic sewage, LUS shall obtain samples of the dry weather sewage for chemical content analysis. Contractor shall provide certification from an approved testing laboratory for the proposed material's chemical resistance to the chemical content found in the LUS sample analysis.

C. The Contractor shall furnish to LUS prior to use of the lining material, certification from an approved testing laboratory of the physical properties and chemical resistance of the proposed lining material satisfactory to the Project Engineer.

1. For each work authorization, the Contractor shall submit testing results on a sample of cured liner. The sample shall be taken at the termination point opposite the liner entry point on 10% of termination points per work authorization. Installations to be tested shall be designated by the Engineer. If any of the 10% tested fails the test, the Engineer reserves the right to require testing of all CIPP installed at the Contractor's expense. The testing shall be accomplished by a laboratory approved by the Engineer.

2. All testing costs shall be considered incidental to the installation of the CIPP and are to be included in the unit prices bid for CIPP.

D. The Contractor shall submit his price proposal for the appropriate size designated in

the proposal section. The minimum thickness of the CIPP for pipe sizes 8" - 10" shall be 6 mm, for pipe sizes 12" shall be 7.5 mm, for pipe sizes 15" - 18" shall be 9 mm, for pipe size 21" shall be 10.5 mm, for pipe size 24" shall be 12 mm, for pipe size 30" shall be 13.5 mm, and for pipe size 36" shall be 16.5 mm. Additional thickness where required will be paid for under "Additional Lining Thickness for (Size) Rehabilitation" on a per linear foot basis. The bid item shall represent an additional 1.5 mm thickness for CIPP. Prior to beginning construction, the Contractor shall submit a schedule showing required design thickness of pipe for all sections for each condition (Depth, Pipe Condition, etc.). For design purposes, the groundwater level shall be assumed at grade. Schedule shall be supported with design data based upon the structural design parameters contained in the latest edition of the Insituform Engineering Design Guide, the National Liner Engineering Design Guide, or the Engineering Design Guide of an approved equal process.

2.02.5 Scotch Seal 5600 or "Approved Equal"

2.02.6 Activated Oakum Band (1/2" diameter) or "Approved Equal"

2.02.7 Non-shrink Grout

PART 3 - EXECUTION

3.01 ***EXAMINATION***

3.01.1 Design

Prior to beginning construction, the Contractor shall submit his design for the necessary liner to the Project Engineer. The design shall be based upon actual conditions in the field -- including all loadings on the liner. This design shall be signed and stamped by a registered Professional Engineer.

3.01.2 Traffic Control

Traffic control shall be provided by the Contractor in accordance with "Supplementary Conditions," Article 24.

3.01.3 Traffic Control during Non-Standard Work Hours

The Contractor shall be due additional compensation as approved by LUS for CIPP installations in which the sewer rehabilitation must be performed after standard working hours requiring traffic control by an officer as requested by LUS. Standard working hours shall be defined as Monday through Friday from 7:00 a.m. to 5:00 p.m. The intent of this additional bid item is to provide compensation to the Contractor for work that cannot be performed during standard working hours. **This item shall allow**

for the hiring of a traffic officer to help with traffic flow and visibility during these hours. It is the Contractor's responsibility to request approval of payment of this item prior to beginning work.

3.02 ***PREPARATION***

3.02.1 Prior to beginning construction, the Contractor shall have sufficient materials to perform the work he is assigned within ten (10) days of the date of the Notice to Proceed or the Work Authorization. The existing sewers, where designated or required, shall be lined using materials and workmanship which can be adapted to the restrictions of the work site. The Contractor shall not begin this phase of work until there are sufficient materials on hand to complete the job.

3.02.2 Pre-Installation Cleaning and Television Inspection Procedures include the following:

A. The line to be rehabilitated by CIPP shall be cleaned and televised, from manhole to manhole, before installation of the CIPP by the Contractor. This shall be considered incidental to the cost of lining the pipe. This will be performed in accordance with Section 02732, "Cleaning and Television Inspection". A video tape and suitable log of pre- and post-television inspections shall be provided by the Installer to the Owner before requesting CIPP installation payment.

B. It shall be the Contractor's responsibility to locate the services prior to installation of the liner. Any damage to property due to the Contractor's failure to adequately locate the lateral connections shall be at the Contractor's expense to remedy said damage.

C. When a line to be rehabilitated by CIPP has been evaluated by television inspection prior to the date on the work authorization, the Contractor shall not be paid for cleaning and/or television inspection. However, the Contractor, when directed by the Project Engineer, will televise and evaluate sewer lines, which will be paid for under the appropriate bid item for television inspection and performed in accordance with Section 02732, "Cleaning and Television Inspection".

3.02.4 Line Obstructions and Sewage Bypassing

A. Video tapes of lines previously televised will be made available to the Contractor for viewing. It is the Contractor's responsibility to familiarize himself with the conditions of the sewers prior to performing any work.

B. It is the responsibility of the Contractor to identify and determine the locations of any conditions on the interior of the pipe which may prevent proper installation of the CIPP. These conditions shall be noted so that they may be corrected by LUS or its designated Contractor. If these conditions cannot be removed by conventional sewer cleaning equipment and will prevent proper installation of the inversion process, such as heavy solids, dropped joints, protruding service connections or collapsed pipe, a point repair

excavation shall be made by LUS or its designated Contractor to repair the problem.

C. When necessary, man-entry may be required for the removal or realignment of sections of bitumastic-based coating material in existing large diameter corrugated metal pipe at locations which may prevent the proper installation of the CIPP.

D. When required for proper installation of the CIPP, it is the Contractor's responsibility to provide sewage bypassing while performing the installation of the CIPP. However, LUS reserves the right to provide for the bypassing of the sewage. The sewage bypassing shall be made by plugging the line at an existing upstream manhole and pumping the flow into a downstream manhole or adjacent system. The pump and bypass line shall be of adequate capacity and size to handle the flow. Said work performed by the Contractor shall be paid for in accordance with Specification Section 02743, "Bypass Pumping."

3.03 *INSTALLATION*

3.03.1 Pre-liner Installation

Typically, a pre-liner shall be required when the host pipe has a bitumastic-based coating material applied to the inside wall surface which retards the corrosion of the host pipe. This is most frequently performed in corrugated metal pipes. The pre-liner shall be installed within the host pipe for separation of the CIPP resin from the host pipe inside wall surface during the installation/cure process of the CIPP product. The pre-liner shall be pulled or inverted into the host pipe prior to the inversion of the CIPP tube, as described within ASTM F1216.

3.03.2 Wet Out

The Contractor shall designate a location where the tube will be impregnated ("wet out") with resin using distribution rollers and vacuum to thoroughly saturate the tube felt prior to installation. This must be done to insure that there will be no resin voids or weak areas. The Contractor shall allow the LUS representative to inspect the materials and wet out procedure. A catalyst system compatible with the resin and tube shall be used as per the manufacturer's recommendation.

3.03.3 Insertion

The wetted out tube shall be inserted through an existing manhole or other approved access by means of an inversion process and the application of a water column sufficient to fully extend it to the next designated manhole or termination point. The tube end shall initially be turned inside out and attached to a platform ring or standpipe. The inversion water column will be adjusted to be of sufficient height to cause the impregnated tube to invert from manhole-to-manhole and hold the tube tight against the existing pipe wall, produce dimples at side connections, and flared ends at the

manholes. The installed CIPP shall extend six inches (6") into the manhole.

The Contractor shall not be allowed to pull the wet out tube in place unless the Contractor can prove to the satisfaction of the Project Engineer that this method of installation does not result in tears or abrasion of the tube and uneven distribution of resin. This data shall be submitted and approved prior to the beginning of any installations.

3.03.3 Curing

After the insertion is completed, the Contractor shall supply a suitable heat source and water re-circulation system capable of delivering hot water uniformly throughout the section to effect a consistent cure of the resin. The curing temperature shall be that as recommended by the resin/catalyst system manufacturer. The heat source shall be equipped with suitable monitors to gauge the temperature of the incoming and outgoing water supply. Another such gauge shall be placed between the impregnated tube and the invert of the original pipe at the manhole(s) to determine the temperatures during the resin curing process. Initial cure shall be considered complete when the exposed portions of the felt tube appear to be hard and the remote temperature sensing device indicates the cure period to be of adequate temperature and duration as recommended by the resin/catalyst system manufacturer and as modified for the inversion process - as previously submitted.

3.03.4 Cool-Down

The Contractor shall cool the hardened CIPP to a temperature below 100 degrees Fahrenheit before relieving the water column. Cool water may be added to the water column while draining hot water from a small hole at the opposite end of the CIPP so that a constant water column height is maintained until cool-down is completed. Care shall be taken in the release of the water column so that a vacuum will not be developed that could damage the newly installed CIPP. Coupon samples shall be obtained for testing as stated in Specification Section 02744, Part 2.02.3.C. Cool down process may vary depending on the installation technique recommended by the manufacturer as submitted previously.

Upon completion of the cool-down process, any flow that had been restricted for the installation process shall be relieved immediately.

3.03.5 Finished Pipe

The finished CIPP shall be continuous over the entire length of an inversion run and be

free from visual defects such as foreign inclusions, dry spots, keel, pinholes, delaminations, wrinkles, and other deformities. The liner passing through or terminating in a manhole shall be carefully cut (also for samples) in a shape and manner approved by the Project Engineer. The invert, drop inlets, and benches shall be streamlined and improved for smooth flow. The finished CIPP shall also meet the leakage requirements of pressure test specified in section 3.04.1 of this specification.

"Insituform Technologies, Inc." and "National Liner" methods for sewer rehabilitation by CIPP are being structurally equal processes as far as "end product" required by LUS. The minimum required performance criteria, and/or standards physical/structural properties, chemicals resistance tests, and all other liner specifications shall be strictly followed. It shall be the Contractor's responsibility to comply in full with the specifications without any request for change after the award of the contract. LUS reserves the right to accept, reject or modify any later requests for change at no additional cost to the LCPCG or event to the extent of asking credit for the LCPCG.

3.03.6 Sealing and Benches in Manhole

The CIPP shall make a tight fitting seal with the existing pipe(s) in the manhole. Half-inch (1/2") diameter activated oakum band soaked in Scotch seal 5600 or equal shall be applied circumferentially near the annual space touching the end of the existing pipe and encased with a cementitious non-shrink grout. The top half of the pipe shall be neatly cut off and not broken or sheared off, at least six (6) inches away from the walls. The channel and the manhole shall be a smooth continuation of the pipe(s) and shall be merged with other channels, if any. Channel cross-section shall be U-shaped with a minimum height of half pipe diameter.

No separate payment for above work shall be made. Cost shall be considered incidental to the installation of the CIPP.

3.03.7 Service Connections

Once the CIPP has been cured in place, the Contractor shall reopen the existing active service connections as designated by LUS. After the service is reopened, it shall be brushed smooth, eliminating all burrs and irregularities. This work shall generally be performed without excavation, and in the case of non-man entry pipe, from the interior of the pipeline by means of television camera, a cutting device that re-establishes the service connection to not less than ninety percent (90%) capacity, and a brushing device. The edge of the cured-in-place pipe that was cut to re-establish the service connection should be smooth, continuous and close enough to the invert of the service to provide unobstructed flow of sewage from the connection. Cutting devices that use high pressure water shall not be used due to the damage they cause to the lateral lines. When fiberglass or other reinforcing fibers are used, that may cause wicking to lateral openings, the lateral edges must be sealed with a resin mixture compatible with the tube resin. The Project Engineer reserves the right to require service connection by

excavation at certain or all locations if the quality, workmanship, and approval rating for the remote cut is poor and not satisfactory. The Contractor shall be responsible for restoring/correcting, without any delay, all missed or faulty re-connections, as well as for any damage caused to property owners for not reconnecting the services within a reasonable amount of time or for not giving notice to the owners.

3.03.8 Post-Installation Televising

Post-installation televising of the CIPP, from manhole to manhole, shall be performed at no additional cost to the LCPCG. The post-inversion televising shall be performed after all service re-connections have been completed. The video shall be taken by a 360 degree radial view camera for close up view showing the completed work, including the condition of the restored taps prior to requesting payment.

3.04 *FIELD QUALITY CONTROL*

3.04.1 Field Testing

The water tightness of the CIPP shall be gauged by monitoring the water level in the inversion tube while curing. The water testing must be done directly on the finished product and not on an intermediary hose which is not part of the finished product. In addition, there shall be no visible evidence of infiltration at the termination point of the liner.

3.04.2 Acceptance

A. Line segments tested must meet the required minimum values shown in the table in Section 2.02.4 A and the finished CIPP shall be fully rounded and free of any visual defects, including but not limited to damage, deflection, cracks, foreign inclusions, dry spots, keel, pinholes, delaminations, wrinkles, and other objectionable deformities as determined by the Engineer.

B. There shall be no visible infiltration through the liner, or around the liner at manhole or service line connections. The Contractor shall be required to repair any visible leaks in a manner approved by the Engineer.

3.04.3 Non-Conforming Work

A. If either the thickness, flexural strength, or flexural modulus of elasticity of the installed CIPP liner are less than 80% of the approved design values, the product is considered unacceptable. A method of repair or replacement shall be submitted for review and

approval by the Engineer. All work required to remedy non-conforming work shall be at no additional expense to the Owner.

B. For all instances, as described in this section, other than thickness, flexural strength, and flexural modulus of elasticity, where the CIPP liner is deemed unacceptable, the Contractor shall submit a method of repair or replacement for review and approval by the Engineer. All work required to remedy non-conforming work shall be at no additional expense to the Owner.

C. Where post-installation thickness measurements and /or physical property testing is performed, payment for installed cured-in-place pipe shall be made in accordance with the following:

1. If the thickness, flexural strength, or flexural modulus of elasticity of the installed CIPP are 90% or greater than the specific values, full payment shall be made accordingly.

2. If the thickness, flexural strength, or flexural modulus of elasticity of the installed CIPP are between 90% and 80% of the specified values, with all at least 80% of the specified values, payment shall be based on:

   Adjusted Unit Price = Unit Price Bid x Value Factor, where:

   Value Factor = [* thickness + * flexural strength + * flexural modulus of elasticity] / 3.

   * Insert actual measured or tested result expressed as a percentage of specified value. Maximum allowable percentage is 100%.

D. During the warranty period, any defects which will affect the integrity or strength of the CIPP shall be repaired at the Contractor's expense in a manner mutually agreed to by LUS, satisfactory to the Project Engineer.

3.04.4 Process Limitations

Though the installation process may be licensed or proprietary in nature, the Contractor shall not change any material, thickness, design values or procedural matters stated or approved in the submittals, without the Project Engineer's prior knowledge and preapproval. The Contractor shall submit, in writing, full details about component materials, their properties and installation procedures and abide by them fully during the entire course of the project. The Contractor shall warrant to LUS that the methods, materials and equipment used herein, where covered by license are furnished in accordance with such license. The Contractor shall also warrant to LUS that the prices included in this proposal include all applicable royalties and fees in accordance with such license. The Contractor shall warrant and save harmless LUS against all claims

for patent infringement and any loss thereof.

3.05 ***CLEANING***

3.05.1 Upon acceptance of the installation work and testing, the Contractor shall reinstate the project area affected by his operations at no additional cost. The Contractor shall dispose of all excess material and debris not incorporated into the permanent installation.

3.06 ***SCHEDULES***

3.06.1 A schedule must be provided to the Project Engineer 24 hours before beginning work on project.

3.07 ***MEASUREMENT***

3.07.1 The work will be measured by the actual length of each section reconstructed. Service re-connections shall be measured by the actual number of re-connections made irrespective of pipe size or whether the service is for single, double, or multi-service. Only those line sections included on a work authorization issued by LUS shall be considered for measurement.

3.08 ***PAYMENT***

3.08.1 Payment for the work completed shall be in accordance with the prices set forth in the proposal for the linear-foot quantity as measured from center-of-manhole to center-of-manhole on a reconstructed sewer pipe section.

3.08.2 Initial (first time) cleaning, television inspection work and bypass pumping, if required and approved by the Project Engineer, shall be accomplished as specified by the "Cleaning and Television Inspection" and "Bypassing for Each Pump" Technical Specifications. Payment shall be as described in this specification, Section 02744, Part 3 and in accordance with their respective specifications.

3.08.3 Payment for installation of pre-liner shall be paid for as "Insertion of Pre-Liner within existing (size) Sewer".

3.08.4 Payment for removal or realignment of sections of bitumastic-based coating in existing large diameter corrugated metal pipe shall be paid as "Man-entry cleaning of large diameter corrugated metal sewer."

3.08.5 Payment for installation of CIPP shall be for wet out tube, insertion of tube, curing of tube, sealing CIPP in manholes, testing and clean-up and paid for as "Insertion of (thickness) CIP pipe within existing (size) Sewer".

3.08.6 Additional thickness where required and as approved by LUS, will be paid for on a per

linear foot basis under the appropriate bid item, "Additional Lining Thickness for (Size) Rehabilitation". As per Part 2.02.3.D of this specification, this bid item shall be paid on a per linear foot basis for each 1.5 mm increase in the liner thickness.

3.08.7 Payment for reopening of existing service connections from the interior of the pipe shall be in addition to that for installation of CIPP and paid for as "Remote Cutting of Branch Sewer Service Connection" or "Man-Entry Cutting of Branch Sewer Service Connection".

3.08.8 Payment for brushing of existing service connections from the interior of the pipe, after reopening has been achieved, shall be in addition to that for installation of CIPP and paid for as "Remote Brushing of Branch Sewer Service Connection" per applicable installation as approved by the Project Engineer.

3.08.9 Payment to the Contractor for installation of the CIPP after standard working hours requiring assistance from a traffic officer shall be made under the bid item "Traffic Control for sewers during Non-Standard Working Hours" per applicable installation as approved by the Project Engineer.

END OF SECTION

SECTION 02750

SANITARY SEWERAGE MANHOLE REHABILITATION/REPAIR

PART 1 -- GENERAL

1.01 SECTION INCLUDES

A. Cleaning Manholes

B. Plugging and Repairing Manholes

C. Sealing and Coating Manholes

1.02 DEFINITION

A. "LUS" shall refer to the Lafayette Utilities System (a Department of the Lafayette City-Parish Consolidated Government (LCPCG)) or their authorized representative.

B. ASTM shall refer to American Society for Testing and Materials.

1.03 REFERENCES

A. Where reference standards are specified throughout this section, the date of the standard is that in effect as of the Bid Date, or date of Owner-Contractor Agreement when there are no bids.

B. ASTM C1244-93(2000) – Standard Test Method for Concrete Sewer Manholes byt the Negative Air Pressure (Vacuum) Test.

1.04 REGULATORY REQUIREMENTS

A. Observe and comply with all applicable federal, state and local laws, ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the project.

B. Observe and comply with all applicable safety and health standards published by the Secretary of Labor under Section 107, Part 1585 of the Contract Work Hours and Safety Standards Act.

C. Observe and comply with all applicable safety procedures for entering manholes as adopted by LUS in publication "Confined Space Entry".

D. Observe and comply with all applicable procedures in the "Work Area Traffic Control Handbook" for work within the roadway or adjacent to the roadway. The closure of a lane requires notification and approval of LCPCG Traffic Engineering (291-8531).

1.05 SUBMITTALS

A. Submit product data for materials to be used in cleaning, plugging and repairing, and sealing and coating.

B. Submit two (2) copies of Material Safety Data Sheets for items in A.

C. Submit two (2) copies of all the ASTM Standards applicable for products used and the referenced standard, Section 1.03 B, for vacuum testing.

D. Submit manufacturer's printed instructions for delivery, storage, preparation, application, and finishing.

E. Submit within fourteen (14) days after signing the Contract, a list of all materials and equipment ordered for the project, the manufacturers or agents from whom ordered, catalog and type, quantity ordered and promised delivery date of each item. Any subsequent changes in this list shall be promptly brought to the attention of the Engineer.

F. Submit on a daily basis a “Work Completed” and “Work Scheduled” form, provided by LUS.

G. Submit a project schedule at the pre-construction meeting.

H. Submit a phone number(s) at which the Contractor can be contacted 24 hours a day to advise of any emergency, trouble, or other matter requiring his attention.

1.06 PROJECT RECORD DOCUMENTS

A. Accurately record status of manhole rehabilitation using work sheets provided by LUS during pre construction meeting.

B. Work sheets shall be filled in jointly by the Contractor and LUS Representative on a weekly basis.

1.07 QUALITY CONTROL

A. Leakage in a manhole will not be acceptable.

B. Installed products shall meet or exceed the product manufacturers strength and density properties, as determined by applicable ASTM sample collection and sample test procedures.

C. All materials on site must be marked and easily identifiable. Any unmarked material(s) will not be accepted.

1.08 STORAGE AND HANDLING

A. Store all materials in an appropriate stockroom upon receipt, and in accordance with the manufacturer's recommendations.

B. Replace damaged material.

1.09 PRE-CONSTRUCTION CONFERENCE

A. Within ten (10) days of the date of the Notice to Proceed, the Contractor and his project superintendent shall meet with the LUS Representative for a pre-construction conference.

B. Location of the meeting to be designated by LUS.

C. Submit a construction schedule.

D. Submit requirements as set forth in Section 1.05, Submittals.

E. Provide LUS with a phone number where someone is available to take calls at all times, in case of emergency, trouble or other matters requiring the Contractor's attention.

1.10 COPIES OF PLANS AND SPECIFICATIONS FURNISHED

A. Contractor will be furnished with three (3) sets of plans and specifications for construction purposes.

1.11 UNIT PRICES

A. GENERAL

This article is a standard including items of work normal to sanitary sewer manhole rehabilitation projects in general. Measurement and payment for items of work will be made only on the items specifically listed in the bid.

Any items of work not appearing in this Article and not listed in the bid, but are necessary for completion of the work in accordance with the Plans and Specifications, shall be included in the cost of the items listed and bid.

Payment for the various items of work to rehabilitate manholes shall constitute full compensation for all preparation work, cleaning, plugging and repairing, sealing and coating, disposal, excavation, backfill and clean-up accepted in accordance with the Plans and Specifications; the use of all tools, supplies and equipment; the furnishing, hauling and installing of all materials; labor and all incidentals necessary to complete the items; and for all risk or expense arising out of the nature of the work or prosecution thereof.

B. REHABILITATED MANHOLES

Payment for rehabilitated manholes shall be based on the actual vertical footage per manhole rehabilitated, with no distinction of various diameters, and will be paid for at the contract unit price per vertical foot for "Rehabilitated Manhole (Depth)" as indicated in the contract bid form. Contract price shall include all items, materials and labor used in the rehabilitation of manholes.

After rehabilitation of a manhole, eighty percent (80%) of the payment, less applicable retainage, will be due. Upon passing the acceptance test identified in Part 3.07, the

remaining twenty percent (20%) less applicable retainage will be due.

The depth of the manhole rehabilitated, shall be measured from the top of the manhole cover to the invert of the manhole. The dimension shall be rounded off to the nearest tenth. (.05 to be rounded up, less than .05 to be rounded down.) For instance, a manhole that is 5.2 feet deep will be paid as follows: 5.2 feet times the amount bid for Rehabilitated Manhole 0-6 feet. Additionally, a manhole that is 8.3 feet deep will be paid as follows: 8.3 feet times the amount bid for Rehabilitated Manhole 6.1-12 feet. Additional manhole depths will be paid accordingly. In cases where the depth so determined is an exact foot, payment will be made under the bid item for which that exact foot is the upper limit.

C. ACCEPTANCE TEST

Payment for acceptance tests shall be based upon the actual amount of said tests performed by the Contractor and will be paid for at the contract unit price per each for "Manhole Vacuum Test, Manhole Exfiltration Test", or “Manhole Infiltration Test” as indicated in the contract bid form. Contract price shall include all items, materials, and labor used to acceptance test the manhole. All manholes in this contract shall be vacuum tested, exfiltration tested, or infiltration tested as specified by LUS if conditions permit.

Any manholes that are not tested shall be visually inspected. Both the Contractor and an LUS representative shall be present for all testing. No payment shall be made for visual inspections.

D. REPAIR INVERT

Payment for repaired manhole inverts shall be based upon the actual amount of inverts repaired as directed by the LUS representative and will be paid for at the contract unit price per each for "Repair Invert" as indicated in the contract bid form. Contract price shall include all items, materials and labor used to repair the manhole inverts.

E. REBUILD BENCH

Payment for rebuilt benches shall be based upon the actual amount of benches rebuilt as directed by the LUS representative and will be paid for at the contract unit price per each for "Rebuild Bench" as indicated in the contract bid form. Contract price shall include all items, materials and labor used to rebuild the manhole benches.

F. REPAIR AND RESEAL RISER

Payment for sealed riser shall be based upon the actual amount of vertical footage per manhole rehabilitated, with no distinction of various diameters, and will be paid for at the contract unit price per vertical foot for “Repair and Reseal Riser” as indicated in the contract bid form. Contract price shall include all items, materials and labor used in the sealing of the risers.

The vertical footage, shall be measured from the actual area sealed. The dimension shall be rounded off to the nearest tenth. (.05 to be rounded up, less than .05 to be rounded down.) LUS Engineer shall make final decision on riser area to be sealed.

G. REPAIR AND RESEAL CONE

Payment for sealed cones shall be based upon the actual amount of vertical footage per manhole rehabilitated, with no distinction of various diameters, and will be paid for at the contract unit price per vertical foot for "Repair and Reseal Cone" as indicated in the contract bid form. Contract price shall include all items, materials and labor used in the sealing of the cones.

The vertical footage, shall be measured from the actual area sealed. The dimension shall be rounded off to the nearest tenth. (.05 to be rounded up, less than .05 to be rounded down.) LUS Engineer shall make final decision on cone area to be sealed.

H. REPAIR AND RESEAL MANHOLE WALL SEAMS

Payment for the repairing and resealing of manhole wall seams shall be based on the actual number of wall seams repaired and resealed. The repairing and resealing of a manhole seam shall be paid for at the contract unit price per each for "Repair and Reseal Manhole Wall Seams" as indicated in the contract bid form. Contract price shall include all items, materials and labor used in the sealing of the wall seams.

LUS Engineer shall make final decision on wall seams to be sealed.

I. REPAIR AND RESEAL PIPE ENTRANCES

Payment for the repair and resealing of pipe entrances shall be based on the actual number of pipe entrances sealed. The repairing and resealing of pipe entrances shall be paid for at the contract unit price per each for "Repair and Reseal Pipe Entrances" as indicated in the contract bid form. Contract price shall include all items, materials and labor used in the sealing of the pipe entrances.

LUS Engineer shall make final decision on pipe entrances to be sealed.

1.12 WARRANTY

A. Contractor shall warrant finished work for a duration of twelve (12) months beginning with the date of the notice of acceptance. The Contractor shall repair defects in material or workmanship, which may develop during the one-year period; and any damage to other appurtenances caused by such defects or discovered within the same period at no additional cost to LUS.

PART 2 -- PRODUCTS

2.01 APPROVED REHABILITATION MATERIALS

A. Quick-Set Grout

1. Preco Plug as manufactured by Preco Industries, LTD.
2. EMACO-503 as manufactured by Master Builders.
3. Strong-Plug as manufactured by Strong Systems, Inc.
4. Hydroplug as manufactured by Quadex.
5. Stop Leak as manufactured by Standard Cement Materials, Inc.
6. Permacast-Plug as manufactured by AP/M Permaform.
7. Dinjer Quick Set Mortar as manufactured by WBE Dorcas, Inc.
8. Approved equal.

B. Non-Shrink Grout

1. Preco Patch as manufactured by Preco Industries, LTD.
2. EMACO-503 as manufactured by Master Builders.
3. Strong-Seal QSR as manufactured by Strong Systems, Inc.
4. Reliner MSP as manufactured by Standard Cement Materials, Inc.
5. Permacast-Patch as manufactured by AP/M Permaform.
6. Approved equal.

C. Sealing and Coating

1. Quadex QM-1S as manufactured by Quadex.
2. EMACO S88-CI as manufactured by Master Builders.
3. Strong-Seal MS-2A as manufactured by Strong Systems, Inc.
4. Standard-Reliner MSP as manufactured by Standard Cement Materials, Inc.
5. Permacast MS-10,000 as manufactured by AP/M Permaform.
6. Dinjer CMS-10K as manufactured by WBE Dorcas, Inc.
7. Approved equal.

PART 3 -- EXECUTION

3.01 SAFETY

A. Procedures as stated in Part 1, Section 1.04 shall be followed.

3.02 MANHOLES TO BE REHABILITATED

A. The contractor shall investigate existing structures (Section 3.12, Existing Structures)

3.03 CLEANING MANHOLES AND INVERTS

A. As per product manufacturers recommendations, the contractor shall thoroughly clean the manhole prior to application of any rehabilitation material.

B. The contractor shall be completely responsible for sufficiently cleaning the manhole in order that the products used will adhere to the inside of the manholes.

C. All excess material resulting from cleaning operation shall be removed from the manhole and disposed of by the contractor. Excess material shall not be disposed of through the sewers.

3.04 MANHOLE REPAIR

A. REPAIR AND RESEAL RISER (RRR)

When specifically called for in the work authorization, the manhole riser as defined in Detail No. MH-1, shall be repaired and resealed. No excavation shall be performed for this work. The Contractor shall thoroughly clean the manhole riser prior to any repair work being performed. Active leaks shall be plugged and repaired with quick-set grout prior to sealing and coating. Any gaps and cracks shall be repaired with non-shrink grout prior to sealing and coating. Any missing or loose bricks, or missing or loose concrete shall be removed, and voids shall be repaired with non-shrink grout. The sealing of the riser shall be performed after the plugging/repairing of the manhole. The application and procedures used during sealing and coating shall be as per the manufacturer's recommendation. The finished surface shall have a smooth, troweled finish with no trowel seams and/or no protruding bricks showing. Leakage through the riser shall not be accepted. Measurement and payment shall be as per Section 1.11.F.

B. REPAIR AND RESEAL MANHOLE CONE (RSC)

When specifically called for, the manhole cone as defined in Detail No. MH-1, shall be repaired and resealed. No excavation shall be performed for this work. The Contractor shall thoroughly clean the manhole cone prior to any repair work being performed. Active leaks shall be plugged and repaired with quick-set grout prior to sealing and coating. Any gaps and cracks shall be repaired with non-shrink grout prior to sealing and coating. Any missing or loose bricks, or missing or loose concrete shall be removed, and voids shall be repaired with non-shrink grout. The sealing of the cone shall be performed after the plugging/repairing of the manhole. The application and procedures used during sealing and coating shall be as per the manufacturer's recommendation. The finished surface shall have a smooth, troweled finish with no trowel seams and/or no protruding bricks showing. Leakage through the cone shall not be accepted. Measurement and payment shall be as described in Section 1.11.G.

C. REPAIR AND RESEAL MANHOLE WALL SEAM (RSWS)

When specifically called for, the manhole wall seams as defined in Detail No. MH-1, shall be repaired and resealed. No excavation shall be performed for this work. The Contractor shall thoroughly clean the manhole wall seams prior to any repair work being performed. Active leaks shall be plugged and repaired with quick-set grout prior to sealing and coating. Any gaps and cracks shall be repaired with non-shrink grout prior to sealing and coating. Any missing or loose bricks, or missing or loose concrete shall be removed, and voids shall be repaired with non-shrink grout. The sealing of the wall seams shall be performed after the plugging/repairing of the manhole. The application and procedures used during sealing and coating shall be as per the manufacturer's recommendation. The finished surface shall have a smooth, troweled finish with no trowel seams and/or no protruding bricks showing. Leakage through the wall seams shall not be accepted. Measurement and payment shall be as described in Section 1.11.H.

D. REBUILD BENCH (RBB)

When specifically called for, or upon the direction of the LUS representative, benches shall be rebuilt in the manhole invert. The products used to perform said work shall be one from PART 2 – PRODUCTS or approved equal and shall be capable of bonding to the existing concrete and/or brick surfaces. Minimum dimensions of a rebuilt bench shall be half the diameter of the pipe and a 15 degree slope to the walls as defined in Detail No. MH-1. Measurement and payment shall be as described in Section 1.11.E.

E. REBUILD INVERT (RI)

When specifically called for, or upon the direction of the LUS representative, inverts shall be repaired to prevent leaks. Inclusive to repairs are joints, pipe circumferences and any unordinary crevice or crack allowing leakage. The products used to perform said work shall be one from PART 2 – PRODUCTS or approved equal and shall be capable of stopping leakage. Measurement and payment shall be as described in Section 1.11.D.

F. REPAIR AND RESEAL MANHOLES AROUND PIPE ENTRANCE (RPE)

When specifically called for, or upon the direction of the LUS representative, the Contractor shall repair and reseal the manhole around the pipe entrance. All loose material shall be removed from the perimeter of the pipe. The area shall be thoroughly cleaned by the Contractor. Any gaps and cracks shall be repaired with non-shrink grout prior to sealing and coating. Active leaks shall be plugged and repaired with quick-set grout prior to sealing and coating. The sealing shall be performed after the plugging and repairing of the area. The sealing and coating shall be performed in accordance with the manufacturer's recommendations. Measurement and payment shall be as per Section 1.11.I.

3.05 PLUGGING AND REPAIRING MANHOLES

A. Active leaks shall be plugged and repaired with quick-set grout prior to sealing and coating.

B. Gaps and cracks between bricks shall be repaired with non shrink grout prior to sealing and coating.

C. Missing and loose bricks shall be replaced or reinstalled prior to sealing and coating.

D. Steps shall be cut off flush with the manhole wall.

E. Connection of incoming pipes into the manhole, junctions of walls and bases, and cracks at ring castings and donuts shall be plugged or repaired as appropriate.

F. Grout products shall be prepared as per the manufacturers recommendations.

G. The application and procedures during plugging and repairing manholes shall be as per the product manufacturers recommendations

H. The cured grout shall meet or exceed the product manufacturers published strength and density properties, as determined by applicable ASTM sample collection and sample test procedures. Lafayette Utilities Systems test data shall be used to determine strength and density compliance.

3.06 SEALING AND COATING MANHOLES

A. Cleaning, plugging and repairing shall be performed prior to sealing and coating.

B. Sealing and coating products shall be prepared as per the manufacturers recommendations.

C. The particular application and procedures during sealing and coating shall be as per the product manufacturer's recommendation.

D. At minimum, a one-half inch thick sealing and coating layer shall completely cover the inside of the manhole from the bench, including the junction of the base and floor, to the cover ring. The annular space between the ring and the donut, or supporting structure, shall be sealed and coated.

E. Contractor shall take all precautions necessary to insure that no cementitious material should be allowed to enter the sewer mains or services.

F. The finished surface shall have a smooth, troweled finish with no trowel seams and/or no protruding bricks showing.

G. The cured seal and coating shall meet or exceed the product manufacturers published strength and density properties, as determined by applicable ASTM sample collection and sample test procedures. Lafayette Utilities Systems test data shall be used to determine strength and density compliance.

H. Upon the direction of the LUS representative inverts shall be repaired to prevent leaks. Inclusive to repairs are joints, pipe circumferences and any unordinary crevice or crack allowing leakage. The products used to perform said work shall be one from PART 2 PRODUCTS or approved equal and shall be capable of stopping leakage.

I. Upon the direction of the LUS representative benches shall be rebuilt in the manhole invert. The products used to perform said work shall be one from PART 2 PRODUCTS or approved equal and shall be capable of bonding to the existing concrete and/or brick surfaces. Minimum dimensions of a rebuilt bench shall be half the diameter of the pipe and a 15 degree slope to the walls.

J. Leakage will not be accepted.

3.07 TESTING MANHOLES

A. General

1. All manholes will be vacuum tested if conditions permit. If conditions do not permit, the exfiltration or infiltration test will be used. Lafayette Utilities System shall have final decision on which test to be used in lieu of the vacuum test. Any manholes that are not tested shall be visually inspected. An LUS representative

shall be present for all test and visual inspections.

2. Furnish all equipment, labor and materials, required to perform the tests, unless otherwise stated.

3. Tests shall be performed no sooner than thirty (30) days after the rehabilitation of the manhole is completed.

4. A retest at contractors expense shall be performed no sooner than fourteen (14) days after a failed manhole is corrected.

5. Manhole leakage shall not be acceptable.

B. Manhole Infiltration Test

1. The Contractor will perform the infiltration test with an LUS representative present. The manholes that shall be tested by infiltration test shall be at LUS's direction.

2. The test will consist of surcharging the soil around the manhole with pressurized water.

3. The manhole will be considered to have passed the test if no infiltration is detected. Contractor shall repair and retest manholes failing the above test as outlined in Specifications Section 02750, Article 3.07, A4. Retests shall not be paid for.

C. Manhole Exfiltration Test

1. This test shall be performed by the contractor on manholes that are within the roadway or on manholes otherwise accepted by LUS in lieu of the infiltration test. The manholes that shall be tested by exfiltration shall be at LUS's direction.

2. Plug all inlet pipes.

3. Fill to top of manhole with water.

4. The Engineer will determine the length of time for the test, but not exceeding one hour.

5. The manhole will be considered to have passed the test if no exfiltration is detected.

6. Dewater manhole into existing wastewater collection system.

7. Repair and retest manhole failing the exfiltration test. Retests shall not be paid for.

8. Contractor shall have a large capacity water tank on the job site for the exfiltration of manholes in areas where fire hydrants cannot be used.

D. Manhole vacuum testing shall be performed as outlined in ASTM C1244-93.

E. Visual Inspection

1. Prior to final acceptance a visual inspection shall be performed.

2. Leakage will not be acceptable.

3. Visual Inspections shall not be paid for.

3.08 WORK TO BE PERFORMED WHILE SYSTEM IS IN USE

A. Flow-thru plugs shall be used on services unless otherwise approved by LUS.

B. Flows through mains and manhole inverts shall be maintained.

C. Lift stations may be turned off for short periods of time by contacting and coordinating with the LUS Superintendent of the Wastewater Collection System (291-5926).

D. While sealing and coating the manhole, precautions shall be taken to prevent any material from entering the sewer pipelines. Material that enters pipelines due to negligence on the part of the contractor shall be removed at the contractors expense.

3.09 OPENING MANHOLE COVERS

A. Prior to opening manhole covers located in roadways, contractor shall paint marks on manhole ring and cover to insure proper alignment of the manhole cover upon replacement.

B. The contractor shall be responsible and liable for proper closure of manholes from the time of initial removal to the time of the one year warranty start date. The only exclusion of this will be when LUS is required, due to operation or maintenance reasons, to enter a manhole under rehabilitation.

3.10 COVERS AND RINGS

A. Grass, vines, etc. shall be removed around the outside edge of the manhole top.

B. The outside surface of the ring and the inside portion of the ring that seals the manhole cover shall be free of dirt, rust, grass clippings, etc.

3.11 BARRICADES AND FLARES

A. Provide barricades and flares at locations where there exist open holes, trenches or other hazardous obstructions. Said barricades shall bear the Contractor's name and a telephone number where he or his representative can be reached at all times.

B. All barricades and flares shall conform to DOTD Section 713 "Temporary Signs, Barricades and Pavement Markings".

3.12 EXISTING STRUCTURES

A. Existing structures shall be defined as all above and below ground level structures,

including all pipelines, poles, tracks, roads, culverts, sidewalks, drains, cables, wires, conduits, vaults, manholes, landscaping, and other appurtenant facilities, whether owned or operated by public bodies, private individuals, corporations, firms or companies.

B. Protect all existing structures from damage during construction.

C. Utility facilities when shown on the Plans are approximate locations (not to scale) and do not include service locations. There is no expressed or implied guarantee as to the accuracy of the various utilities or any omissions.

D. The Contractor shall verify the locations of all utilities and follow OSHA Law Section 1926.651 at no cost to LUS. Final project location will be determined in the field by the Engineer upon the Contractor's verification of all utilities.

E. In no case shall the Contractor receive additional compensation due to the location of existing utilities in relation to the final location of the proposed lines and appurtenances.

F. Notify all utilities or other interested parties prior to starting work and advise them of any adjustments required.

G. Contractor shall be responsible for investigating and informing himself of the condition, character and extent of all structures which may be encountered during construction.

H. Perform work in a manner to prevent interference with or damage to existing structures. Any damages done by the Contractor shall be his responsibility and all repairs shall be made immediately to the satisfaction of LUS.

I. LUS and/or his agents shall not be responsible for any damages to or any costs incurred as a result of any delays due to existence, removal, adjustment or repair to any structures mentioned herein, shown on the Plans or encountered during construction.

3.13 EXCAVATION

A. Excavation shall include the removal, handling, re-handling, refill or backfilling, and disposal of any and all materials encountered in the work.

B. Perform all excavation of whatever substance encountered, to depths indicated on the drawings, specified herein, or as stated in the test procedures.

C. Fill all excavations with suitable compacted material at no cost to LUS.

D. Stockpile material suitable for backfilling a sufficient distance back from the edges of the excavation to avoid overloading and to prevent slides or cave-ins.

E. Control banks of all excavated areas to prevent movement of soil in areas supporting existing foundations, slabs, pole lines, pipelines or other structures. If, as a result of such excavation or through fault or neglect of the Contractor, the earth or ground under such structures slips or is otherwise disturbed, corrective measures, as approved by the Engineer, shall be taken by and at the expense of the Contractor.

F. Keep all drains, gutters, culverts, etc. for surface drainage open, or if they are unavoidably closed, make other provisions for this drainage.

G. No trenches shall be left open during non-working hours.

3.14 BACKFILL

A. Fill space around manholes upon completion of testing with acceptable material, free from stones, hard clay lumps, or other hard substances, in not more than twelve (12) inch lifts. Compact each layer by hand tamping to obtain a minimum of 90% maximum density (Standard Proctor).

B. Avoid displacement of the manhole in placement of backfill about the manholes.

C. The Contractor shall be responsible for obtaining suitable compaction of all backfill.

D. Compaction will be verified through compaction tests ordered by the Engineer. If the test results indicate insufficient compaction, the cost for that compaction test shall be borne by the Contractor. LUS will pay only for those tests which prove that the specified compaction has been achieved.

E. Avoid damage to manhole during compaction.

3.15 MAINTENANCE OF TRAFFIC AND COMMUNICATIONS

A. Refer to "Louisiana Department of Highways Maintenance Traffic Controls Handbook" (for state highway right-of-way) and "The Work Area Traffic Control Handbook" (for City streets).

B. Conduct operations as to minimize interference with public travel and inconvenience to the public and to property owners.

C. Provide and maintain, at Contractor's expense, suitable bridges, detours or other temporary facilities for the accommodation of public or private travel, as directed by the Engineer.

D. Give twenty-four (24) hours notice to owners of private driveways prior to interfering with them.

E. Keep local fire protection authorities informed at all times of the location of construction operations and fire lanes. Maintain access for fire-fighting equipment as requested by the Fire Department.

F. Maintain one-way traffic on all streets during construction, except where suitable detours or other arrangements are agreed upon. A flagman (flagmen) shall be provided as required in Part A. of this section.

G. Provide motorized rubber wheel road grader on site upon completion of backfilling of all excavations in roadways and streets. Maintain all streets and roadways in a satisfactorily condition approved by the Engineer for the duration of the contract.

H. Contractor shall have someone available to take calls at all times. Provide LUS with a

night phone number to call so that the Contractor may be advised of any emergency, trouble or other matter requiring his attention.

3.16 CARE OF STREETS, SIDEWALKS & ROADS

A. Remove all excess materials, debris or other obstruction from streets or roads immediately after completing backfilling, at Contractor's expense.

B. Wash streets, sidewalks and roads daily to remove dust problem.

C. No cross streets, sidewalks or roads shall be wholly obstructed except by written permission from the Engineer.

D. If at any time the Contractor neglects to remove such material or obstruction and does not place streets, sidewalks and roads in suitable condition for traffic within twenty-four (24) hours after having received notice (written or verbal) from the Engineer, the work may be done by LUS, and the cost thereof charged to the Contractor and deducted from his final estimate.

E. Repair and replace streets, sidewalks, roads, ditches and culverts to the satisfaction of the Engineer and parties concerned.

3.17 PROTECTION AND CARE OF PUBLIC OR PRIVATE PROPERTY AND EASEMENTS

A. Continuously maintain and protect all underground and above ground structures, utilities, including the restoration of all public utilities, water mains, water services, gas mains, gas services, culverts, drains, ditches, curbs, sidewalks, landscaping and/or other facilities which may be damaged, to a condition at least equal to their original status, at no additional cost to LUS. In the event of damage to any facilities, the appropriate utility will be notified immediately. LUS will repair damaged facilities at the Contractor's expense or require the Contractor to repair said damage.

B. All construction work under this contract on easements, right-of-way, private property or franchise shall be confined to the limits of such easements, right-of-way or franchise. All work shall be accomplished so as to cause the least amount of disturbance and a minimum amount of damage.

C. No trees or shrubbery shall be removed or trimmed without the consent of the Engineer. With such approval ornamental trees and shrubbery shall be carefully removed, with the earth surrounding their roots wrapped in burlap and replanted in their original positions within forty-eight (48) hours. All shrubbery or trees destroyed or damaged shall be replaced by the Contractor with material of equal quality at no cost to LUS.

D. All obstacles such as fences, markers, mail boxes, driveway culverts, etc. shall be removed by the Contractor and immediately replaced after the trench is backfilled in their original position and condition at no direct cost to LUS.

E. Maintain adequate drainage during the process of construction.

F. When applicable the initial application of maintenance shell or limestone will be paid by LUS. Any subsequent applications necessary due to trench settlement/erosion will

be furnished by the Contractor at no cost to LUS.

3.18 REMOVAL AND REPLACEMENT OF STREET SURFACING AND SIDEWALKS

A. Comply with all requirements of City Ordinance O-2552 and the requirements stated herein.

B. Removal and replacement of surfacing for drives and parking areas shall conform to the Details for street repair except as modified herein.

C. Pavements, driveways and sidewalks must be replaced expeditiously and in no case more than 30 calendar days from the initial removal.

D. The decision of the Engineer will be final as to the classifying of any form of pavement or surfacing not specified in the contract or of any forms where the classification is at all doubtful.

E. For repairs of pavement made up of two or more courses, all the courses shall be considered as integral parts of the pavement. The price bid shall consist replacement of the pavement complete, including foundation, intermediate course (if present), and surface.

F. Should the street, sidewalk surfacing, curbs, gutters, bridges, etc., outside the width measured for payment be damaged, cracked, settled, disturbed or injured in any manner by the Contractor's operations, such damage or injury must be replaced and the surfacing etc. restored to its former condition by the Contractor with no separate compensation being made thereof.

G. Where the street has not been paved but has a hard surface composed of gravel, shell, etc. the Contractor shall save and stockpile such surface material and shall, after the crowned backfill has completely settled or been compacted, replace this material cover the trench, making up any deficiency with material of the same character, so as to restore the street surfacing to a condition equal to that in which he found it.

3.19 CLEAN-UP

A. Remove from the site all tools, equipment, temporary structures and surplus materials.

B. Dispose of all excess soil, waste, rubbish, debris or objectionable materials off the site and in a manner and a location that complies with local ordinances and laws and is acceptable to all parties concerned and is approved by the Engineer.

C. The entire construction site shall be left clean and to the satisfaction of the Engineer.

SUPPLEMENTARY CONDITIONS

ARTICLE 1 – INTRODUCTION

The work covered by these specifications shall include furnishing all labor, supervision, materials, equipment, and incidentals which may be required to complete "Wastewater Collection System – Manhole Rehabilitation Project 2011-1" for the Lafayette City-Parish Consolidated Government (LCPCG) on an as needed basis for a period of six (6) months.

Where LUS is mentioned in these specifications, reference is made to Lafayette Utilities System, a division of the Lafayette City-Parish Consolidated Government (LCPCG).

ARTICLE 2 – TERM OF CONTRACT

The primary term of this Contract shall be for a period of six (6) months commencing with the date of the Notice to Proceed. All prices bid shall be firm and for the entire term of the Contract. At the discretion of LUS and with the consent of the Contractor, this Contract may be extended for two (2) additional six (6) month periods, with no price adjustments of the items bid on the Bid Form. This Contract extension must be agreed upon by both parties in writing at least thirty (30) calendar days in advance of the initial Contract expiration date.

ARTICLE 3 – PAYMENT AND PERFORMANCE BONDS

The Contractor shall be required to furnish a Payment and Performance Bond, submitted by the Surety in accordance with the provisions set forth in Article 34 of the General Conditions. If the Contract is extended for a second term, the Contractor shall furnish a new and similar Payment and Performance Bond for the new term.

ARTICLE 4 – WORK AUTHORIZATIONS

It is anticipated that several work authorizations will be issued during the term of the Contract. Work Authorizations will be issued for additional linear footage of manholes to be rehabilitated and or repaired.

No work shall begin on this project until the Owner has issued a written work authorization. The Engineer will provide the Contractor with necessary information and with project drawings or sketches, as necessary.

The Contractor shall be paid additional compensation, unit price quoted in the Bid Proposal Form, for mobilization of work crews on all work authorizations which are for a total dollar amount less than $10,000.00.

The Contractor shall respond to work directives within ten (10) calendar days. Failure to respond within this time can be grounds for termination of the entire contract.

ARTICLE 5 – QUANTITIES & UNIT PRICE OF WORK

The Lafayette Utilities System has budgeted **$100,000.00** to perform the Wastewater Collection System – Manhole Rehabilitation Project 2011-1 and expects to spend no more than this amount over the next six (6) months. There is no assurance that any work authorization will be issued under this contract. It is the intent of these specifications that the Contractor be paid according to the unit prices for those items actually completed. The Contractor will be due no profit or any other compensation for work not done. The quantities given in the Bid Proposal Form are approximate only. These quantities, however, at the price bid for each item shall determine the relative value of each proposal. The quantity of each individual item is not a binding feature of the bid or contract, and Lafayette Utilities System does not, either expressly or by implication, agree that the amount of work to be done will correspond to the quantities given in the Bid Proposal Form. Bidders must bear this in mind. The Contractor will be due no profit or any other compensation for those items in the proposal which are either not used or not used completely.

ARTICLE 6 – ABNORMAL CONDITIONS

Due to factors such as age of the sanitary sewer manholes to be rehabilitated, their possible location in utility easements behind houses and/or garages, etc., construction problems may arise which have not been anticipated by the Lafayette Utilities System. Accordingly, the Contractor shall submit his proposed construction methods to be employed to solve the various specific problems not covered in the specifications.

Standard working hours shall be defined as Monday through Friday from 7:00 a.m. to 5:00 p.m. Work that cannot be performed during standard working hours, such as sewer lines that exhibit high flow or have numerous businesses connected to it will be completed during non-standard working hours.

It is the Contractor's responsibility to familiarize himself with all regulatory requirements and safety procedures. Any Manholes falling under "Abnormal Conditions" will be rehabilitated at no extra cost.

SPECIAL CONDITIONS

ARTICLE 1 - GENERAL

1. Contractor and Foreman assigned to the project shall attend a pre-construction meeting prior to commencing the work.

2. Engineer shall determine work days in the field. His decision is final.

3. The Contractor shall perform all work in accordance with his products specifications as recommended by the manufacturer.

4. The Contractor shall perform all work in accordance with his project schedule as approved by LUS.

5. Some manholes on this contract may be in high traffic areas such as, but are not limited to, University Ave., Evangeline Thwy., Congress St., Kaliste Saloom Rd., S. College Rd., Pinhook Rd., Carmel Ave., Louisiana Ave., Johnston St. and Surrey St. Proper traffic control must be maintained and in place for these areas by the Contractor (ie: arrow boards, cones, warning signs, flagmen, and/or Lafayette City Police/Sheriff on site).

6. Lafayette Utilities System reserves the right to add/replace manholes within this project as field conditions dictate.

7. Any manhole(s) rehabilitated or repaired not directed by LUS Engineer will be done at contractor's cost. Payment will not be made for wrongly rehabilitated or repaired manholes.

ARTICLE 2 - (INSURANCE - (ARTICLE 32-GENERAL CONDITIONS REVISION)

(PERTAINING TO THE GENERAL CONDITIONS)

THE FOLLOWING CHANGES OF ARTICLE 32 ARE FOR SECTIONS "I THROUGH III". ANY OTHER REQUIREMENTS OF ARTICLE 32, NOT ADDRESSED, SHALL BE APPLICABLE.

The successful contractor will be required to furnish an ACORD certificate of insurance as follows:

I. Standard Worker's Compensation Insurance - Coverage for all Worker's Compensation claims as permitted under Louisiana State Law together with Employer's Liability Coverage of $1,000,000 minimum, per occurrence.

II. Commercial General Liability Insurance - Coverage under this policy must be provided on an "occurrence" basis, and not on a "claims made" basis. THE LAFAYETTE CITY-PARISH CONSOLIDATED GOVERNMENT, ITS OFFICIALS, EMPLOYEES AND VOLUNTEERS MUST BE NAMED AS AN ADDITIONAL INSURED ON THE POLICY. All comprehensive general

liability insurance shall include coverage for the following:

A. Premises Operations	$1,000,000
B. Independent Contractors	$1,000,000
C. Products - Completed Operations	$1,000,000
D. Contractual Liability	$1,000,000
E. Broad Form Property Damage	$1,000,000

Additionally, the policy required by this Subsection shall also include Explosion, Collapse and Underground Coverage.

Pollution Liability Coverage is required in the amount of $1,000,000.

III. Business Auto Liability Policy

	BODILY INJURY per person	BODILY INJURY per accident	PROPERTY DAMAGE per accident
A. Any Auto	$ 1,000,000	$1,000,000	$1,000,000
B. Owned Autos	$ 1,000,000	$1,000,000	$1,000,000
C. Non-Owned Autos	$ 1,000,000	$1,000,000	$1,000,000
D. Hired	$ 1,000,000	$1,000,000	$1,000,000

If Coverage A - Any Auto is carried, Coverages B, C, & D will not be required. If the Contractor does not own an automobile (vehicle) and an automobile (vehicle) is utilized in the execution of the contract, then hired and non-owned coverage is required.

SECTION 02770

REPLACEMENT OF STREETS, DRIVES, AND SIDEWALKS

PART I GENERAL

1.01 SECTION INCLUDES

A. Removal and replacement of streets, drives, and sidewalks necessary to complete the work.

1.02 SAMPLES

A. Frequency of testing for concrete surfacing will be determined by the Engineer.

B. Frequency of testing for asphalt concrete mixtures will be determined by the Engineer, but not to exceed the following:

1. One sample per 100 tons (or less) up to maximum of 5 samples for that portion of each lot placed in the project. Sample the top 4" of the finished section.

C. Contractor shall provide samples for testing.

1.03 QUALITY ASSURANCE

A. Finish and materials shall be same as existing surface.

1.04 UNIT PRICES

A. Method of Measurement

1. Replacement of streets, drives, and sidewalks shall be measured by the square yard. Design quantities may be adjusted to meet field conditions. Removal of existing surfacing and excavation will not be measured for payment. Formwork, compaction of subgrade, and tack coat for asphaltic pavement will not be measured for payment.

B. Basis of Payment

1. Payment of replacement of streets, drives, and sidewalks shall be paid for by the unit price bid per square yard. The payment shall constitute full compensation for removal of existing paving, backfill, compaction, subgrade preparation, finishing and curing, furnishing, hauling, and

installing of all materials, and for furnishing equipment, tools, labor, and other incidentals necessary to complete this item.

PART 2 PRODUCTS

2.01 MATERIALS

A. Concrete and incidentals necessary for construction shall be in accordance with DOTD Standard Specifications (2000 Edition)- Section 706-Concrete Walks, Drives and Incidental Paving.

B. Asphalt concrete pavement shall be in accordance with DOTD Standard Specifications (2000 Edition)-Section 501, Type 3 and asphaltic tack coat in accordance with Section 504.

PART 3 EXECUTION

3.01 PROTECTION

A. Conduct operations to prevent damage to walks and drives not designated or authorized for removal.

B. Remove and replace streets, drives, curbs, and walks, not designated or authorized for removal, which is damaged by construction operations. The removal and replacement shall be performed at no cost to the Owner.

3.02 PREPARATION

A. Remove all temporary maintenance aggregate and debris from trench area.

B. Excavation to required depth and width, removing and replacing unstable material at no direct pay.

C. Remove necessary fill-crete to section as indicated on drawings.

D. Shape subgrade and compact to a firm, even surface conforming to the section shown on the plans.

E. Existing streets, drives, and walks shall be saw-cut to necessary limits.

3.03 FORMS

A. Forms shall be of wood or metal and shall extend the full depth.

B. Forms shall be straight, clean and of sufficient strength.

C. Forms shall be braced for proper alignment at all times.

3.04 SUBGRADE

A. Thoroughly moisten subgrade prior to placing concrete.

B. Coat subgrade and pavement surfaces that will receive asphaltic concrete pavement with an even distribution of asphaltic tack coat.

3.05 REMOVAL AND REPLACEMENT OF STREET, PARKING, DRIVEWAY AND WALK PAVEMENT

a. Removal Procedures: Where concrete surfaces must be removed to allow excavation for the work described in the work order or where directed in writing by the Engineer, neat lines shall be sawed the full depth for break-out grooves along the limits of removal.

The sawing for the break-out groove shall be accomplished with an approved power driven concrete saw, manufactured specifically for the purpose of sawing concrete. The depth of cut shall be the full depth of the existing slab. Existing reinforcing steel shall be cut to leave projection for splicing with the new steel in the replacement slab. Care shall be exercised to preserve bond between the concrete slab remaining in place and its reinforcing steel.

Curbs shall be removed and replaced only where shown on the work sketches or directed by the Engineer. Curbs damaged or destroyed by the Contractor's operations at other locations shall be removed and replaced at the Contractor's expense. Replacement curbs shall have a configuration conforming with that in place and shall have a minimum compressive strength of 3000 psi at 28.

The removal of asphalt surfaces, with or without concrete base, shall be accomplished as described above. The removal limits shall be saw cut, or cut in such a method as to produce a straight, clean edge around the patch. The pay limits will remain the same as described above.

Concrete and asphalt removed by the Contractor will become his property and shall be disposed of by him. No separate pay item will be allowed for this disposal work.

b. Replacement Procedures: In all paved or unimproved streets, parking areas or driveways where directed by the Engineer, the surface of the backfilled area, after having been filled and compacted, shall be finished without unnecessary delay and in the best workmanlike manner in accordance with the Typical Street Repairs as shown on the Typical Water Details and in accordance with the Concrete Street

Repair Details from the Public Works Department. Temporary filcrete and steel plates for surfacing shall be used as previously described when required in the Contract Documents or by the Engineer. The underlying foundation course(s), as well as the finished surface, shall conform to the Typical Street Repair Details in every respect, be equal in quality, materials and workmanship. Reinforced concrete pavement and/or base shall have a minimum compressive strength of 4000 psi, and shall have the thickness shown on the details. Reinforcing tie bars and reinforcing mesh or bars shall be as per the Mid-Panel Repair for Concrete Street Repairs. Any expansion/contraction joints removed or affected from the saw cut of the concrete street shall be replaced in accordance with the Concrete Street Repair Details and as directed by the L.U.S. Representative. Removal of these joints will be included in the Removal and Replacement of the Concrete Street.

When a particular pavement to be removed and replaced is made up of two or more layers and/or materials, they shall all be considered to be a composite course whose classification shall be that of the thickest course, and shall be paid for at the unit price in the Bid Form for the removal and replacement of that type or category of pavement. The predominant course shall be replaced to the thickness shown on the detail for replacement of such pavement. The type and thickness of replacement surface courses shall be equal to the existing surface courses. For example, if an existing pavement to be removed and replaced consists of a 6" concrete pavement overlaid with 4" of asphalt, the pavement shall be classified as an 8" concrete pavement, and shall be paid likewise, and the replacement shall consist of a 14" concrete course with a 4" asphalt overlay.

The decision of the Engineer shall be final as to the classification of any category of pavement or surfacing not shown on the work sketches or of any categories where the classification is not clear.

As soon as the roadway, parking area, driveway or sidewalk improvement which was removed by the Contractor has been replaced, all refuse or surplus materials deposited or left by the Contractor on public or private property shall be removed there from and the area restored in respects to at least as good a condition as existed before the excavation was commenced.

Should the street or sidewalk surfacing, curbs, gutters, bridges, etc. outside the width measured for payment be damaged, cracked, settled, disturbed or injured in any manner by the Contractor's operations, such damage or injury must be replaced and the surfacing, etc. restored to its former condition by the Contractor with no separate compensation being made therefore. If the Contractor should fail or refuse to repair any such damage, the Owner may, after twenty-four (24) hours written notice, employ such work force and furnish such materials as may be necessary and then perform the work, deducting the actual cost thereof from any amounts due or to become due to the Contractor.

Pavements, driveways and sidewalks must be replaced expeditiously and in no case more than fourteen (14) days from the time the backfilling and compaction of the trench is completed and accepted, except by written permission or written direction of the Engineer.

Where the street has not been paved but has a hard surface composed of gravel, shell, etc., the Contractor shall save and stockpile such surface material and shall, after the crowned backfill has completely settled or been compacted, replace this material over the trench, making up any deficiency with material of the same character, so as to restore the street surface to a condition equal to that in which he found it.

The Contractor shall maintain and keep in good condition all replaced pavements, driveways and sidewalks from the time of installation until final acceptance of the work. If it should settle, sag or otherwise fail during the one-year warranty period, it is his responsibility to repair it with no additional compensation being made.

Concrete drives and parking areas shall be restored to the same thickness as the existing surfacing or a minimum of six (6) inches thick, whichever is greater.

6" x 6" x #6 wire mesh steel reinforcement or No. 3 bars, on eighteen inch (18") centers both ways or approved equal (OAE) fibrous concrete reinforcement shall be required for concrete drives and parking areas.

Thickness of replaced sections of sidewalk shall be that of the existing surface or a minimum of four (4) inches, whichever is greater.

3.06 JOINTS

A. Expansion Joints:

1. Fill joints with ½ ” thick preformed expansion joint filler.

2. Install at maximum 100 foot intervals and between intersecting paving and any fixed structure.

3. Extend for full width and depth of paving.

B. Dummy or Contraction Joints:

a. Form with jointing tool or other acceptable means.

b. Extend into concrete ¼” and shall be approximately 1/8”.

c. Space in walks shall be equal to the width of walk.

d. A longitudinal joint shall be formed along the centerline of drives more than 16’ wide and transverse joints of drives equal to the width but not greater than 16’.

C. Construction Joints:

1. Construction joints shall be formed around manholes, utility poles, etc., extending into pavement and ¼” thick preformed expansion joint filler shall be installed in these joints.

D. Tie-ins of existing concrete shall be made by full depth sawing at no direct pay.

3.07 CURING

A. Roadway pavement surface shall be uniformly sprayed with white pigmented curing compound immediately after completion of surface finishing.

B. Curing shall be maintained continuously for 72 hours.

C. Have available at the site sufficient material to cover the last hour’s pour against the effects of rain.

3.08 PAVEMENT STRIPING AND RAISED PAVEMENT REFLECTORS

A. Striping and raised pavement reflectors removed during construction shall be replaced with new material at similar spacing as existing.

END OF SECTION

SECTION 02830

FENCES AND GATES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. This work consists of constructing or rebuilding fences and gates in accordance with these specifications and in conformity with lines and grades shown in the Drawings or established by the Engineer.

1.02 REFERENCES

A. ASTM A 90 – Weight of Coating on Zinc-Coated (Galvanized) Iron or Steel Articles.

B. ASTM A 116 – Zinc-Coated (Galvanized) Iron or Steel Farm-Field and Railroad Right of Way Wire Fencing.

C. ASTM A 120 – Pipe, Steel, Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless, for Ordinary Uses.

D. ASTM A 121 – Zinc-Coated (Galvanized) Steel Barbed Wire.

E. ASTM A 123 – Zinc (Hot-Galvanized) Coatings on Products.

F. ASTM A 392 – Zinc-Coated Steel Chain-Link Fence Fabric.

G. ASTM A 525 – Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.

H. ASTM A 702 – Hot-Rolled Steel Fence Posts and Assemblies for Field and Line-Type Fencing.

I. ASTM B 211 – Aluminum – Alloy, Bars, Rods and Wire.

J. AASHTO M 181 – Chain-Link Fence.

K. DOTD Louisiana Standard Specifications for Roads and Bridges (LSSRB), 2000 Edition, Section 705 – Fences.

L. DOTD LSSRB Section 901 – Portland Cement Concrete (Class R).

M. DOTD LSSRB Section 1010 – Fence and Guard Rail.

1.03 QUALITY ASSURANCE

A. All dimensions and gauges of material are subject to accepted industry tolerance standards.

B. All materials will be subject to inspection for acceptance as to condition at any time during the work. Any material found not to be in compliance with the Specifications shall be removed and replaced at the Contractor's expense.

C. The fencing shall have uniform properties throughout the installation and shall be supplied by a single manufacturer. Fencing exhibiting unacceptable variation shall be subject to rejection and replacement at the Contractor's expense.

1.04 UNIT PRICES

A. Method of Measurement:

1. New Fence: Measured by the linear foot between outside of end posts for each continuous run of fence, exclusive of gates.

2. Single Gate: Measured per each single gate installed of the type indicated.

3. Double Gate: Measured per each double gate installed of the type indicated.

B. Basis of Payment:

1. New Fence: Payment shall be by the linear foot.

2. Single Gate: Paid for by the single gate.

3. Double Gate: Paid for by the double gate.

4. Payment for each item shall constitute full compensation for all labor, material, supervision, equipment, and other appurtenances necessary to complete the installation of the item in accordance with these Specifications and as shown on the Drawings.

PART 2 PRODUCTS

2.01 MATERIALS

A. Chain Link Fencing:

1. Chain link fabric shall be either aluminum coated conforming to the requirements of ASTM-A491-74 or hot galvanized conforming to the requirements of ASTM-A392-74, Class 2 coating. Fabric shall be woven from 9 gauge (coated size) wire in a 2-inch mesh. Fabric shall be knuckled at one selvage and twisted and barbed at the other selvage.

2. Posts and rails shall be roll formed, open seam, self draining shapes, hot dip galvanized in conformance to the requirements of ASTM-A123-73 or galvanized standard weight pipe conforming to the requirements of ASTM-A120-73.

3. Line posts shall be C-Section roll formed from steel conforming to ASTM-A570-72, Grade E, 2.25" x 1.70" with minimum bending strength of 316 pounds under a 6-foot cantilever load, or 2 3/8" O.D. standard weight galvanized pipe with minimum bending strength of 201 pounds under a 6-foot cantilever load.

4. Top and brace rails shall be roll formed section of 1.625" x 1.25" channel shaped rail with minimum vertical bending strength of 192 pounds on 10-foot span or 1.66" O.D. standard weight galvanized pipe with minimum vertical bending strength of 202 pounds on 10-foot span. Top rail couplings 6 inches minimum in length shall be spaced at maximum 21-foot centers and 9 gauge minimum fabric tie wires shall be spaced at 24-inch maximum centers.

5. All end, corner, and pull posts and gate posts for gate leaves 6'0" wide and less shall be roll formed section 3.5" x 3.5" with minimum bending strength of 453 pounds on 6-foot cantilever load or 2 7/8" O.D. galvanized standard weight pipe with minimum bending strength of 381 pounds on 6-foot cantilever load.

6. Gate posts for gate leaves over 6'0" wide shall be standard weight pipe complying with ASTM-A120 of diameters as recommended by the gate manufacturer.

7. Attachment of chain link fabric to roll formed terminals shall be made by weaving directly into integral lock loops formed in the post.

8. Attachment of chain link fabric to tubular terminal posts shall be made with minimum 1/4" x 3/4" tension bar and 12 ga. x 1" wide clamps using minimum 3/8" diameter carriage bolts.

9. Gate frames shall be tubular shaped, 1.90 inch outside diameter with welded or steel fitted corners. Braces and trusses shall be furnished when necessary.

10. Hardware shall be of adequate design and strength to provide satisfactory operation of gate.

11. All gate components shall be galvanized or aluminum coated as specified herein for fencing components.

12. Locking hasps with locks keyed to the LUS Sewer Department master shall be furnished on gates.

13. All fittings shall be pressed steel or malleable iron and shall be hot dip galvanized conforming to the requirements of ASTM-A153-73.

14. Tie wires shall be minimum 9 gauge aluminum or 11 gauge galvanized steel.

15. Line and terminal posts to be of sufficient lengths to allow for approximate 36-inch settings into concrete footings. Diameter of footings to be 10 inches for line post, and 12 inches for terminal posts.

16. All dimensions and gauges of material are subject to accepted industry tolerance standards.

17. Concealment slatting shall be installed in chain link fence where indicated on the Plans to create a visual barrier. Slatting shall be designed and manufactured specifically for vertical insertion in chain link fencing fabric and shall self-lock in place in the fabric. The slatting shall have a 25 year limited warranty provided by the manufacturer against color fading and breakage of components.

B. Wood Fencing:

1. Lumber: The fencing lumber shall be #1 Grade Cedar at a standard 1" thick x 6" width dimension, unless otherwise stated on plans. Boards shall be fastened with 10d screw shank galvanized nails.

2. Rails: Wood fence rails shall be a maximum of 7.5 feet in length and a standard 2" x 4" in size. There shall be a minimum of three (3) rails between posts. Rails splices shall alternate between posts. Rails shall be No. 1 grade, treated pine placed 6" from the top and bottom as well as in the center of the fence. Rails shall be attached to posts by ¼" by 4" long galvanized bolts.

3. Posts:

   a. Line posts shall be galvanized 2” diameter tubular steel; galvanizing shall be in accordance with ASTM A-120-73. Line posts shall be placed no farther than 8’ O.C. Footings shall be a minimum 2 ½’ in depth and 12” in diameter with 2500 p.s.i. concrete used as encasement.

   b. Corner posts shall be galvanized 2 1/2” diameter tubular steel while gate posts shall be galvanized 4” diameter tubular steel. Footings and concrete shall be the same as the line posts.

4. Hardware: All fittings shall be galvanized steel conforming to the requirements of ASTM A-153-73.

5. Gates:

   a. Gates frames shall be tubular shaped galvanized steel with welded or steel fitted corners.

   b. Hardware shall be of adequate design and strength to provide satisfactory operation of gate.

   c. All gate components shall be galvanized or aluminum coated as specified herein for fencing components.

   d. Locking hasps, a chain to secure gate, and locks keyed to the L.U.S. Sewer Department master shall by furnished on gates.

C. Concrete:

1. Concrete for setting posts shall be Class R concrete in accordance with DOTD Standard Specification Section 901.

PART 3 EXECUTION

3.01 GENERAL CONSTRUCTION REQUIREMENTS

A. All clearing and grubbing necessary for fence installation shall be performed prior to laying out of fence.

B. The Contractor's operation shall be confined to the area adjacent to right-of –way lines and construction servitudes.

C. Where breaks in a run of fencing are required, and at intersections with existing fences, appropriate adjustment in post spacing shall be made for the type closure indicated.

D. Ground rods shall be installed along each segment of new or rebuilt fence, regardless of type fence post used, at maximum 500 foot intervals. Ground rod installation will not be measured for payment.

3.02 REBUILT FENCE

A. When specified, the Contractor shall take down, move back and rebuild existing fence. Fence shall be rebuilt in the same manner as specified for new fence. Rebuilt ornamental fence, picket fence, or other special type fence shall be equal in all respects to existing fence.

3.03 GATES

A. Gates shall be double seven (7) foot gates, of rigid construction and after erection shall not show any sag or warp.

3.04 CHAIN LINK FENCE AND GATES

A. Concrete Post Anchorage:

1. Posts shall be anchored in Class R concrete footings.

2. Hand mixing of concrete shall be permitted for small quantities.

3. Tops of footings shall extend slightly above ground and shall be steel troweled to a smooth finish sloped to drain away from posts.

4. Posts shall be centered in footings.

5. Excess excavation from footings shall be disposed of in a satisfactory manner.

B. Fence Erection:

1. Pull posts shall be placed not more than 200 feet apart in straight runs and at each vertical angle greater than 20 degrees. Corner posts shall be placed at each horizontal angle greater than 20 degrees. Corner and pull posts shall have a

horizontal brace and tie rod on each side of posts. The horizontal brace and tie rod shall be connected to adjacent line posts.

2. Posts shall be permanently positioned, anchorages firmly set, and top rail or tension wires satisfactorily secured to posts before fabric is placed. Ends of fabric shall be secured by stretcher bars threaded through loops of fabric and secured to posts by clamps with bolts and nuts.

3. Fabric shall be placed by securing one end and applying sufficient tension to remove all slack before making attachments elsewhere. The degree of tensioning shall be commensurate with air temperatures at time of installation to prevent undue sagging or tensioning of fabric due to changing temperature. Fabric shall be fastened to line posts at approximately equal spaces and to top rail and bottom tension wire with tie wires or bands as specified.

C. Gate Erection:

1. Gate installation shall include gate frames, stretcher bars, filler fabric, latches, stops, chain, locking devices, padlocks, hinges, gate posts with braces, tie rods, turnbuckles, caps, and all fittings as specified or required for complete installation.

2. Clamps for attaching hardware shall be tightened.

3. Bottom of gates shall clear the ground at least 3 inches at all points in its swing. The Contractor shall grade the area if necessary to meet this requirement.

4. Stops with latches or other approved means for holding the gate open shall be provided, placed to prevent damage to gate or fence by over swing.

5. Unless otherwise directed, stops shall be provided at the centerline of fence to arrest the swing of a closed gate.

D. Repair of Protective Coatings:

1. After completion of fence and gate installation, any damaged protective coatings shall be satisfactorily repaired by approved methods.

E. Concealment Slatting:

1. If called for in the Plans, the Contractor shall install concealment slatting in chain link fencing fabric of the color and type installed.

2. Slatting shall be installed according to manufacturer's recommendations.

3. Damaged slatting shall be replaced at the Contractor's expense.

3.05 WOOD FENCING

A. Posts: Line posts shall be placed on centers not exceeding 8'. Posts shall be anchored according to Section 3.04.A.

B. Fence Erection:

1. Horizontal 2" x 4" rails shall be bolted to posts.

2. Lumber shall be accurately cut and framed to a close fit in such a manner that the joints will have an even bearing over the entire contact surface.

3. Abutting runners shall be connected with galvanized steel connectors.

4. Galvanized, rib shank nails shall be used to secure the fence boards to the railings.

5. Fencing boards that are deemed unacceptable by the Engineer, whether by poor workmanship and poor quality, shall be replaced at the Contractor's expense.

END OF SECTION

SECTION 02900

SITE RESTORATION AND CLEANUP

1.01 GENERAL

At all times during the work, keep the premises clean and orderly, and upon completion of the work, repair all damage caused by equipment and leave the project free of rubbish or excess materials of any kind. All streets, parking areas, driveways and sidewalks shall be washed and cleaned at the end of each work day.

Surface restoration shall be ongoing during pipe installation and in all cases restoration of any area including pavement, sidewalk, driveways, fences and lawn areas shall be completed within fourteen (14) calendar days following pipe installation and backfill in that area. Failure to complete this work will result in withholding some or all of any partial payment due the Contractor.

Stockpile excavated materials in a manner that will cause the least damage to adjacent lawns, grassed areas, gardens, shrubbery, or fences, regardless of whether they are on private property, or on state, parish, or city rights-of-way. Remove all excavated materials from grassed and planted areas, and leave these surfaces in a condition equivalent to their original condition. Replace topsoiled areas where pipeline installations are outside of roadways. The Contractor shall rake and grade these areas to conform with their original contour and seed and fertilize area.

All existing drainage ditches and culverts shall be reopened and graded daily and natural drainage restored. Restore culverts broken or damaged to their original condition and location.

Upon completion of pipe laying and backfilling operation, hand-rake and drag all former grassed and planted areas, leaving all disturbed areas free from rocks, gravel, clay, or any other foreign material and ready, in all respects, for seeding and fertilizing. The finished surface shall conform to the original surface, and shall be free draining and free from holes, ruts, rough spots, or other surface features detrimental to a seeded area.

The Contractor shall be responsible for erosion control for the entire project site throughout the construction and warranty term and take preventive measures for keeping erosion from occurring.

1.02 SEEDING AND FERTILIZER

The work covered by this article shall consist of preparing seed beds and furnishing and applying fertilizer and grass seed on the areas of construction or as directed by the Engineer.

1) Materials

   a) Seed

      Seed shall conform to all requirements, rules and regulations of Louisiana Revised Statutes 3:1431, et seq. The minimum percentage of pure live seed and

the maximum percentage of weed seed permitted shall be in accordance with Table 1 herein.

Each variety of seed shall be furnished and delivered in separate bags or other containers. Each bag or container shall bear an analysis tag which is a Number 6 standard shipping tag, minimum, containing all information required by the Louisiana Seed Law.

All seed furnished shall be the previous season's crop (the last crop year for the crop kind in question) and the date of analysis shown on each tag shall be within 5 months (excluding the month in which the test is completed) of the time of delivery to the project.

TABLE 1

SEED REQUIREMENTS

Kind	Min. % of Pure Live Seed (Purity Times Germination Including Hard Seed)	Max. % of Weed Seed
Hulled Bermuda	83	1
Pensacola Bahia	81	2
Dixie Crimson Clover	78	1
Kentucky 31 Fescue	80	1
Centipede	85	0

(a) Noxious Weeds shall be interpreted to mean that list of weeds, except Bermuda, which has been adopted by the Louisiana Seed Commission as being noxious in Louisiana. Noxious weed seeds shall not exceed the limitations prescribed in the regulations and in no case shall they exceed 500 seeds per pound.

Analysis tags shall be removed from each bag or container only by the Engineer or his authorized representative.

b) Fertilizer

Fertilizer shall be a commercial type conforming to the commercial fertilizer laws in effect as regulated by the Louisiana Department of Agriculture. The chemical composition shall be as specified and shall be designated by a 3-number sequence representing minimum percentages by weight, respectively, of nitrogen (N), available

phosphoric acid and soluble potash. Fertilizer shall be supplied in granulated or pelletized form and shall be packaged in suitable containers to prevent contamination by moisture.

2) Preparation of Seed Beds

Remove all foreign materials, stones, waste materials, weeds, and undesirable plants and their roots. Remove contaminated soils. Grade to eliminate uneven areas, soft or low spots, and to ensure positive drainage.

Prepare seed beds by disking, harrowing, or other approved methods. Soil shall be thoroughly pulverized to a minimum of 3 inches and leveled as directed. Hardpan areas shall be rototilled if necessary to ensure that soil is in condition to receive and sprout seed.

3) Fertilizing

Do not apply fertilizer more than 48 hours prior to sowing of the seed. Fertilizer may be incorporated during disking or harrowing operations in preparation of the ground surface. Apply fertilizer in accordance with the manufacturer's instructions at the following rates:

Type	Pounds Per Acre
8-8-8	1000
12-12-12	675
13-13-13	625
16-16-16	500

Do not apply fertilizer at the same time or with same machine as will be used to apply seed. Apply uniformily and mix thoroughly into upper 2 inches of soil by light disking or harrowing. Lightly water to aid the dissipation of fertilizer.

Fertilizer will be measured by the pound. The estimated quantity shown in the Bid Form is based on Type 8-8-8 fertilizer. If other types of fertilizer are used, the measured quantities will be multiplied by the following factors to determine pay quantities:

Type	Pounds Per Acre
12-12-12	1.5
13-13-13	1.625
16-16-16	2.0

4) Seeding

Select seed mixture based on the planting dates and existing grass, apply seed mixture at the rates shown in Table 2.

TABLE 2

MIXTURE	SEED MIXTURE	POUNDS PER ACRE	PLANTING DATE
A	Hulled Bermuda Pensacola Bahia	35 15	March thru Sept.
B	Hulled Bermuda	40	March thru Sept.
C	Centipede	45	March thru Sept.
D	Kentucky 31 Fescue Crimson Clover	40 10	Sept. thru Feb.
E	Kentucky 31 Fescue	50	Sept. thru Feb.

Apply evenly in two intersecting directions and rake in lightly. Do not sow immediately following rain, when ground is too dry, or during windy periods. Roll seeded area with roller not exceeding 112 lbs. Apply water with a fine spray immediately after sowing seed in each area.

Any reseeding required because of growth failure shall be done by the Contractor at no additional cost to the Owner. Damage due to erosion shall be repaired by filling and tamping with topsoil and reseeding at no additional cost to the Owner. Where obvious erosion problems exist, the Contractor shall take such measures as necessary to insure a good stand of grass. Such measures could include, but are not limited to, the following vegetative mulch, hydroseed, protective fabric, or hay. All such protective measures shall be the responsibility of the Contractor and no additional payment shall be made for these items.

5) Existing Turf

Any existing, grassed areas outside the immediate work area which are needlessly disturbed or damaged by the Contractor, shall be fertilized and seeded in accordance with this item of work and at the expense of the Contractor.

1.03 TREES, SHRUBBERY, AND PLANTS

Trees, shrubbery and plants removed and/or damaged by the Contractor's operations shall be replaced in kind. All plantings shall be nursery-grown.

The plantings shall be maintained as follows:

1. Water as often as necessary to keep the ground and backfill moist until plantings have become established.
2. Repair or replace bracing as necessary.
3. Prune as necessary.

4. Treat the plants in accordance with approved methods of horticultural practices where insects or disease affect the plants after pruning.

If it is necessary to remove tree branches, said removal and other necessary pruning shall be performed utilizing best standard procedures.

SECTION 02920

HYDROSEEDING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preparation of Ground Surface.

B. Hydroseeding

C. Water

D. Maintenance

1.02 DEFINITIONS

A. Noxious Weeds: Noxious weeds are interpreted to mean the list of weeds, except Bermuda, which have been adopted by the Louisiana Seed Commission as being noxious in Louisiana.

1.03 COORDINATION

A. Coordinate work in this Section with other construction operations to minimize damage to seeded areas.

B. Apply hydroseeding as soon as practical in order to avoid unnecessary erosion at the site.

1.04 MAINTENANCE

A. Maintain hydroseeded areas immediately after application until grass is well established and exhibits a vigorous growing condition.

B. If grass is well established and exhibits a vigorous growing condition prior to final acceptance, maintain until time of final acceptance.

1.05 UNIT PRICES

A. Method of Measurement and Payment:

1. Hydroseeding: Measured by the acre actually applied.

2. Water: Water for Hydroseeding will not be measured for payment.

B. Basis of Payment:

1. Hydroseeding: Paid for at the contract unit price per acre actually applied as directed by the Engineer.

PART 2 PRODUCTS

2.01 MATERIALS AND PACKAGING

A. Seed:

1. Conform to all requirements, rules, and regulations of Louisiana Revised Statutes. The minimum percentage of pure live seed and the maximum percentage of weed seed to be as follows:

Kind	Min. Percent of Pure Live Seed (Purity times Germination Including Hard Seed)	Max. Percent of Weed Seed
Hulled Bermuda	83	1
Carpet Grass	76	2
Dixie Crimson Clover	78	1
Kentucky 31 Fescue	80	1

2. Furnish from previous season's crop (the last crop year for the crop kind in question).

3. Limit noxious weed seeds as prescribed in the regulations, but in no case shall they exceed 500 seeds per pound.

B. Fertilizer:

1. Provide commercial type conforming to the commercial fertilizer laws in effect as regulated by the Louisiana Department of Agriculture.

2. Fertilizer used shall have specified chemical composition indicated by a 3-number sequence representing minimum percentages by weight, respectively of nitrogen (N), available phosphoric acid (P_2O_5) and soluble potash (K_2O).

3. Allowable chemical compositions: 8-8-8, 12-12-12, 13-13-13, 16-16-16, 26-6-9.

C. Water: Clean, fresh and free of substances or matter which could inhibit vigorous growth of grass.

PART 3 EXECUTION

3.01 INSPECTION

A. Engineer or his authorized representative shall receive verification of quality of seeds and type of fertilizer.

B. Verify that prepared soil base is ready to receive the work of this Section.

3.02 PREPARATION OF GROUND SURFACE

A. Prepare ground surface areas by removing foreign materials, stones, waste materials, weeds, and undesirable plants and their roots. Remove contaminated soils.

B. Grade to eliminate uneven areas, soft or low spots, and to ensure proper drainage. Maintain lines, levels, profiles and contours. Make changes in grade gradual. Blend slopes into level areas.

C. Finish grade and rake to an even and properly compacted condition.

D. Prepare seed beds by disking, harrowing, or other approved methods to a minimum depth of 3 inches and thoroughly pulverize for the 3 inch preparation depth.

3.03 HYDROSEEDING

A. Mulch for Hydroseeding shall be “HYDRO 2000”, manufactured by CONWED, Inc. or “REFIBER WOOD w/TAC”, manufactured by Wood Recycling, Inc. A minimum of 1800 pounds per acre (dry weight) of mulch material shall be applied.

B. Distribute seed, fertilizer, mulch, water and tackifier in one operation.

C. Apply seeded slurry at the rates of:

1. March thru September

Hulled Bermuda	70lbs./acre
Fertilizer (13-13-13)	300 lbs./acre
"or"	
Hulled Bermuda	35 lbs./acre
Kentucky 31 Fescue	35 lbs./acre
Fertilizer (13-13-13)	300 lbs./acre

2. September thru March

Rye Grass	50 lbs./acre
Unhulled Bermuda	70 lbs./acre
Fertilizer (13-13-13)	300 lbs./acre
"or"	
Rye Grass	50 lbs./acre
Unhulled Bermuda	35 lbs./acre
Kentucky 31 Fescue	35 lbs./acre
Fertilizer (13-13-13)	300 lbs./acre

D. "Fiber Plus" Tackifier at the rate of 30 pounds per acre shall be utilized on areas where slopes are greater than 2:1 or as directed by Engineer.

E. Distribute in two intersecting directions, with a hydraulic seeder.

F. In highly erodible soil areas, contractor shall use an approved erosion control matting in conjunction with hydroseeding.

3.04 MAINTENANCE

A. If vigorous growth occurs before final acceptance, cut grass at regular intervals to maintain at a maximum height 2 ½ inches. Do not cut more than 1/3 of grass blade at any one mowing.

B. Water on a regular basis to promote growth and to prevent grass and soil from drying out. Water at other times as directed by the Engineer.

C. Immediately reseed areas which show bare spots.

D. Repair to re-establish the grade and reseed surfaces which have become gullied due to erosion.

3.05 SCHEDULE

A. Hydroseed ground surface areas within the Site as follows:

1. Areas within limits of construction as designated in the Drawings.

B. Hydroseed ground surface areas affected outside the limits of construction by construction operations.

END OF SECTION

SECTION 03050

FILL-CRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fill-Crete for backfilling of trenches.

1.02 UNIT PRICES

A. Method of Measurement:

1. Fill-Crete: Measured by the in-place cubic yard as set forth by the limits designated in the Drawings.

2. Design quantities will only be adjusted if the Engineer authorizes changes to adjust to field conditions or if design changes are made. Fill-crete required due to unauthorized excess trench excavation shall not be measured for payment.

B. Basis of Payment:

1. Fill-Crete: Paid for by the in-place cubic yard which includes furnishing and placing all materials.

PART 2 PRODUCTS

2.01 MATERIALS

A. Portland Cement: Portland Cement shall conform to ASTM Designation: C150.

B. Sand: Sand shall conform to ASTM Designation C33. The percentages of foreign matter shall not exceed the following values:

	PERCENT
Coal or Lignite	0.25
Clay Lumps	3.0

Sand shall conform to the following gradation:

SIEVE SIZE	PERCENT PASSING (BY WEIGHT)
3/8”	100
No. 4	95 to 100
No. 16	45 to 90
No. 50	7 to 30
No. 100	0 to 7
No. 200	0 to 3

C. Water: Water shall be clean and not detrimental to concrete.

2.02 FILL-CRETE MIX

A. Mix cement, sand and water in the following proportions to yield one (1) cubic yard of mixture:

Portland Cement	-	188 lbs.
Sand	-	3,010 lbs.
Water	-	46.2 gal.

PART 3 EXECUTION

3.01 PROTECTION

A. Protect adjacent structures and surfaces during fill-crete placement operations.

3.02 BACKFILLING

A. Fill-crete shall be used to entirely backfill trenches cut through roadways and in areas directed by the Engineer to the limits designated in the Drawings.

3.03 SCHEDULE

A. Place fill-crete at locations and to the limits designated in the Drawings and in areas directed by the Engineer.

END OF SECTION

SECTION 03051

PRESSURE GROUTING

PART 1 GENERAL

A. This work includes furnishing and installing approved cementitious grout mixture by approved pressure application methods to fill abandoned pipeline left in place; to fill annular space around pipe installed by bore; to fill failed or rejected bores; and other applications where indicated on the Plans or where directed by the Engineer.

B. Abandoned pipeline and other items designated to be pressure grouted shall be filled completely, end to end, unless otherwise directed by the Engineer.

C. Contractor shall submit plan for applying grout and recipe for grout mixture to the Engineer for approval prior to commencement of grouting operations.

PART II PAYMENT

A. Unless otherwise specified elsewhere in the Contract Documents, measurement of pressure grouting will be based on calculated in-place volume of grout as set forth by the limits shown in the Plan Details or described in the Specifications, or as directed by the Engineer. The limits shown in the Plan Details or described in the Specifications will be adjusted only if the Engineer authorizes changes to adjust to field conditions or if design changes are made. Pressure grouting placed at the authorization or direction of the Engineer shall be calculated, in cubic yards, from the diameter and length of the pipeline or other feature to be grouted. Pressure grouting required due to failed or rejected bores or other such shortfall on the Contractor's part shall not be measured or paid for. Payment will be at the Unit Price per cubic yard for Pay Item 'Pressure Grouting' or 'Pressure Grout (calculated measurement)' as written on the Bid Form.

B. If measurement is designated to be by truck measurement, haul tickets must be provided to the Engineer for the material to be considered for payment. Payment will be at the Unit Price per cubic yard for 'Pressure Grout (vehicular measurement)' as written on the Bid Form.

SECTION 11100

CONSTRUCTION VIDEO

PART 1 GENERAL

1.01 WORK INCLUDED

A. Furnishing video at locations designated herein.

1.02 UNIT PRICES

A. No Direct Pay

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

A. Video

1. Video to be taken prior to beginning construction.

2. Video to include all surface features of construction area and shall include, but not be limited to the following items: roadways, pavements, curbs, driveways, sidewalks, culverts, headwalls, buildings, landscaping, trees and fences.

3. Identify by audio and visual each parcel with project name, property owner, street name, approximate location, date and time. An identifying device shall be used to indicate the address of each driveway.

4. Video shall be of the digital MPEG format and shall produce sharp, clear pictures.

5. DVD shall be indexed with the project name, street names and location.

END OF SECTION

07/21/2003

SECTION 16000

ELECTRICAL AND CONTROL

PART 1 GENERAL

1.01 GENERAL

A. The General Conditions are a part of this specification and the Contractor shall consult them in detail for instructions pertaining to his work. He shall also consult all other sections to determine if any other work is to be performed.

B. All work shall be done in accordance with the 2002 National Electrical Code and with local and state ordinances governing this class of work.

C. The current Lafayette Utilities System (LUS) Material Specifications shall govern.

D. The Contractor shall comply with the Standards and Procedures of LUS.

1.02 SCOPE OF WORK

A. Provide and install all conduit with conduit seals as indicated on the riser diagram.

B. Install, connect and place in operation with following equipment:

1. Pump motor power and control cables.

C. Install, connect and place in operation the following equipment furnished by LUS:

1. Pump Control Panel.
2. Ultrasonic level transducer.
3. Tip float switches
4. Other type of level transducer, if required.
5. UPS, Radio and Yagi antenna, if applicable.

D. Provide and install all other cable.

E. Provide and install the hot dip galvanized (after fabrication) steel equipment support frame.

F. Provide and install the fusible safety switch, or circuit breaker, the non-fusible double throw switch 4 pole as specified on the drawings, and the generator power receptacle.

G. Provide and install the 7.5 kVA dry type transformer (480 VAC service only).

H. Provide and install the area lighting fixture and switch.

I. Provide and install the NEMA-4X junction boxes (JB-1, JB-2 & JB-3) with breather adjacent to wet well.

J. Install the meter can provided by the utility company. Provide and install the service conductors, [service pole] and grounding. Coordinate the service installation with the power company. Refer to LUS Electric Services Manual.

K. If required, provide and install the antenna support pole, mast and grounding.

L. If required, provide and install the conduit for the radio coaxial cable.

1.03 VARIOUS RESPONSIBILITIES

A. The pumps are being furnished by the Contractor under the Section 02535 "Detailed Specifications for Submersible Sewage Pump Station". The pump control panel, [the radio/UPS system and Yagi antenna], tip float switches (non-mercury) and the ultrasonic level transducer are being furnished by the Owner, LUS.

B. LUS will furnish a new pump control panel recently manufactured and tested and a new level transducer.

C. The Contractor is responsible for proper operation of all of these components after installation as well as their operation as a complete integrated system.

D. The Contractor shall furnish and install all hardware, brackets, supports, cable, etc. necessary for a complete installation.

E. The Contractor (with assistance of the pump supplier and manufacturer) will be expected to assume the responsibility for proper pump operation with the control panel and integration of the various parts of the system.

F. The Contractor shall test and check out the completed system and shall troubleshoot problems during start-up and check-out, as necessary. LUS will be available for consultation and assistance.

G. Refer to the Section 02535 "Detailed Specifications for Submersible Sewage Pump Station" for additional information.

1.04 SUBMITTALS – SHOP DRAWINGS

A. Submit shop drawings for the Engineer's approval prior to proceeding with the work and within thirty (30) days of awarding of the contract. Included and in particular are shop drawings for the area lighting luminaire, generator receptacle, [transformer] and the fusible double throw (on-off-on) switch. The contractor shall submit all other such drawings as the Engineer may require. Review and approval of any drawings by the Engineer shall not release the Contractor from responsibility from errors and omissions in such drawings. Wiring configuration drawings shall adhere to the Plan details.

1.05 SUBMITTALS – FINAL DOCUMENTATION

A Prior to acceptance of the project, three copies of all shop drawings, descriptive data, schematics, printed installation instructions, operating and maintenance instructions and parts lists for the pump control panel shall be neatly bound in three (3) hard-cover D-ring binders and turned over to the Engineer.

1.06 REFERENCES

A. Standards of the following organizations and the individual standards named shall be followed as though they were part of this Specification (unless otherwise noted):

Underwriters Laboratories Inc. (UL)
Southern Standard Building Code
State Fire Marshall's Act
Institute of Electrical and Electronic Engineers
National Board of Fire Underwriters
National Electrical Code
National Electrical Manufacturers Association
Edison Electric Institute
Insulated Power Cable Engineers Association
American National Standards Institute
American Society for Testing Materials
National Electrical Safety Code
National Fire Protection Association
Applicable Rules and Regulations of the local utility companies providing

services.

1.07 REGULATORY REQUIREMENTS

A. Observe and comply with all applicable federal, state and local laws, municipal ordinances, codes and the rules and regulations of all authorities having jurisdiction over constsruction of the project.

B. Adhere to the following standards, where applicable:

NEMA ICS-1-1983 General Standards for Industrial Control and Systems
NEMA ICS-2-1983 Industrial Control Devices, Controllers and Assemblies
NEMA ICS-3-1983 Industrial Systems
NEMA ICS-4-1983 Terminal Blocks for Industrial Use
NEMA ICS-6-1983 Enclosures for Industrial Control and Systems
NFPA 70E Electrical Safety Requirements for Employee Workplaces
NFPA 79 Electrical Standards for Industrial Machinery
NFPA 328 Flammable and Combustible Liquids and Gasses in Manholes, Sewers And Similar Underground Structures
NFPA 820 Standard for Fire Protection in Wastewater Treatment and Collection Facilities
ANSI B 286-74 (R-1985) Copper Conductors for Use in Hookup Wire for Electronic Equipment
IEEE 74-1958 Standard Test Code for Industrial Control
ISA RP60.1 Control Center Facilities
DIN (Deutsches Institut fur Normung – German National Standard)

1.08 ELECTRICAL SERVICE

A. Provide and install the service as called for in the Plans. The Contractor shall consult with the power company when preparing the bid. All equipment, materials, metering, labor and utility charges shall be included in his bid. No additional compensation will be allowed after bid opening for any failure on the part of the contractor with respect to service acquisition.

1.09 REJECTED WORK AND MATERIAL

A. Should the Contractor introduce any materials different from the type and quality described in the specifications or shown on the plans, it must be immediately removed

from the premises when requested by the Engineer.

1.10 WARRANTY

A. Contractor for this work shall be required to keep the work installed by him in repair and perfect working order for one (1) year from the date of final acceptance of the project.

1.11 HAZARDOUS AREAS

A. Be aware that certain areas of the pump station are considered Class I, Division 1, Group C & D "hazardous" areas as defined in the National Electrical Code. Special wiring techniques, materials and equipment must be used in such areas. The Contractor is referred to Articles 500 and 501 of the 2002 NEC for detailed requirements for electrical work in hazardous areas. All equipment used in hazardous areas must be suitable for use in such areas.

PART 2 PRODUCTS

2.01 MATERIALS AND APPROVALS

A. Base the proposal on materials as specified herein. Specific mention of a manufacturer or trade name is not intended to indicate preference but to indicate a type and standard of quality. However, where the term "prior approved equal" is used, any substitutions for materials specified herein must be submitted to the Engineer for approval seven (7) days prior to the bid date. Where the term "or approved equal" is used, the substitute product is subject to the Engineer's approval when the shop drawings are submitted. Where the term "or equal" is used, the substitute product shall be equal to that specified and subject to the Engineer's approval but shop drawings are not required.

2.02 RACEWAYS AND FITTINGS

A. Galvanized Rigid Steel Conduit: This conduit shall be galvanized inside and outside by the hot-dip or electro-galvanize processes (ANSI-C80.1 and UL-6).

B. PVC Conduit: This conduit shall be rigid schedule 40 or 80 PVC (as specified on the plans) conduit rated 90°C and UL listed (NEMA TC 2 and UL-651).

C. Rigid Aluminum Conduit: This conduit shall be manufactured of 6063 alloy in temper

designation T-1 (ANSI-C80.5 and UL-6).

D. All wiring is to be installed in conduit.

E. All outdoor conduit connections to junction boxes, conduit fittings, outlets, disconnect switches, etc. must be watertight.

2.03 CONDUCTORS AND WIRING

A. All conductors shall be stranded copper.

B. Motor circuit power conductors shall be Exane-insulated (or equal) type cable. All other conductors shall have THWN/THHN 600-V insulation. The minimum wire size shall be 14 AWG. The power conductors are to be sized according to the NEC, using rate motor FLA and voltages, along with additional voltage drop requirements.

C. Signal cable (carrying 4-20 mA currents) shall be a twisted and shielded pair of 18 AWG insulated copper conductors. Furnish Belden No. 1120A or prior approved equal.

2.04 DOUBLE THROW SWITCH

A. The double throw switch shall be non-fusible, shall have a cover interlock and shall be capable of being padlocked in the top, bottom and neutral positions. The switch shall be signed to select one of two sources for a single load. The switch shall be NEMA-3R and shall be furnished with the current rating, voltage rating and number of poles required in the plans. The switch must be UL listed, suitable for use as service equipment, heavy-duty rated and shall be as manufactured by Siemens, Cutler-Hammer / Westinghouse or prior approved equal.

2.05 SAFETY SWITCHES

A. Safety switches shall be fusible or non-fusible and rated 240VAC or 480 VAC, as required, and noted on the plans.

B. Fusible and non-fusible safety switches shall be quick-make, quick-break, with cover interlock and padlocking provisions, and shall be UL approved as rain-tight and NEMA-3R or as otherwise specified in the Plans. Approved manufacturers are Siemens and Cutler-Hammer / Westinghouse.

2.06 AREA LUMINAIRE

A. The area luminaire shall be an Appleton p/n VPAN10125G, Cooper Crouse-Hinds or approved equal. The luminaire shall be provided with a 200-W, 130-VAC A-23 lamp.

2.07 CONDUIT SEALS

A. Conduit seals shall be furnished where called for in the Plans. Seals shall be the type EYS as manufactured by Cooper Crouse-Hinds or Appleton and shall be installed with an explosion-proof union directly below boxes. Sealing compound shall be "Apelco" or "Chico A".

2.08 CONCRETE

A. Where concrete is required it shall be 3000 psi minimum (standard aggregate) and shall be in accordance with American Concrete Institute (ACI) standards. Al reinforcing (if required) shall be in accordance with ASTM A615 (GR40).

2.09 DRY TYPE TRANSFORMER

A. Furnish and install a 7.5-kVA dry type transformer, if the service is 480VAC. The transformer shall be connected for a 480 VAC primary and a 120/240 VAC (single-phase) secondary. The transformer shall be NEMA-3R. Approved manufacturers include Siemens and Cutler-Hammer / Westinghouse.

2.10 CABLE SUPPORT GRIPS

A. Properly sized cable support grips shall be provided for cables, which enter the wet well. The cable support grips shall be "Kellems Grip" as manufactured by Hubbell, p/n 07401023 / 07401025 (or equal). The Kellems shall be stainless steel.

2.11 CORD GRIP CONNECTORS

A. Cord grip connectors shall be Cooper Crouse-Hinds type CGB or Appleton CG. The neoprene bushing shall fit tightly around the cord after being compressed and shall exclude gasses and moisture.

2.12 GENERATOR PLUG

A. Generator service plug shall be Appleton or approved equal. The model number plug for this project shall be as follows:

[100 A plug – Appleton #ACJA 1044-150RS]
[200 A plug – Appleton #AJA 20034-250RS]

2.13 JUNCTION BOX AND BREATHER VENT

A. Breather shall be Cooper Crouse-Hinds c/n ECD16 or approved equal. Breather to be ½-inch N.P.T. conduit fitting, made of brass with brass cap. Conduit end to be threaded type.

B. Junction Box, JB-1, is to be 16x16x8-inch. JB-2 and JB-3 shall be 6x6x6-inch. All are to be NEMA 4X aluminum (with backplate) as manufactured by Hoffman or approved equal. The junction boxes are to be mounted with the hinge at the top. A padlock hasp is to be provided. The terminal blocks are to be as described in Section 16000-2.15.

2.14 DIN MOUNTING RAILS

A. LUS Material Specification 33005000 – DIN (Deutsches Institut fur Normung – German National Standard) mounting rails to be Phoenix Contact 08-01-73-3, Entrelec 173-220.05 or approved equal.

2.15 TERMINAL BLOCKS

A. High Density 600 V, LUS Material Specification 33005100 – rated for 50 A. Universal foot for mounting on DIN rails, 8 mm width to accommodate 18-8 AWG wire. Phoenix Contact 30-05-01-5, Entrelec 115-118.11, plus accessory parts, or approved equal.

B. Double Grounding, LUS Material Specification 33005130 – to be 6.2 mm wide and used for grounding purposes. Universal ground conductor foot for mounting on DIN rails and accommodates 22-10 AWG wire. Phoenix Contact 27-75-18-4 or approved equal.

2.16 SERVICE [AND ANTENNA SUPPORT] POLE

A. If applicable, a creosote-treated southern pine wooden pole shall be furnished at the location shown in the plans. The pole shall be Class 4 or better and shall meet the requirements of the power company. Install the galvanized pipe antenna mast as

shown in the plans and in the accordance with the instructions of LUS. Pole length shall be 55 ft. The service pole may also serve as the antenna pole.

PART 2 EXECUTION

3.01 INSTALLATION

A. All electrical and control equipment installed or connected by Contractor shall be in strict accordance with the instructions of the manufacturer and with the requirements of LUS.

3.02 STANDARDS OF MATERIALS AND WORKMANSHIP

A. All work shall present a neat and finished appearance when completed and shall be executed in a workmanlike manner. All materials furnished by the Contractor shall be new and listed by the Underwriters Laboratories Inc. (UL) as conforming to its standards. Equipment shall meet NEMA standards wherever such standards have been established.

3.03 SCHEDULE OF WORK

A. Check for information regarding the number of days available to complete the work.

B. Coordinate the work with the work of other trades to avoid conflicts during construction.

3.04 SITE INSPECTION

A. Visit the site and become familiar with the difficulties that may be encountered in execution of the work.

3.05 INSPECTION, TESTING AND START-UP

A. After completion of the work, the Contractor shall conduct an operating test for approval in the presence of the Engineer or his representative. At this time it shall be demonstrated that the equipment operates in accordance with this specification.

B. Accurately measure the current of each phase of each pump motor, while the pump is in operation. Measure the currents using a clip-on ammeter in rapid succession, so that the pump motor load will be approximately the same for each reading. The

readings shall be submitted to the Engineer.

C. Record the name plate of each pump motor and submit the information to the Engineer.

D. Record the setting of the overload relays. This information shall be submitted to the Engineer.

E. Record the level settings of the "Low Water Cut Off" tip float, the "Stop All Pumps" level setting, the "Start Lead Pump" level setting, the "Start Lag Pump" level setting and the "High Level Alarm" tip float level setting. This information shall be submitted to the Engineer.

F. Instruct the Owner's operating personnel during startup and separate operating tests of the system.

G. Submit O&M Manuals to the Engineer.

3.06 CLEAN-UP

A. Clean the premises of all debris before leaving the site at the end of the day.

B. Any damage to adjacent surfaces or other materials caused by the Contractor shall be satisfactorily repaired.

3.07 GROUNDING

A. A 5-ohm (maximum) resistance to Earth ground is required. Refer to the Plans for additional information. The Contractor shall install additional ground rods, if required.

3.08 IDENTIFICATION

A. All wires shall be marked at each point of termination with sleeve-type wire markers with the same designation used on the pump control panel drawings.

End of Section

SECTION 16900

CONTROL EQUIPMENT

PART 1 GENERAL

1.01 REQUIREMENTS

A. The Owner will furnish the pump control panel, radio/UPS system and antenna (if required), level transducer and the two (2) non-mercury tip-float type level sensors. These are to be installed and terminated by the Contractor. The control panel manufacturer will provide start-up and technical assistance, as needed, to the Owner and Contractor. The Owner believes that the pump control panel will provide all operational and protective features necessary for reliable, safe and effective operation of the station pumps. However, it is the ultimate responsibility of the Contractor to verify that the pump control panel furnished by the Owner fulfills all requirements and is in all ways suitable for use with the pumps furnished by the Contractor.

B. The pump control panel was designed and specified by LUS and constructed by an independent control panel manufacturer. Copies of the plans and specifications used to build the pump control panel are available for review by the Contractor and for prospective pump suppliers.

C. By bidding this project, the Contractor certifies that the pump supplier and manufacturer of the pumps have reviewed the plans and specifications used to build the pump control panel furnished by LUS and that the control panel is in all ways acceptable for use with the pumps furnished and all warranties will be honored.

D. The pump control panel will be newly manufactured and tested. The level transducer and non-mercury tip-float switches shall be new.

E. All equipment being furnished by LUS will be furnished in a timely manner so as not to delay the project.

F. It is the Contractor's responsibility to make the various pump suppliers and manufacturers aware of the conditions mentioned above and to obtain their assurances that they have reviewed and are willing to abide by these conditions.

1.02 Measurement and Payment

A. Compensation for furnishing, installing, testing, adjusting and guaranteeing all items described or implied in this Section of the Specifications will be included in payment of the Contract Lump Sum Price Item, "Sewage Pump Station", which is described in Section 02535 of these Specifications. Such payment shall constitute full compensation for materials, equipment, tools, labor, supervision and incidentals and the performance of all work necessary to furnish and install all items described in this Section of the Specifications and shown on the Plans.

PART 2 PRODUCTS

Not used this section.

PART 3 EXECUTION

3.01 Installation

A. Equipment described herein shall be installed in accordance with the Plans, with Section 02535 of these Specifications, and with manufacturers' recommendations.

End of Section

Lafayette City-Parish Consolidated Government
Code of Ordinances
Chapter 78, Article III, Division 2

EXCAVATIONS

ARTICLE III. EXCAVATIONS

DIVISION 1. GENERALLY

Secs. 78-61—78-80. Reserved.

DIVISION 2. CITY OF LAFAYETTE

Subdivision I. In General

Sec. 78-81. Territorial Applicability.

The provisions of this division apply only in the city.

Sec. 78-82. Inspection of Restoration Work.

An inspector from the public works department may be assigned to inspect the work site of an excavation on a periodic basis to ensure that proper workmanship and materials of acceptable quality are being used in the restoration work. The inspector shall act only as an aid in accomplishing the results as outlined in this division. The presence of an inspector does not relieve the permittee of the obligation to fully comply with the intent of this division.

(City Code 1965, § 19-22)

Sec. 78-83. Correction of Unacceptable Work.

(a) Should any person or owner of utilities fail to replace materials, fail to restore areas to their original conditions, or in any way fail to comply with conditions of this division, after he has been notified by the public works department that such work is unacceptable, the city-parish consolidated government shall have the right to perform the necessary work or restoration to original condition and charge the cost, plus a 25 percent administrative charge, to the permittee doing the excavation work. It is provided, however, that no such work shall be

undertaken by the public works department until the permittee doing the excavation work shall have had an opportunity to do the work himself within at least ten days after notice has been given to him. Proper notice shall consist of notification by certified mail or by personal delivery.

(b) When the party doing the excavation work fails to respond to proper notice as set forth in subsection (a) of this section and the city-parish consolidated government is required to perform the necessary work of restoration to original condition, the actual cost to the city-parish consolidated government, plus a 25 percent administrative charge in having to perform the work, is declared to be the obligation of the permittee doing the excavation work. After the city-parish consolidated government has performed the necessary work of restoration to original condition, the city-parish consolidated government shall invoice the permittee doing the excavation work for the actual cost of the work performed, plus a 25 percent administrative charge, and the permittee shall have ten days in which to pay the invoice in full. If the permittee fails to pay the invoice in full within ten days, the city-parish consolidated government shall have the right to enforce collection of the actual cost, together with the cost of prosecuting the suit, in any court of proper jurisdiction.

(c) In addition thereto, the public works department shall have the right to revoke a permit issued under this division upon any violation by the permittee of this division, and the public works department shall also have the right to refuse a future permit to a person or owner of utilities who has, in the past, failed to comply with all the requirements of this division.

(City Code 1965, § 19-23)

Sec. 78-84. Failure of Work; Warranty.

(a) Should settlement occur over restored trenches or excavations or should there occur any other failure due to faulty construction, within a period of one year after restoration, it shall be the obligation of the permittee who did the work to correct the settlement and/or failure, including refilling, tamping and repaving, resodding and reseeding.

(b) The public works department shall notify, by certified mail or by personal delivery, the permittee of any condition due to settlement and/or any other failure of restoration. The permittee shall have ten days after receipt of the notice to make the necessary corrections, including opening, refilling, tamping and repaving, resodding and reseeding, as may be required by the public works department.

(c) If the permittee fails to respond to proper notice as set forth in subsection (b) of this section, the city-parish consolidated government shall have the right to perform the necessary corrective work. If the city-parish consolidated government performs the necessary corrective work, the actual cost, plus a 25 percent administrative charge to the city-parish consolidated government in having to perform the work, is declared to be an obligation of the permittee who did the excavation work. After the city-parish consolidated government has performed the necessary corrective work, the city-parish consolidated government shall

invoice the permittee for the actual cost, plus a 25 percent administrative charge, and the permittee shall have ten days in which to pay the invoice in full. If the permittee fails to pay the invoice in full within ten days, the city-parish consolidated government shall have the right to enforce collection of the actual cost, plus a 25 percent administrative charge, plus all costs of prosecuting the suit, in any court of proper jurisdiction.

(d) In addition thereto, the public works department shall have the right to revoke a permit upon any violation by the permittee of this division, and shall also have the right to refuse a future permit to a person or owner of utilities who has, in the past, failed to comply with all the requirements of this division.

(City Code 1965, § 19-24)

Sec. 78-85. Compliance with Specifications.

It shall be the duty of a permittee under this division to do all work in strict accordance with the specifications, terms and conditions set out in his application and permit, and any failure to comply therewith shall be punishable in accordance with section 1-9. In addition thereto, the permittee shall be liable to the city-parish consolidated government for any cost, expense or liability incurred by the city-parish consolidated government by reason of the failure of the permittee to strictly comply with such specifications, terms and conditions.

(City Code 1965, § 19-25)

Sec. 78-86. Trenching in Grass Areas.

Trenching in grass areas or planting spaces shall be replaced in a condition close to that which existed prior to the excavation, particularly regarding sod or grass and proper elevation of the finished surface. All excess material shall be removed and overgraded to ensure no obstructions to mowing operations. In planting areas, no trench or excavation shall be made that will remove or endanger any shrubbery, flowers, trees or other planting. Should it be determined that a trench should be excavated at a location that would cause removal of or endanger any planting, special arrangements shall be made with the public works department, operations division, for the work prior to making excavations.

(City Code 1965, § 19-21)

Secs. 78-87--78-100. Reserved.

Subdivision II. Permit

Sec. 78-101. Required; Exceptions.

It shall be unlawful for any person or owner of utilities, private or public, to make any excavation or opening in or boring below any street, alley, sidewalk, boulevard, neutral ground or planting space located within the public right-of-way without first obtaining a permit from the public works department. If emergency repairs are necessary to restore or maintain service, the entity making the emergency repairs need not obtain a permit in advance of making the repairs, but shall comply with all other applicable provisions of this division. The permit shall be obtained at the first reasonable opportunity after such emergency repairs have commenced. No permit is required under this division whenever any person has been awarded a public contract pursuant to the laws of the state and for the construction of improvements on behalf of the city-parish consolidated government. Work crews of the city-parish consolidated government shall not be required to obtain a permit for right-of-way excavation outside pavement areas, but they shall adhere to construction specifications contained in this division.

(City Code 1965, § 19-16)

Sec. 78-102. Duties of Permittee.

(a) *Protection of existing structures and facilities; submission of plans.* It shall be the duty and obligation of all applicants for permits under this division to make all investigations necessary to locate all existing underground utilities, structures, pipelines, conduits, etc., in the area where work is contemplated. It shall be the duty and obligation of the permittee to maintain and protect any and all existing structures, etc., within the limits of the work area. Any applicant for a permit to perform excavations within the public right-of-way shall submit sufficient data, plans, specifications, drawings, etc., which clearly define the proposed work, and also plans for restoration. The permit must be secured prior to the commencement of any work. Any work within the public right-of-way that is underway without a permit will be stopped by the city-parish consolidated government immediately upon detection, and no further work will be allowed until the proper permit is issued for that work.

(b) *Deposit; restoration of site.* No deposit shall be required for a permit to perform work within the right-of-way. However, the permittee is fully responsible to restore the work area to a condition as good or better than the original condition.

(c) *Protection of public safety.* It shall be the duty and obligation of the permittee to safeguard the public by maintaining the necessary guards, barricades and safety lights, in accordance with article IV of this chapter. The permittee shall maintain the street, alley or sidewalk surface in a good and safe condition, and the permittee shall hold the city-parish consolidated government harmless from any claim for damages or personal injury as a result of such work by the permittee.

(City Code 1965, § 19-17)

Secs. 78-103--78-120. Reserved.

Subdivision III. Installation Standards for Utility Lines

Sec. 78-121. Definitions.

The following words, terms and phrases, when used in this subdivision, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Arterial street means a street used primarily for through traffic, carrying heavy loads and large volumes of traffic.

Residential street means a street used primarily for access to abutting properties for traffic turning off arterial streets.

(City Code 1965, § 19-18)

Cross references: Definitions generally, § 1-2.

Sec. 78-122. Water Lines.

Standards for installation of water lines are as follows:

(1) *Arterial streets.* Must be bored. Any six-inch outside pipe barrel diameter line or greater must be encased. The casing must be installed by boring such that the bore hole is not greater by two inches than the outside barrel diameter of the casing. Any water line less than six inches outside barrel diameter must be bored such that the bore hole is not greater by two inches than the outside diameter of the bell of the water pipe. If this requirement cannot be met, then the six-inch or less barrel diameter water line must be encased. In either event, the crown of the bore hole shall be not less than 42 inches below the surface of the pavement. Taps into existing facilities under arterial streets that exist at less than 42 inches from the pavement are allowed.

(2) *Residential streets.* Water lines may be installed by cutting the street or by boring. If boring is used, the bore hole diameter must not be over two inches larger than the pipe bell diameter. The crown of the bore hole must be not less than 42 inches below the pavement surface.

(City Code 1965, § 19-18(a))

Sec. 78-123. Gravity Sewer Lines.

Standards for installation of gravity sewer lines are as follows:

(1) *Arterial streets.* All gravity sewer lines must be bored such that the diameter of the bore hole is not larger than the outside diameter of the gravity sewer pipe barrel (not flange) plus three inches; if this requirement cannot be met, the sewer pipe must be encased. The casing must be installed by boring such that the bore hole is not greater by two inches than the outside barrel diameter of the casing. The crown of the bore hole must be not less than 42 inches below the pavement surface, unless it is required to tie into existing lines.

(2) *Residential streets.* The gravity sewer line may be installed by street cut or bored. If bored, the diameter of the bore hole shall not be larger than the outside diameter of the gravity sewer pipe barrel (not flange) plus three inches; if this requirement cannot be met, the sewer pipe must be encased and the bore hole diameter must be within two inches of the diameter of the casing. In either event, the crown of the bore hole shall be not less than 42 inches below the surface of the pavement, unless it is required to tie into existing lines.

(City Code 1965, § 19-18(b))

Sec. 78-124. Sewer Force Mains.

Standards for installation of sewer force mains are as follows:

(1) *Arterial streets.* Must be bored. Any six-inch outside pipe barrel diameter line or greater must be encased. Boring and casing requirements are the same as for water lines under arterial streets.

(2) *Residential streets.* May be installed by street cut or bored. Boring and casing requirements are the same as for water lines under residential streets.

(City Code 1965, § 19-18(c))

Sec. 78-125. Electrical Lines.

Standards for installation of electrical lines are as follows:

(1) *Arterial streets.* Must be bored. Boring and casing requirements are the same as for gravity sewer lines under arterial streets.

(2) *Residential streets.* May be installed by street cut or bored. If bored, requirements are the same as for gravity sewer lines under arterial streets.

(City Code 1965, § 19-18(d))

Sec. 78-126. Gas Lines.

Standards for installation of gas lines are as follows:

(1) *Arterial streets.* Must be bored. Any six-inch outside pipe barrel diameter or greater must be cased. The same requirements apply as for water lines under arterial streets, except that any gas line operated under pressure greater than 200 pounds per square inch must be cased, regardless of its diameter.

(2) *Residential streets.* May be installed by street cut or bored. If bored, the same requirements apply as for water lines under arterial streets, except that any gas line operating under pressure greater than 200 pounds per square inch must be cased, regardless of its diameter.

(City Code 1965, § 19-18(e))

Sec. 78-127. Telephone and Television Cable.

Standards for installation of telephone and television cable are as follows:

(1) *Arterial streets.* Must be bored. Boring and casing requirements are the same as for gravity sewer lines under arterial streets.

(2) *Residential streets.* May be installed by street cut or bored. If bored, requirements are the same as for gravity sewer lines under arterial streets.

(City Code 1965, § 19-18(f))

Secs. 78-128--78-140. Reserved.

Subdivision IV. Street Cuts and Bores

Sec. 78-141. General Standards.

General standards for street cuts and bores are as follows:

(1) When pipes are encased, the casing shall extend through the street from ditch line to ditch line or to not less than two feet beyond the back of the curb. Pipes or casings shall be not less than 42 inches below the pavement surface or less than 24 inches below the theoretical flow line of the side ditches. Crossing shall be made at as nearly a right angle to the roadway center as possible. No existing drainage structures may be used for the purpose of pipe crossing. If a street is cut, it shall be done one half at a time, thereby allowing traffic on the other half; except that with proper justification and public works department approval, the entire street may be cut at one time.

(2) When pipes are installed and all necessary tests are approved, the restoration work shall then be completed before the beginning of construction on another section of the project.

(City Code 1965, § 19-19(a))

Sec. 78-142. Trenching and Backfilling.

Trenching and backfilling procedures for street cuts and bores shall be in accordance with sound engineering practices and the following procedures:

1) All excavations shall be shored and sheeted if necessary to prevent the walls of the trench from caving into the excavation.

2) It shall be the duty and the obligation of the permittee to barricade the excavation or cover the opening, as is necessary to ensure a safe working area, and the permittee shall hold the city-parish consolidated government harmless from any claim for damages or personal injury as a result of such work by the permittee.

3) All backfill shall be select A-4 soil classification, as per the American Association of State Highway and Transportation Officials' classification system for soils, and shall be free of all foreign matter. Soil that is dug out of the excavation may be used for backfill if it meets this soil classification and is approved by the public works department. The backfill soil must be sufficiently dry, or moist, in order to attain proper compaction.

4) All excavations through streets, alleys, sidewalks or other structures shall be backfilled under the control of an independent testing laboratory hired by the permittee. The testing laboratory shall approve the backfill soil and test each layer of compaction soil for density. The testing laboratory shall furnish the public works department a laboratory report certifying the density test results.

5) All backfill under the roadway pavement shall be mechanically tamped in six-inch to eight-inch layers up to the subgrade to 95 percent of standard proctor density. In areas outside the roadway pavement, the backfill shall be compacted to 90 percent of standard proctor density.

6) An alternate method of backfill for trenches through streets, alleys, sidewalks or other structures shall be to entirely fill the trench to subgrade with Fill-Crete, which is a cementitious grout mixture of sand, cement and water, in the following proportions:

a. Cement: 188 pounds.

b. Sand: 3,010 pounds.

c. Water: 46.2 gallons.

This mix design will produce one cubic yard of mixture and takes into consideration a 5.7 percent moisture level in the sand aggregate. Concrete or any alteration of this mix is not acceptable and must be removed at the permittee's expense.

(City Code 1965, § 19-19(b))

Sec. 78-143. Concrete Pavement Restoration.

Concrete pavement restoration for street cuts and bores shall be in accordance with sound engineering practices and the following procedures:

(1) A 4,000 psi (minimum) concrete shall be used for street or alley pavement restoration and a 2,500 psi (minimum) concrete shall be used for sidewalk and curb restoration.

(2) A saw cut shall be made at least two inches deep into pavement in such a method as to produce a straight, clean edge around the patch to be restored.

(3) If a street cut is made within two feet of an existing crack or pavement joint, the cut shall be extended past the crack.

(4) If a street cut is made within three feet of an existing curb, it and the intermediate pavement shall be removed and restored.

(5) All excavated material, as well as debris left by the contractor, shall be hauled out of the work area and disposed of by the permittee.

(6) All loose material within the trench is to be removed and the top and inside edge of the cut pavement is to be swept clean.

(7) All trenches backfilled with soil backfill shall be mechanically tamped. Sand backfill shall not be used beneath any pavement or around any drainage structure. Sand backfill may be used only if specifically approved by the public works department in writing.

(8) An epoxy bonding agent is to be applied to the inside edge of the cut immediately before pouring concrete. The epoxy resin system to be used must be first approved by the public works department. The epoxy bonding agent may be eliminated by installing steel dowels

which will bind the new pavement to the old existing pavement and provide for load transfer. These dowels must be installed in a manner acceptable to the public works department.

(9) An independent testing laboratory shall be hired by the permittee to design and control the concrete mixture to be used. The laboratory shall make four test cylinders of the concrete mixture and test them at three, five, seven and 28 days for compressive strength. The laboratory shall furnish the city-parish consolidated government with a report certifying the compressive strength test results. This is not required for pours of less than two cubic yards.

(10) All concrete placement, vibration and form work and curing shall be in accordance with the 1982 edition of the Louisiana Standard Specifications for Roads and Bridges, section 601. The finished texture shall be a broom finish.

(11) Traffic may not resume on the newly restored pavement until a compressive strength of 3,000 psi is obtained from the laboratory-prepared concrete test cylinders. The permittee shall provide for effective traffic control and maintenance during the concrete curing period.

(12) If the restoration encompasses a contraction or expansion joint, the permittee shall replace it. The new joint shall match the original design and be of the same quality.

(13) Minimum patch width shall be four feet wide.

(14) The existing concrete pavement shall be cut back a minimum of 12 inches past the vertical trench wall, allowing the newly restored pavement to be supported on the existing road base.

(15) The minimum thickness of restored pavement shall be the thickness of the existing pavement or ten inches, whichever is greater.

(City Code 1965, § 19-19(c))

Sec. 78-144. Asphaltic Concrete Pavement Restoration.

Asphaltic concrete pavement restoration for street cuts and bores shall be in accordance with sound engineering practices and the following procedures:

(1) The asphalt pavement shall be saw cut, or cut in such a method as to produce a straight, clean edge around the patch.

(2) All trenches are to be mechanically tamped as mentioned in section 78-142, if soil backfill is used. Sand backfill shall not be used beneath any pavement or around any drainage structure. Sand backfill may be used only if specifically approved by the public works department in writing.

(3) Full-depth asphaltic concrete shall be compacted from the subgrade to the finished pavement grade in layers not to exceed four inches in thickness.

(4) Full-depth asphaltic concrete shall be a minimum thickness of eight inches below the existing asphalt pavement surface or to the bottom of the existing base, whichever is greater.

(5) All asphaltic concrete, as well as tack coating, shall conform to the specifications of the state department of transportation and development. All asphaltic concrete shall be type 1 wearing course or type 3 wearing course, as specified by the Louisiana Standard Specifications for Roads and Bridges, 1982 edition.

(6) Prior to compacting asphaltic concrete within the trench or the restoration of the pavement, a tack coat shall be applied to the top and the inside edge of the existing cut asphaltic concrete pavement once it is swept clean.

(7) Compaction of the asphaltic concrete shall be obtained by mechanical tampers or rollers that will adequately compact the asphaltic concrete in all areas of the trench. The compaction tools must be approved by the public works department.

(8) When the final layer of asphalt is laid down to be compacted, it shall be a thickness of 20 percent more than the desired compacted thickness. This will compact flush with the plane of the existing pavement. Example: If the desired thickness is 2 1/2 inches, lay down three inches, since 2.5" x 0.2 = 0.5" + 2.5" = 3.0".

(9) The finished asphalt shall be finished rolled until all creases are removed from the new pavement.

(10) The newly restored asphalt shall be protected by means of a flagman or some effective barrier to prevent traffic from driving on the patch until it has sufficiently cooled.

(11) On all asphalt streets, except those that have full-depth asphalt bases, a Portland cement concrete base may be used instead of a full-depth asphalt as mentioned in this section. The concrete base shall be a minimum 4,000 psi, and shall be placed over the compacted subgrade and shall have a minimum thickness of eight inches or to the bottom of the existing base, whichever thickness is greater. A 1 1/2-inch space shall be left between the restored base and the top of the existing asphaltic concrete surface to provide for the correct restoration of the new asphaltic concrete pavement. The same requirements for concrete mentioned in section 78-143 apply here. Traffic may not resume on the newly restored base and asphalt pavement until the concrete base reaches a compressive strength of 3,000 psi.

(12) Asphaltic concrete pavement restoration over a Portland cement concrete base shall be as follows:

a. Sweep clean the top of the concrete base and the top and inside edge of the cut existing asphaltic concrete pavement.

b. Apply a tack coat to both the top of the concrete base and the inside and top edge of the cut existing asphaltic concrete pavement.

c. Restore the layer of asphaltic concrete, as described in this section, taking into consideration an additional 20 percent laydown thickness of the hot asphaltic concrete.

d. Compaction and protection of the restored asphaltic concrete shall be as described in this section.

(City Code 1965, § 19-19(d))

Sec. 78-145. Boring.

Street borings shall begin at the outfall end of the pipe, whenever possible. If the grade at the boring end is below the ground surface, suitable pits or trenches shall be excavated for the purpose of conducting the operations and for placing the joints of pipe. Adequate sheeting and bracing shall be provided to prevent earth cave-ins. The method used shall be such as not to weaken or damage the overburden. The pipe shall not vary laterally or vertically by more than three inches in ten feet from the intended straight line and grade. Any variation shall be regular, and no abrupt changes in direction shall be permitted. Any pipe damaged or misaligned shall be removed and replaced. The use of water and other fluids in connection with boring operations shall be permitted only to the extent necessary to lubricate the cuttings. Jetting shall not be permitted. Any overcutting of the bore hole shall be remedied by pressure grouting the entire length of the installation.

(City Code 1965, § 19-20)

Secs. 78-146--78-170. Reserved.

CONSTRUCTION SPECIFICATIONS

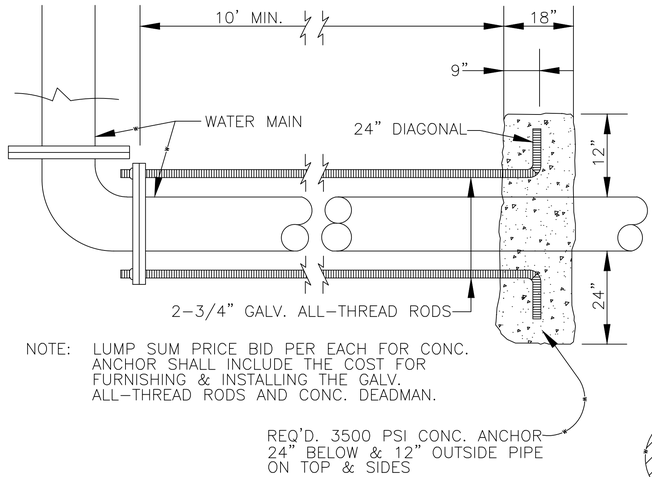
CIVIL ENGINEERING

LAFAYETTE UTILITIES SYSTEM

SECTION TITLE	PROPOSED CSI SECTION NO.
Supplementary Conditions for CIPP	00800
Mobilization	01505
Miscellaneous Construction Requirements	01520
Temporary Fencing	01531
Maintenance Aggregate	02060
Site Preparation	02200
Geotextile Fabric	02271
Special Backfill and Topsoil	02315
Water Main Distribution System	02510
Fire Hydrants, Services, and Valves	02515
Wastewater Collection System	02530
Wastewater Force Mains	02532
Submersible Sewage Lift Station	02535
Wastewater Treatment Facility	02537
Culverts	02720
Testing & Grouting of Sewer Pipe Joints	02731
Cleaning and Television Inspection	02732
Dye Water Flooding	02739
Obstruction Removal	02741
Bypass Pumping	02743
Cured-In-Place Pipe	02744
Sanitary Sewerage Manhole Rehabilitation/Repair	02750
Replacement of Streets, Drives, and Sidewalks	02770
Fences and Gates	02830
Hydroseeding	02920
Fill-Crete	03050
Construction Video	11100
Electrical and Control	16000
Control Equipment	16900
Standard Details	-----

GENERAL NOTES:

1. WHERE SHOWN ON PLANS, NEW WATER MAINS TO BE INSTALLED BY JACK OR BORE WILL BE INSTALLED BELOW EXISTING UTILITIES. THIS DEPTH WILL BE DETERMINED IN FIELD AFTER VERIFICATION OF DEPTH OF EXISTING UTILITIES. CONTRACTOR NEEDS TO TAKE THIS INTO CONSIDERATION WHEN BIDDING AS THERE WILL BE NO ADDITIONAL COMPENSATION FOR EXTRA DEPTH.
2. WORK AREAS MUST BE KEPT NEAT AND FREE OF ALL DEBRIS.
3. BORE UNDER ALL ROADWAYS, HARD SURFACE DRIVEWAYS, AND AS DIRECTED BY PROJECT MANAGER.
4. MECHANICALLY TAMP ALL EXCAVATIONS BY A TRENCH COMPACTOR (IE; WACKER–A–PACKER, RAMMAX) IN ACCORDANCE TO CODE OF ORDINANCES CHAPTER 78, ARTICLE III, DIVISION 2.
5. UTILITIES SHOWN ON THE PLANS ARE APPROXIMATE AND DO NOT INCLUDE SERVICE LOCATIONS. THERE IS NO EXPRESSED OR IMPLIED GUARANTEE AS TO THE ACCURACY OF THE VARIOUS UTILITIES OR OMISSIONS. FINAL LOCATIONS OF ALL WATER LINES AND APPURTENANCES SHALL BE DETERMINED IN THE FIELD BY THE PROJECT MANAGER UPON CONTRACTORS VERIFICATION OF LOCATION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS NOT TO DISRUPT OR DAMAGE EXISTING UTILITIES.
6. LOCATION OF ALL BORE PITS WILL BE DETERMINED IN FIELD BY PROJECT MANAGER.
7. PROJECT MANAGER TO DETERMINE ALL METHODS OF RESTRAINT.
8. ALL STREETS MUST BE MAINTAINED BY WASHING AND REMOVING RESIDUE DAILY. (NO DIRECT PAY)
9. ON RAINY DAYS, CONTRACTOR MUST VISIT SITE AND WASH ROADWAYS AND DRIVEWAYS OF ANY RESIDUE. (NO DIRECT PAY)
10. CONTRACTOR MUST BE CONTACTABLE ON A 24 HOUR BASIS.
11. THE TRUE DEGREE OF CURVATURE OF BENDS WILL BE DETERMINED IN THE FIELD TO BEST MEET THE CONDITIONS.
12. MAINTAIN TRAFFIC CONTROL ACCORDING TO "MUTCD" TRAFFIC CONTROL BOOK (LATEST REVISION) AND STATE OF LOUISIANA DOTD REQUIREMENTS. (NO DIRECT PAY) ANY TRAFFIC SIGNS DAMAGED WILL BE REPLACED BY THE CONTRACTOR. (NO DIRECT PAY) TRAFFIC ENGINEERING SHALL BE INVITED TO THE PRE–CONSTRUCTION MEETING.
13. MAINTAIN 3' OF COVER BELOW DRAINAGE INVERTS FOR ALL MAINLINE INSTALLATIONS.
14. DO NOT DRIVE OR PLACE ANY EQUIPMENT/MATERIAL ON DRIVEWAYS.
15. STOP SIGNS AND MAILBOXES MUST BE TUNNELED OR REMOVED AND REPLACED AT NO COST TO OWNER. IF REMOVED, THEY MUST BE REPLACED THE SAME DAY.
16. CONTRACTOR TO SHORE AND BRACE POWER POLES ADJACENT TO THE PROPOSED WATER LINE. (NO DIRECT PAY)
17. THE CONTRACTOR SHALL ABIDE BY THE LAFAYETTE CONSOLIDATED GOVERNMENT'S SUBSTANCE ABUSE POLICY. DRUG OR ALCOHOL USE WILL NOT BE TOLERATED.
18. CONTRACTOR SHALL PROVIDE A DIGITAL MPEG VIDEO OF THE PROJECT TO PRODUCE A RECORD OF EXISTING CONDITIONS PRIOR TO ANY WORK BEING PERFORMED. NO WORK WILL BE ALLOWED UNTIL THE PROJECT MANAGER REVIEWS THE VIDEO. EACH ADDRESS MUST BE IDENTIFIED BY AUDIO DESCRIPTION AND/OR A VIEW OF PHYSICAL ADDRESS. (NO DIRECT PAY)
19. NO PACK JOINT FITTINGS UNDER ROAD OR OTHER PERMANENT STRUCTURE SHALL BE INSTALLED. A CONTINUOUS SERVICE TUBING IS REQUIRED FROM SERVICE TAP TO METER BOX.
20. MAINTAIN DRAINAGE THROUGHOUT JOB. NO VALVES, FIRE HYDRANTS OR OTHER APPURTENANCES ALLOWED IN OR INTERFERE WITH DRAINAGE SYSTEM. CONTRACTOR WILL BE REQUIRED TO RESHAPE DITCHES TO PUBLIC WORKS APPROVAL.
21. CONTRACTOR SHALL REMOVE ALL EXISTING METER BOXES AND INSTALL NEW METER BOX WITH CUSTOMER HAND CUT OFF VALVE & BOX.
22. PUBLIC WORKS RIGHT OF WAY PERMIT (FORM #320) MUST BE COMPLETED BY CONTRACTOR. COPY OF PERMIT MUST BE KEPT ON SITE DURING CONSTRUCTION.
23. AREA WHERE DRAINAGE CULVERT REMOVAL IS NECESSARY FOR WATER MAIN INSTALLATION MUST BE REPLACED WITH NEW CULVERTS, AS PER PUBLIC WORKS APPROVED INSTALLATION METHODS (RAMNECK, FILTER CLOTH, BACKFILLING). (SEE CONCRETE COLLAR DETAIL BELOW)
24. WATER MAINS CROSSING SEWERS SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF 1.5' BETWEEN THE OUTSIDE OF THE WATER MAIN AND THE OUTSIDE OF THE SEWER. (SEE "TYPICAL SEWER CROSSING DETAIL") MAINTAIN A HORIZONTAL DISTANCE OF 6' BETWEEN WATER AND SEWER.

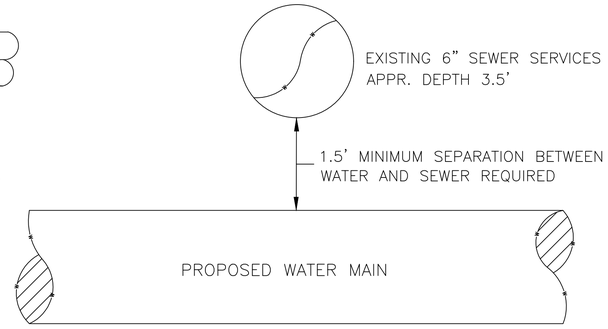


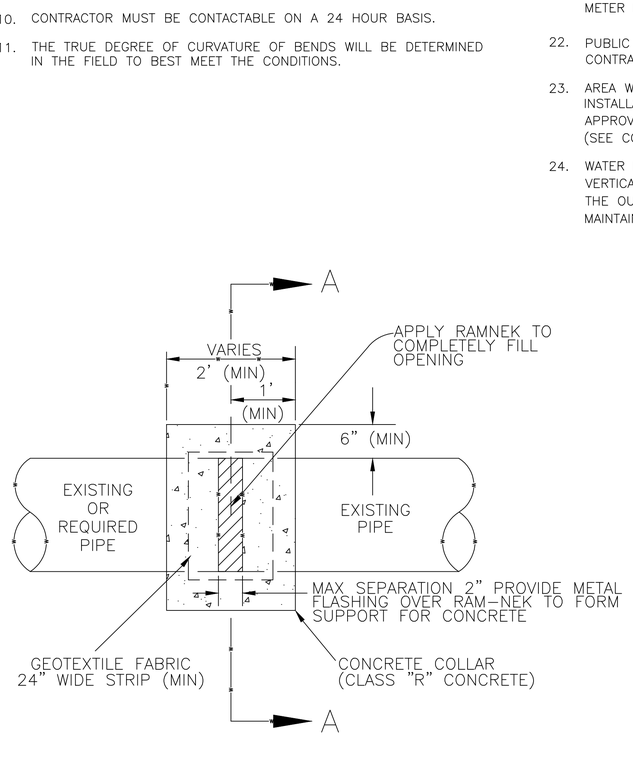
NOTE: LUMP SUM PRICE BID PER EACH FOR CONC. ANCHOR SHALL INCLUDE THE COST FOR FURNISHING & INSTALLING THE GALV. ALL–THREAD RODS AND CONC. DEADMAN.

DETAIL OF WATER MAIN CONC. DEADMAN

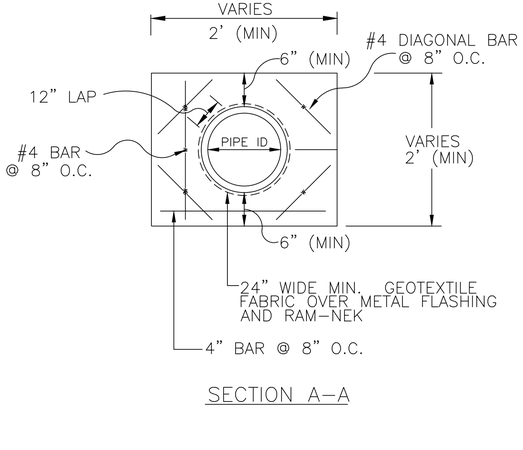
N.T.S.

TYPICAL SEWER SERVICE CROSSING DETAIL (NTS)

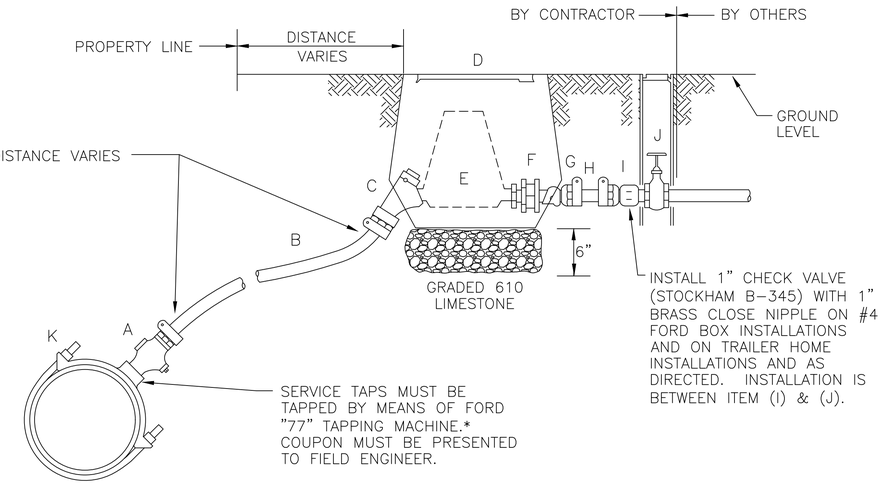




CONCRETE COLLAR DETAIL



SECTION A–A



NOTES:

- x A – 1" PACK JOINT CORPORATION (FORD F1000)*
- x B – 1" HIGH DENSITY POLYETHYLENE PE3408 160 PSI (SELL CLASS 355434–C)
- x C – 1" YOKEBOX VALVE – PACK JOINT
- x D – FORD YOKE BOX – YL244–244–T–NL (1" X 1")*. 1" METER REQUIRES NO.4 FORD BOX.*
- E – 5/8" X 3/4" METER (RECONNECT EXISTING METER)
- x F – 5/8" X 3/4" EXPANSION CONNECTION
- x G – 1" PACK JOINT OUTLET
- x H – 1" PLASTIC PIGTAIL 18" LONG 1" HIGH DENSITY POLYETHYLENE PE 3408 160PSI (SELL CLASS 355434–C)
- x I – 1" PACK JOINT FITTING TO PIPE THREAD (FORD C84–33)*
- x J – CUSTOMER'S VALVE AND BOX
- x K – SERVICE SADDLE CLAMPS – FORD DOUBLE STRAP MODEL (F–202)*

x THESE COME AS ONE COMPOSITE UNIT
* OR APPROVED EQUAL

NOTE:

INSERTS MUST BE USED ON ALL TUBING CONNECTIONS. NO DIRECT PAYMENT. (FORD #52)

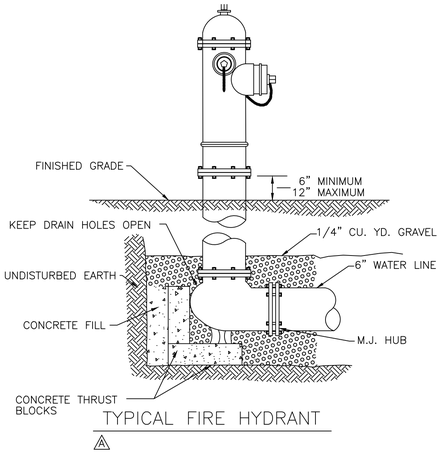
TYPE 'B' SERVICE CONNECTION

LAFAYETTE UTILITIES SYSTEM
ENGINEERING DIVISION
LAFAYETTE, LA

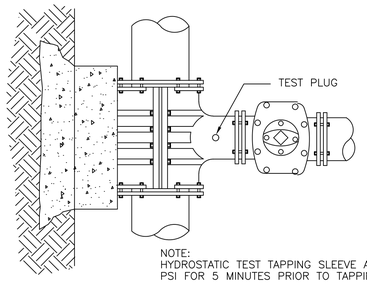
GENERAL NOTES

DATE 7–7–2020		SCALE 1"=20'	
DESIGNED BY BPE		DRAWN BY BPE	
CHECKED BY BG		APPROVED	
		DWG NO.	
		SHEET OF	

H:\Documents\Development Guidelines\Water–Wastewater Drawings\Water\1 – DET_GENERAL NOTES.dwg JKOURY Jul 07, 2026

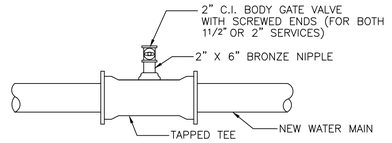


TYPICAL FIRE HYDRANT



NOTE:
HYDROSTATIC TEST TAPPING SLEEVE AT 150 PSI FOR 5 MINUTES PRIOR TO TAPPING

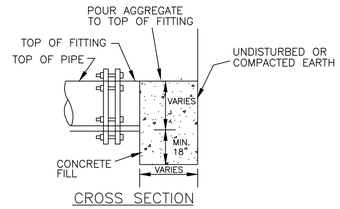
TYPICAL TAPPING SLEEVE & VALVE



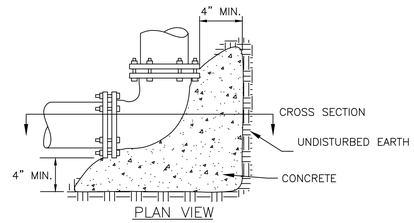
TYPICAL TAPPED TEE CONNECTION

* 3/4" ZINC COATED ALL-THREAD RODS

PIPE SIZE	NO. RODS REQ'D.
6" & 8"	2
10" TO 12"	4
14" TO 18"	6
20" TO 30"	8

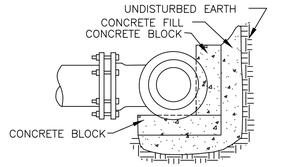


CROSS SECTION

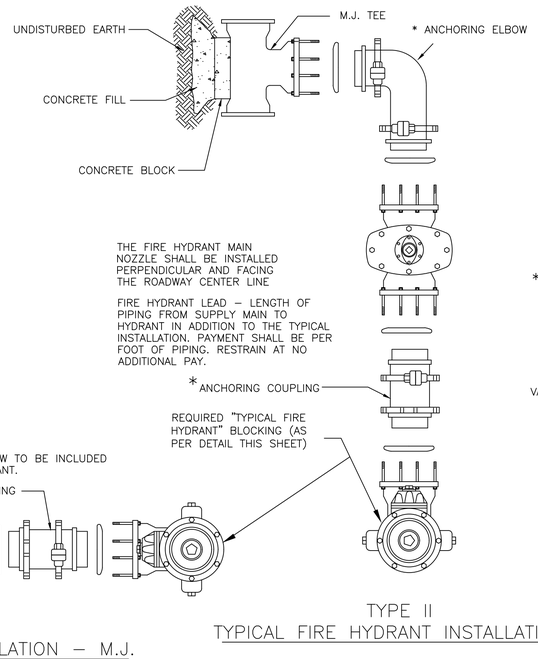


PLAN VIEW

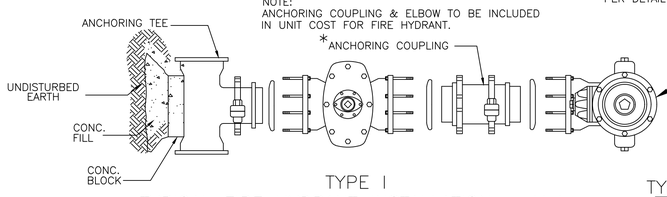
TYPICAL THRUST BLOCKING FOR ALL BENDS 6" AND LARGER



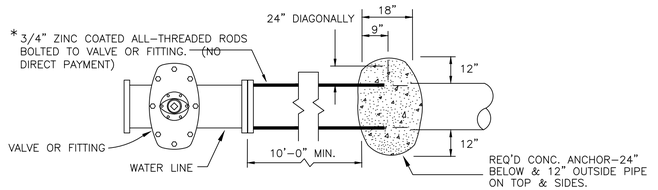
THRUST BLOCKS AT TEES



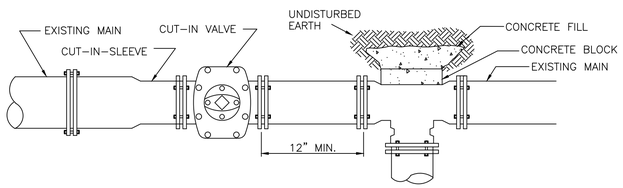
TYPE II
TYPICAL FIRE HYDRANT INSTALLATION – M.J.



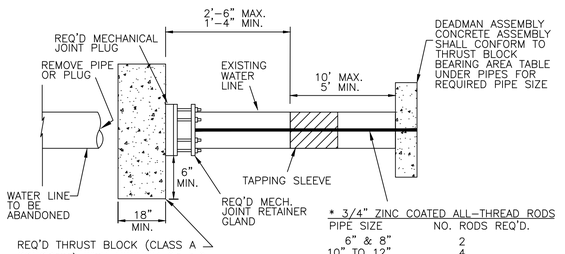
TYPE I
TYPICAL FIRE HYDRANT INSTALLATION – M.J.



TYPICAL DETAIL FOR DEADMAN ASSEMBLY



TYPICAL CUT IN SLEEVE & VALVE AND TEE



* 3/4" ZINC COATED ALL-THREAD RODS

PIPE SIZE	NO. RODS REQ'D.
6" & 8"	2
10" TO 12"	4
14" TO 18"	6
20" TO 30"	8

TYPICAL CUT, PLUG & ABANDON

THRUST BLOCK BEARING AREA IN SQUARE FEET				
PIPE SIZE	PLUG OR 90° BEND	45° BEND	22-1/2° BEND	TEE
6"	3	2	1.5	3
8"	5	2.5	2	4
10"	7	4	3	5
12"	10	6	5	7
16"	14	8	7	10
18"	18	12	9	14

GENERAL NOTES

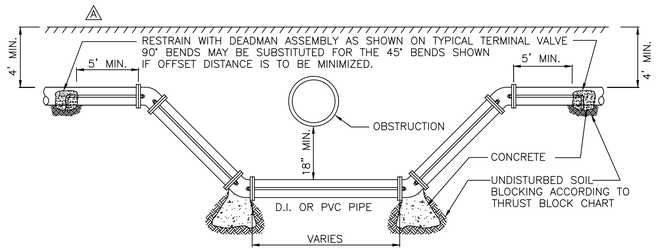
1. NO VALVE SHALL BE OPERATED TO ALLOW WATER TO BE TRANSMITTED FROM A LAFAYETTE UTILITIES SYSTEM SOURCE WITHOUT THE DIRECT SUPERVISON OF LUS. VIOLATORS WILL BE PROSECUTED.
2. CONCRETE DEADMAN'S MUST BE INSTALLED AT ALL PLACES INDICATED ON THE PLANS, AND/OR AS DIRECTED BY LUS ENGINEERING.
3. ALL VALVE BOXES SHALL BE INSTALLED TO MATCH THE FINISHED ELEVATION/GRADE.
4. ALL FITTINGS, VALVES AND FIRE HYDRANTS MUST BE SUPPORTED THROUGHOUT BY CONCRETE BLOCKING.
5. BOLTS MUST BE OPERABLE (FREE OF CONCRETE OR OTHER INTERFERENCES.).
6. ALL FITTINGS, VALVES AND FIRE HYDRANTS, PIPE AND SERVICE TUBING MUST CONFORM TO THE CURRENT LAFAYETTE UTILITIES SYSTEM'S SPECIFICATIONS.
7. RETAINERS ARE REQUIRED ON ALL FITTINGS (I.E. RODS, THRUST BLOCKS, BELL JOINT RESTRAINTS AND RETAINER GLANDS.)
8. ALL CONCRETE BLOCKS MUST BE A MINIMUM SIZE OF 16" X 16" x 4". NO CINDER BLOCKS TO BE USED,
9. ALL INSTALLATIONS STANDARDS/METHODS NOT SPECIFICALLY STATED IN THE CURRENT LAFAYETTE UTILITIES SYSTEM'S SPECIFICATIONS MUST ADHERE TO THE STANDARD OF JURISDICTION (AWWA, NFPA, MANUFACTURER STANDARDS).

DATE	REV.	DESCRIPTION
5/26/99	5/26/99	TYPICAL STREET REPAIR CONCRETE
2/24/15	2/24/15	TYPICAL TAPPING SLEEVE & VALVE
10/10/22	A	DRO 001

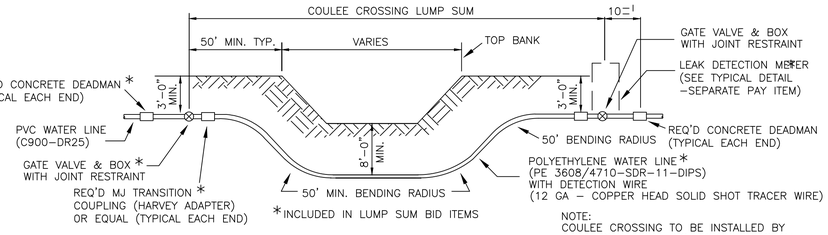
LAFAYETTE UTILITIES SYSTEM
ENGINEERING DIVISION
LAFAYETTE, LA

TYPICAL WATER DETAIL

DATE 7/10/96	SCALE NTS
DESIGNED BY	DRAWN BY TRR
CHECKED BY	APPROVED BG
CONVERTED TO CAD 9/21/00 WAB 7/10/96 TRR 10/12/02 CJA 7/19/96 TRR 11/8/11 CJA 8/22/97 CMN 7/25/12 CJA 9/21/98 WAB 2/24/15 CJA 5/26/99 WAB 10/10/22 LR	DWG NO. WDET1
	SHEET 1 OF



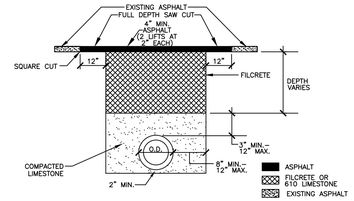
TYPICAL OFFSET – 6" MAIN AND LARGER



*INCLUDED IN LUMP SUM BID ITEMS

NOTE:
COULEE CROSSING TO BE INSTALLED BY DIRECTIONAL BORE. NO EXCAVATION SHALL BE ALLOWED INSIDE COULEE AREA.

CROSSING #	WATER LINE SIZE	ESTIMATED HORIZONTAL DISTANCE (VALVE TO VALVE)
1	14"	600'

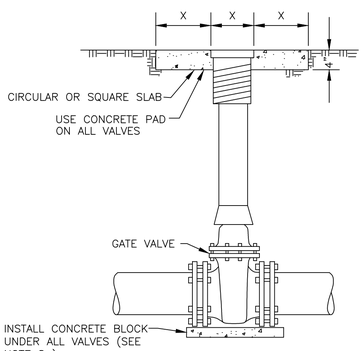


TYPICAL STREET CUT REPAIR
FOR ASPHALT STREETS

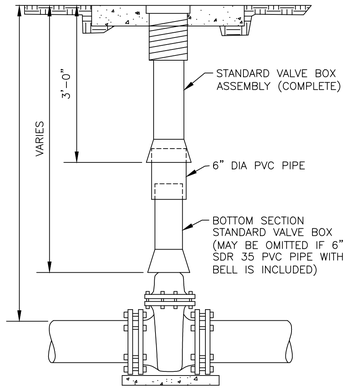
NOTES:

1) HOT MIX ASPHALT TO BE COMPACTED TO 92% DENSITY MINIMUM. FOR A MINIMUM OF FOUR INCHES (4") THICK, CONSTRUCTED IN TWO (2) – TWO INCH (2") LIFTS.
2) FILCRETE MIX SHALL MEET LAFAYETTE CONSOLIDATED GOVERNMENT STANDARD.
3) 610 LIMESTONE MUST BE COMPACTED IN 12" LIFTS TO 95% DENSITY FOR EACH LIFT. A VIBRATORY COMPACTOR WILL BE REQUIRED.
4) TACK COAT TO BE APPLIED PRIOR TO ASPHALT LAYING.
5) ALL PAVEMENT STRIPING AND/OR RAISED PAVEMENT REFLECTORS DESTROYED SHALL BE REPLACED. MATERIAL AND INSTALLATIONS SHALL MEET LAFAYETTE CONSOLIDATED GOVERNMENT STANDARD SPECIFICATIONS FOR THESE ITEMS.

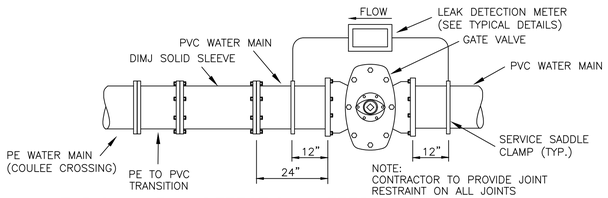
*



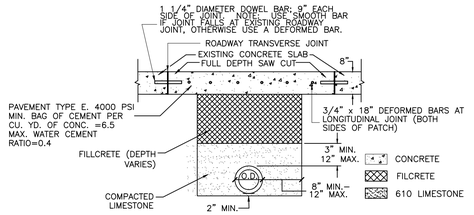
TYPICAL VALVE & BOX INSTALLATION



TYPICAL VALVE & BOX INSTALLATION
BELOW NORMAL BURY



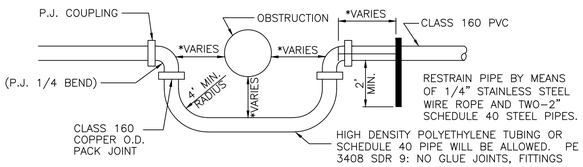
TYPICAL LEAK DETECTION METER LAYOUT



TYPICAL STREET REPAIR FOR
UTILITY LINE REHABILITATION
FOR CONCRETE STREETS

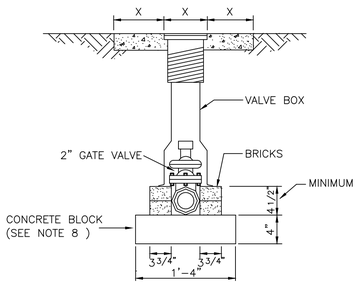
NOTES: CONSOLIDATED GOVERNMENT STANDARD SPECIFICATIONS FOR THESE ITEMS.

1) EXISTING CONCRETE MUST BE DRILLED & DOWELED BEFORE NEW CONCRETE IS POURED. DOWEL BARS AT TRANSVERSE JOINTS MUST BE 1 1/4" IN DIAMETER, 18" LONG WITH 9" EPOXYED INTO EXISTING CONCRETE SPACED AT 12" ON CENTER. USE SMOOTH DOWEL BARS AT EXISTING ROADWAY JOINT ONLY. OTHERWISE USE DEFORMED DOWEL BARS. DOWEL BARS AT LONGITUDINAL JOINT MUST BE 3/4" IN DIAMETER DEFORMED BARS, 18" LONG WITH 9" EPOXYED INTO EXISTING CONCRETE. MUST BE 18" ON CENTER ALONG LONGITUDINAL SIDES OF STREET CUT PATCH.
2) CONCRETE TEST CYLINDERS SHALL BE MADE BY THE CONTRACTOR OR TESTING LABORATORY AT CONTRACTOR'S EXPENSE, AND BREAK RESULTS SHALL BE FORWARDED TO LAFAYETTE CONSOLIDATED GOVERNMENT, PUBLIC WORKS DEPARTMENT. TRAFFIC MAY BE PUT ON CONCRETE PATCH WHEN PSI STRENGTH IS REACHED.
3) A BROOM FINISH IS REQUIRED AND CONCRETE CURED BY AN APPROVED METHOD.
4) FILCRETE MIX SHALL MEET LAFAYETTE CONSOLIDATED GOVERNMENT STANDARDS AND SHALL BE POURED FLUSH WITH EXISTING CONCRETE ROADWAY SURFACE.
5) ALL NEW JOINTS SHALL CONFORM TO THE EXISTING JOINTS.
6) 610 LIMESTONE MUST BE COMPACTED IN 12" LIFTS TO 95% DENSITY FOR EACH LIFT. A VIBRATORY COMPACTOR WILL BE REQUIRED.
7) ALL PAVEMENT STRIPING AND/OR RAISED PAVEMENT REFLECTIONS DESTROYED SHALL BE REPLACED. MATERIAL AND INSTALLATION SHALL MEET LAFAYETTE CONSOLIDATED GOVERNMENT STANDARD SPECIFICATIONS FOR THESE ITEMS.

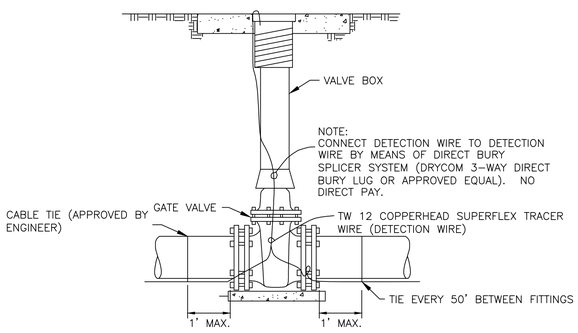


TYPICAL OFFSET/STREAM CROSSING 2" MAIN
(LUS APPROVAL REQUIRED)

NOTE: CONCRETE FILL (1–2–5) MUST BE POURED IN PLACE. COARSE AGGREGATE IS REQUIRED. FILL MUST BE THOROUGHLY MIXED PRIOR TO BEING POURED.



TYPICAL 2" VALVE
& BOX INSTALLATION



TYPICAL DETECTION WIRE INSTALLATION

TYPICAL THRUST BLOCKING
FOR ALL BENDS 6" AND LARGER

THRUST BLOCK BEARING AREA IN SQUARE FEET				
PIPE SIZE	PLUG OR 90° BEND	45° BEND	22–1/2° BEND	TEE
6"	3	2	1.5	3
8"	5	2.5	2	4
10"	7	4	3	5
12"	10	6	5	7
16"	14	8	7	10
18"	18	12	9	14

GENERAL NOTES

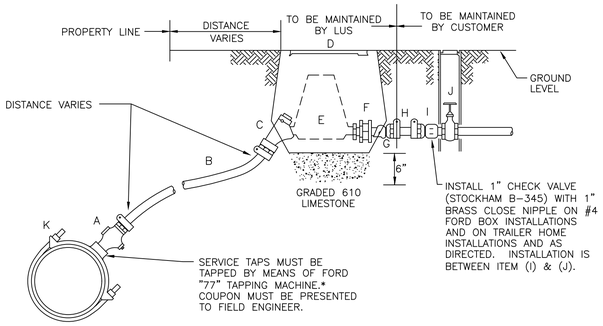
1. NO VALVE SHALL BE OPERATED TO ALLOW WATER TO BE TRANSMITTED FROM A LAFAYETTE UTILITIES SYSTEM SOURCE WITHOUT THE DIRECT SUPERVISON OF LUS. VIOLATORS WILL BE PROSECUTED.
2. CONCRETE DEADMAN'S MUST BE INSTALLED AT ALL PLACES INDICATED ON THE PLANS, AND/OR AS DIRECTED BY LUS ENGINEERING.
3. ALL VALVE BOXES SHALL BE INSTALLED TO MATCH THE FINISHED ELEVATION/GRADE.
4. ALL FITTINGS, VALVES AND FIRE HYDRANTS MUST BE SUPPORTTED THROUGHOUT BY CONCRETE BLOCKING.
5. BOLTS MUST BE OPERABLE (FREE OF CONCRETE OR OTHER INTERFERENCES.).
6. ALL FITTINGS, VALVES AND AND FIRE HYDRANTS, PIPE AND SERVICE TUBING MUST CONFORM TO THE CURRENT LAFAYETTE UTILITIES SYSTEM'S SPECIFICATIONS.
7. RETAINERS ARE REQUIRED ON ALL FITTINGS (I.E. RODS, THRUST BLOCKS, BELL JOINT RESTRAINTS AND RETAINER GLANDS.)
8. ALL CONCRETE BLOCKS MUST BE A MINIMUM SIZE OF 16" X 16" x 4". NO CINDER BLOCKS TO BE USED.
9. ALL INSTALLATIONS STANDARDS/METHODS NOT SPECIFICALLY STATED IN THE CURRENT LAFAYETTE UTILITIES SYSTEM'S SPECIFICATIONS MUST ADHERE TO THE STANDARD OF JURISDICTION (AWWA, NFPA, MANUFACTURER STANDARDS).

DATE	REV.	DESCRIPTION
5/26/99	5/26/99	TYPICAL STREET REPAIR CONCRETE
2/24/15	2/24/15	TYPICAL TAPPING SLEEVE & VALVE
10/10/22	A	DRO 001

LAFAYETTE UTILITIES SYSTEM
ENGINEERING DIVISION
LAFAYETTE, LA

TYPICAL WATER
DETAIL

DATE 7/10/96	SCALE NTS
DESIGNED BY	DRAWN BY TRR
CHECKED BY	APPROVED BG
CONVERTED TO CAD 7/10/96 TRR; 7/19/96 TRR; 8/22/97 CMN; 9/21/98 WAB; 5/26/99 WAB; 8/21/00 WAB; 3/12/02 CJA; 11/8/11 CJA; 7/25/12 CJA; 2/24/15 CJA; 4/30/19 RKP; 10/10/22 LR	DWG NO. WDET2
	SHEET 2 OF



x
x

NOTES:

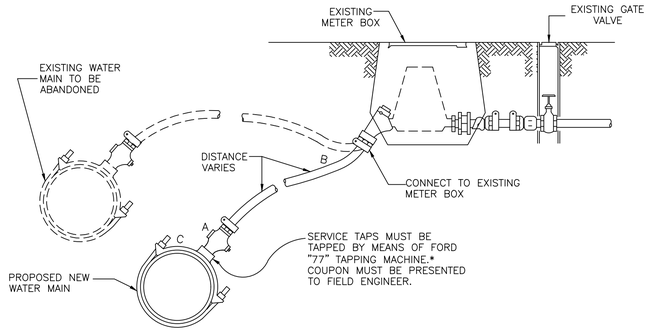
x A – 1" PACK JOINT CORPORATION (FORD F1000)*
x B – 1" HIGH DENSITY POLYETHYLENE PE3408 160 PSI (CELL CLASS 355434-C)
C – 1" YOKEBOX VALVE – PACK JOINT
D – FORD YOKE BOX – YL244-244 (1" X 1")*. 1" METER REQUIRES NO.4 FORD BOX.*
E – 5/8" X 3/4" METER
F – 5/8" X 3/4" EXPANSION CONNECTION
G – 1" PACK JOINT OUTLET
H – 1" PLASTIC PIGTAIL 18" LONG 1" HIGH DENSITY POLYETHYLENE PE 3408 160PSI (CELL CLASS 355434-C)
I – 1" PACK JOINT FITTING TO PIPE THREAD (FORD C84-33)*
J – CUSTOMER'S VALVE AND BOX
K – SERVICE SADDLE CLAMPS – FORD DOUBLE STRAP MODEL (F-202)*

x THESE COME AS ONE COMPOSITE UNIT
* OR APPROVED EQUAL

NOTE:

INSERTS MUST BE USED ON ALL TUBING CONNECTIONS. NO DIRECT PAYMENT. (FORD #52)

TYPICAL WATER SERVICE CONNECTION TYPE "A"



NOTES:

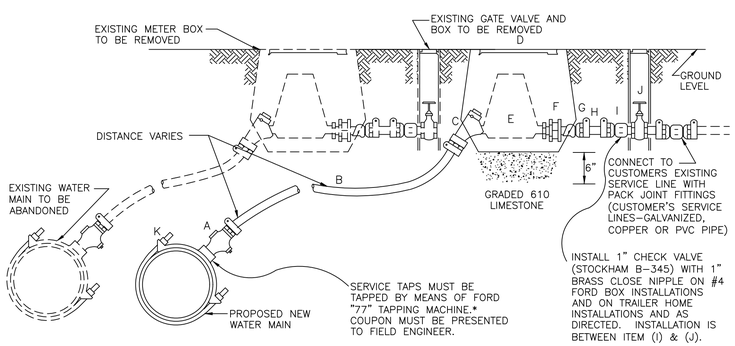
A – 1" PACK JOINT CORPORATION (FORD F1000)*
B – 1" HIGH DENSITY POLYETHYLENE PE3408 160 PSI (CELL CLASS 355434-C)
C – SERVICE SADDLE CLAMPS – FORD DOUBLE STRAP MODEL (F-202)*

* OR APPROVED EQUAL

NOTE:

INSERTS MUST BE USED ON ALL TUBING CONNECTIONS. NO DIRECT PAYMENT. (FORD #52)

TYPICAL WATER SERVICE RELOCATION TYPE "B"



NOTES:

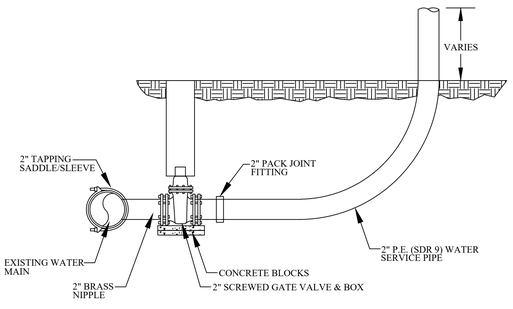
A – 1" PACK JOINT CORPORATION (FORD F1000)*
B – 1" HIGH DENSITY POLYETHYLENE PE3408 160 PSI (CELL CLASS 355434-C)
x C – 1" YOKEBOX VALVE – PACK JOINT
x D – FORD YOKE BOX – YL244-244 (1" X 1")*. 1" METER REQUIRES NO.4 FORD BOX.*
E – 5/8" X 3/4" METER (INSTALLED BY THE WATER DIVISION)
x F – 5/8" X 3/4" EXPANSION CONNECTION
x G – 1" PACK JOINT OUTLET
H – 1" PLASTIC PIGTAIL 18" LONG 1" HIGH DENSITY POLYETHYLENE PE 3408 160PSI (CELL CLASS 355434-C)
I – 1" PACK JOINT FITTING TO PIPE THREAD (FORD C84-33)*
J – CUSTOMER'S VALVE AND BOX
K – SERVICE SADDLE CLAMPS – FORD DOUBLE STRAP MODEL (F-202)*

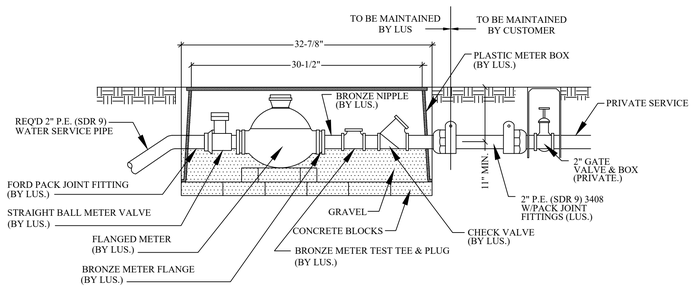
x THESE COME AS ONE COMPOSITE UNIT
* OR APPROVED EQUAL

NOTE:

INSERTS MUST BE USED ON ALL TUBING CONNECTIONS. NO DIRECT PAYMENT. (FORD #52)

TYPICAL WATER SERVICE RELOCATION TYPE "C"





NOTES:

1. CONTRACTOR TO LEAVE WATER SERVICE PIPE EXPOSED ABOVE GROUND, WITH ENOUGH PIPE TO MAKE CONNECTION TO FITTING.
2. CONTRACTOR RESPONSIBLE TO TAP LUS WATER MAIN, 2" GATE VALVE, BOX, AND 2" P.E. (SDR 9) WATER MAIN, AS PER LUS SPECIFICATIONS.

1-1/2" & 2" WATER METER INSTALLATION

⚠

GENERAL NOTES

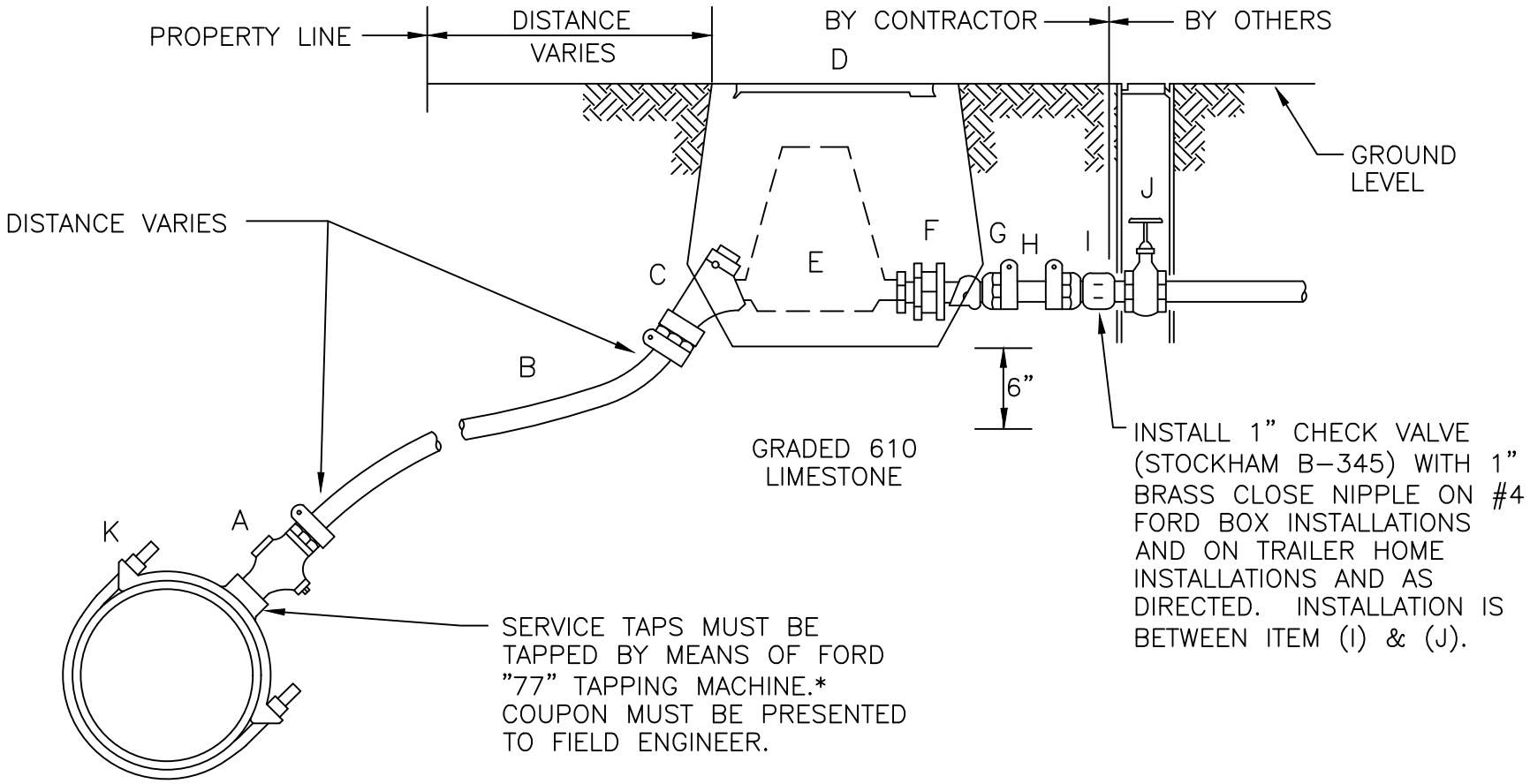
1. NO VALVE SHALL BE OPERATED TO ALLOW WATER TO BE TRANSMITTED FROM A LAFAYETTE UTILITIES SYSTEM SOURCE WITHOUT THE DIRECT SUPERVISON OF LUS. VIOLATORS WILL BE PROSECUTED.
2. CONCRETE DEADMAN'S MUST BE INSTALLED AT ALL PLACES INDICATED ON THE PLANS, AND/OR AS DIRECTED BY LUS ENGINEERING.
3. ALL VALVE BOXES SHALL BE INSTALLED TO MATCH THE FINISHED ELEVATION/GRADE.
4. ALL FITTINGS, VALVES AND FIRE HYDRANTS MUST BE SUPPORTTED THROUGHOUT BY CONCRETE BLOCKING.
5. BOLTS MUST BE OPERABLE (FREE OF CONCRETE OR OTHER INTERFERENCES.).
6. ALL FITTINGS, VALVES AND AND FIRE HYDRANTS, PIPE AND SERVICE TUBING MUST CONFORM TO THE CURRENT LAFAYETTE UTILITIES SYSTEM'S SPECIFICATIONS.
7. RETAINERS ARE REQUIRED ON ALL FITTINGS (I.E. RODS, THRUST BLOCKS, BELL JOINT RESTRAINTS AND RETAINER GLANDS.)
8. ALL CONCRETE BLOCKS MUST BE A MINIMUM SIZE OF 16" X 16" x 4". NO CINDER BLOCKS TO BE USED.
9. ALL INSTALLATIONS STANDARDS/METHODS NOT SPECIFICALLY STATED IN THE CURRENT LAFAYETTE UTILITIES SYSTEM'S SPECIFICATIONS MUST ADHERE TO THE STANDARD OF JURISDICTION (AWWA, NFPA, MANUFACTURER STANDARDS).

DATE	REV.	DESCRIPTION
5/26/99	5/26/99	TYPICAL STREET REPAIR CONCRETE
2/24/15	2/24/15	TYPICAL TAPPING SLEEVE & VALVE
10/10/22	A	DRO 001
5/28/25	5/30/25	JURISDICTION CHANGE

LAFAYETTE UTILITIES SYSTEM
ENGINEERING DIVISION
LAFAYETTE, LA

TYPICAL WATER DETAIL

DATE 10/05/2022	SCALE NTS
DESIGNED BY	DRAWN BY TRR
CHECKED BY	APPROVED BG
CONVERTED TO CAD 7/10/96 TRR; 7/19/96 TRR; 6/22/97 CMN; 9/21/98 WAB; 5/26/99 WAB; B/21/00 WAB; 5/12/02 CJA; 11/8/11 CJA; 7/25/12 CJA; 2/24/15 CJA; 6/30/19 RKP; 10/10/22 LR; 5/30/25 SSP	DWG NO. WDET3
	SHEET 3 OF



NOTES:

A – 1" PACK JOINT CORPORATION (FORD F1000)*
B – 1" HIGH DENSITY POLYETHYLENE PE3408 160 PSI (SELL CLASS 355434-C)
x C – 1" YOKEBOX VALVE – PACK JOINT
x D – FORD YOKE BOX – YL244-244 (1" X 1")*. 1" METER REQUIRES NO.4 FORD BOX.*
E – 5/8" X 3/4" METER (INSTALLED BY THE WATER DIVISION)
x F – 5/8" X 3/4" EXPANSION CONNECTION
x G – 1" PACK JOINT OUTLET
H – 1" PLASTIC PIGTAIL 18" LONG 1" HIGH DENSITY POLYETHYLENE PE 3408 160PSI (SELL CLASS 355434-C)
I – 1" PACK JOINT FITTING TO PIPE THREAD (FORD C84-33)*
J – CUSTOMER'S VALVE AND BOX
K – SERVICE SADDLE CLAMPS – FORD DOUBLE STRAP MODEL (F-202)*

x THESE COME AS ONE COMPOSITE UNIT
* OR APPROVED EQUAL

NOTE:

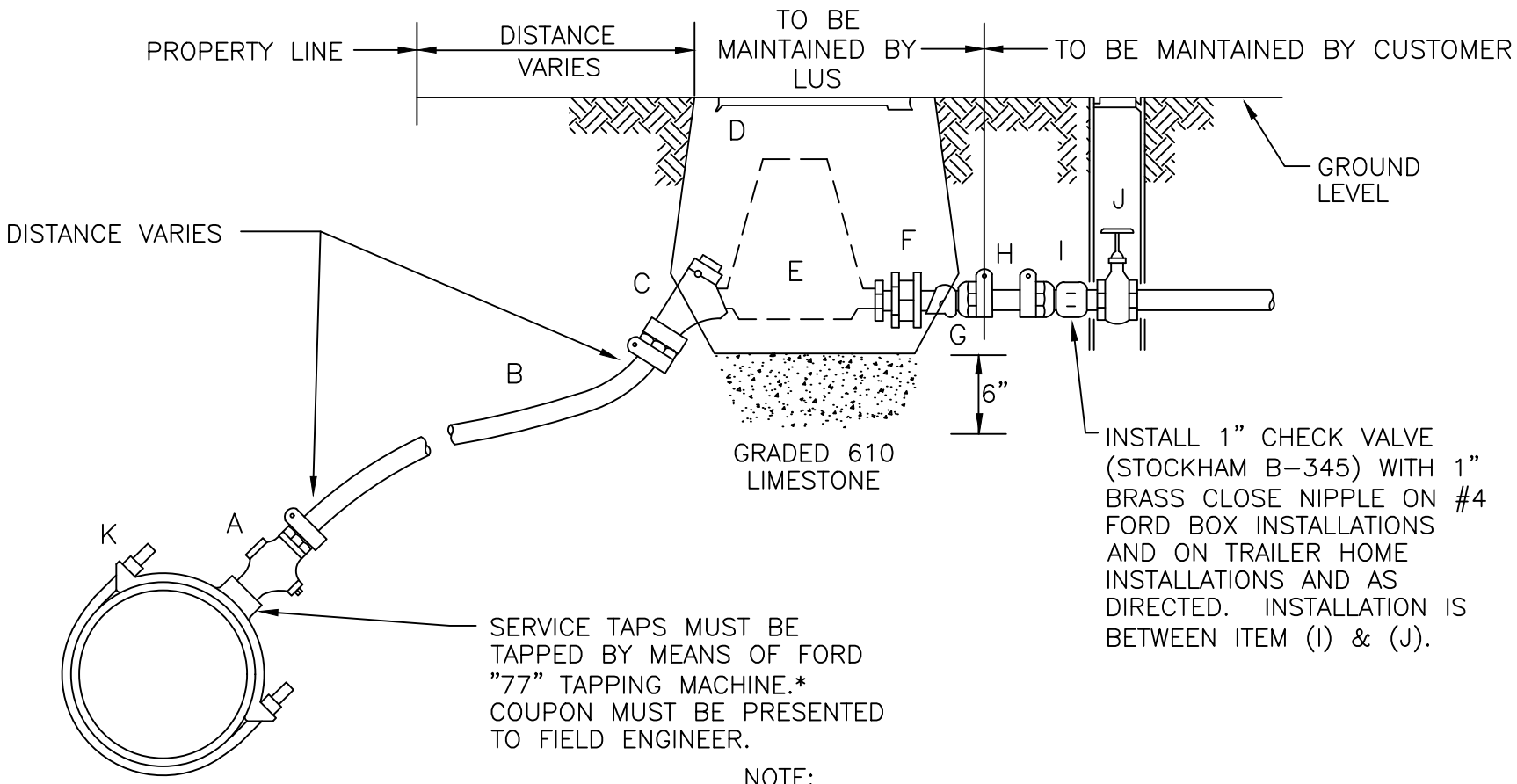
INSERTS MUST BE USED ON ALL TUBING CONNECTIONS. NO DIRECT PAYMENT. (FORD #52)

REVISED 9-24-91

TYPICAL WATER SERVICE CONNECTION

LAFAYETTE UTILITIES SYSTEM

DATE: 3-28-91	SCALE: N.T.S.
DRAWN BY: B.A.T.	APPROVED:
CHECKED:	DWG. NO.: TYPSERCON



NOTES:

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B – 1" HIGH DENSITY POLYETHYLENE PE3408 160 PSI (CELL CLASS 355434-C)
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x F – 5/8" X 3/4" EXPANSION CONNECTION
x G – 1" PACK JOINT OUTLET
H – 1" PLASTIC PIGTAIL 18" LONG 1" HIGH DENSITY POLYETHYLENE PE 3408 160PSI (CELL CLASS 355434-C)
I – 1" PACK JOINT FITTING TO PIPE THREAD (FORD C84-33)*
J – CUSTOMER'S VALVE AND BOX
K – SERVICE SADDLE CLAMPS – FORD DOUBLE STRAP MODEL (F-202)*

x THESE COME AS ONE COMPOSITE UNIT
* OR APPROVED EQUAL

NOTE:

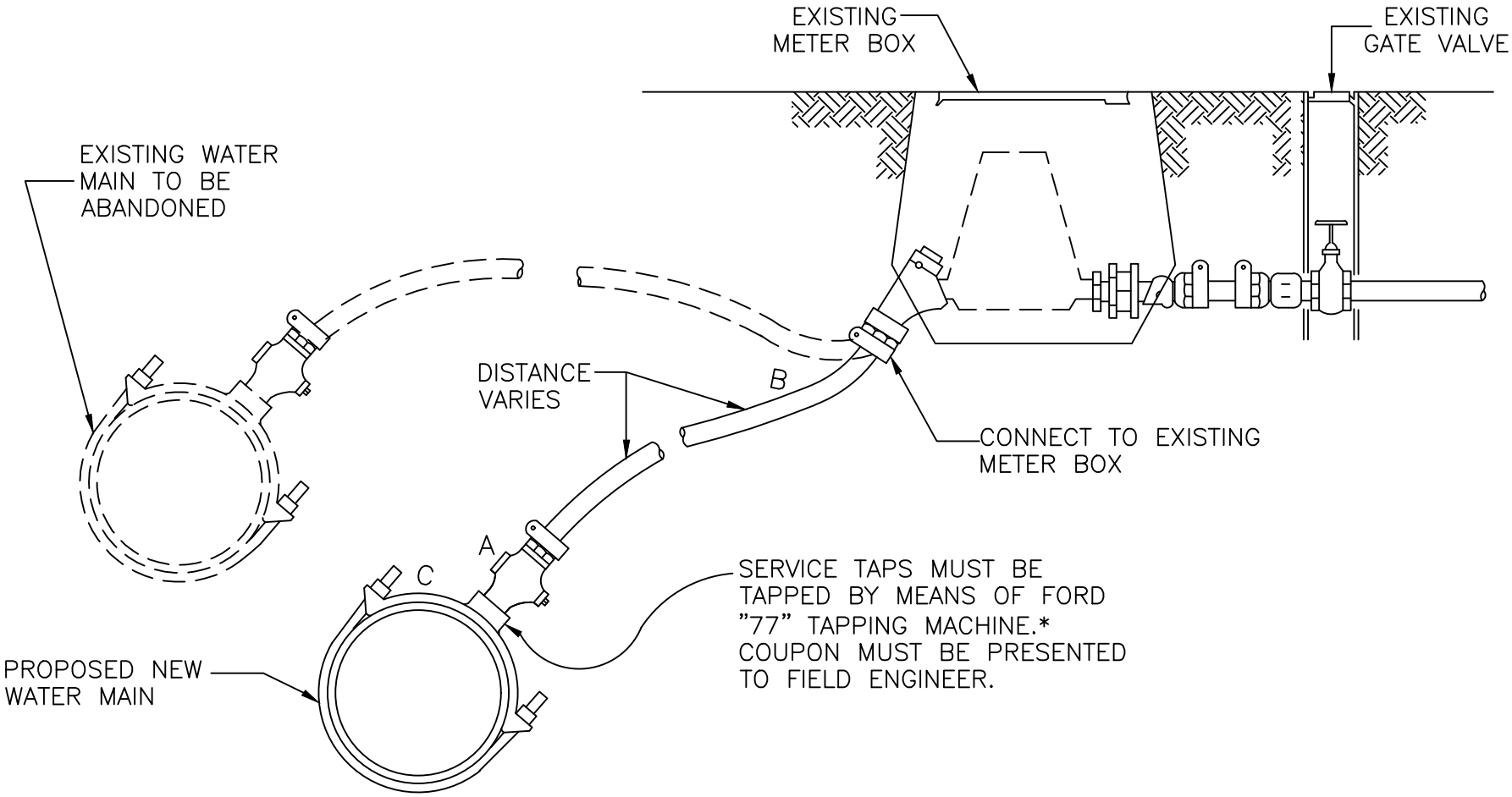
INSERTS MUST BE USED ON ALL TUBING CONNECTIONS. NO DIRECT PAYMENT. (FORD #52)

REVISED 5-30-2025
REVISED 6-11-2014
REVISED 9-24-91

TYPICAL WATER SERVICE CONNECTION TYPE "A"

LAFAYETTE UTILITIES SYSTEM

DATE: 3-28-91	SCALE: N.T.S.
DRAWN BY: B.A.T.	APPROVED:
CHECKED:	DWG. NO.: TYPSERCON-A



NOTE:

INSERTS MUST BE USED ON ALL TUBING CONNECTIONS.
NO DIRECT PAYMENT. (FORD #52)

REVISED 6-11-2014
REVISED 9-24-91

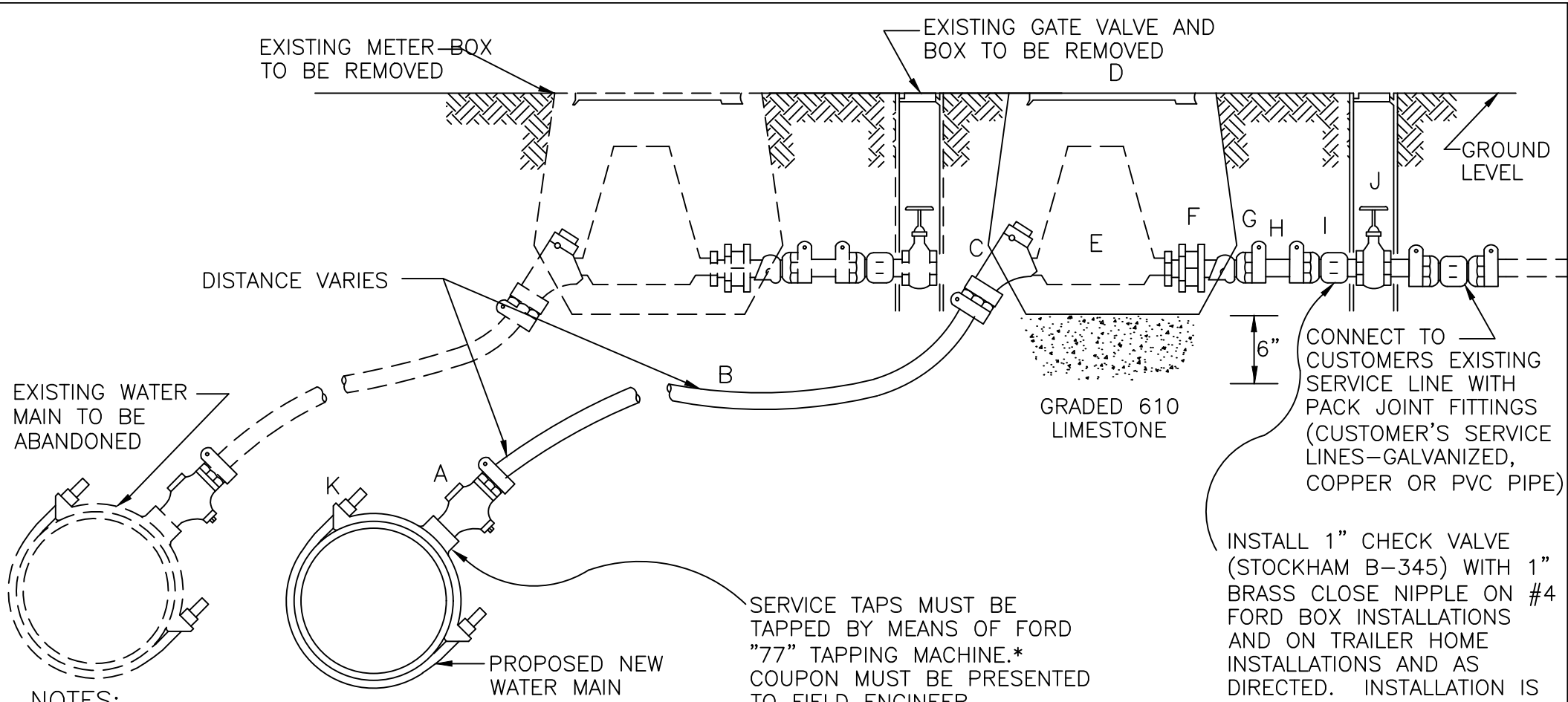
NOTES:

A – 1" PACK JOINT CORPORATION (FORD F1000)*
B – 1" HIGH DENSITY POLYETHYLENE PE3408 160 PSI (CELL CLASS 355434-C)
C – SERVICE SADDLE CLAMPS – FORD DOUBLE STRAP MODEL (F-202)*
* OR APPROVED EQUAL

TYPICAL WATER SERVICE RELOCATION TYPE "B"

LAFAYETTE UTILITIES SYSTEM

DATE: 3-28-91	SCALE: N.T.S.
DRAWN BY: B.A.T.	APPROVED:
CHECKED:	DWG. NO.: TYPSERCON-B



NOTES:

A – 1" PACK JOINT CORPORATION (FORD F1000)*
B – 1" HIGH DENSITY POLYETHYLENE PE3408 160 PSI (CELL CLASS 355434–C)
x C – 1" YOKEBOX VALVE – PACK JOINT
x D – FORD YOKE BOX – YL244–244 (1" X 1")*. 1" METER REQUIRES NO.4 FORD BOX.*
E – 5/8" X 3/4" METER (INSTALLED BY THE WATER DIVISION)
x F – 5/8" X 3/4" EXPANSION CONNECTION
x G – 1" PACK JOINT OUTLET
H – 1" PLASTIC PIGTAIL 18" LONG 1" HIGH DENSITY POLYETHYLENE PE 3408 160PSI (CELL CLASS 355434–C)
I – 1" PACK JOINT FITTING TO PIPE THREAD (FORD C84–33)*
J – CUSTOMER'S VALVE AND BOX
K – SERVICE SADDLE CLAMPS – FORD DOUBLE STRAP MODEL (F–202)*

x THESE COME AS ONE COMPOSITE UNIT
* OR APPROVED EQUAL

NOTE:

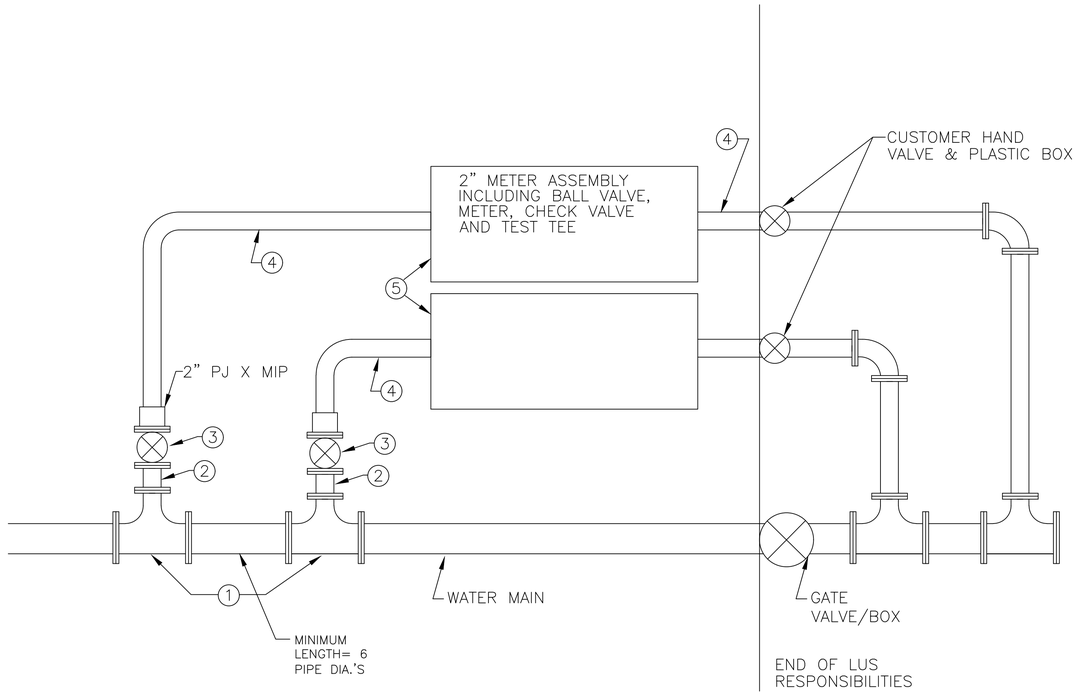
INSERTS MUST BE USED ON ALL TUBING CONNECTIONS. NO DIRECT PAYMENT. (FORD #52)

REVISED 6–11–2014
REVISED 9–24–91

TYPICAL WATER SERVICE RELOCATION TYPE "C"

LAFAYETTE UTILITIES SYSTEM

DATE: 3–28–91	SCALE: N.T.S.
DRAWN BY: B.A.T.	APPROVED:
CHECKED:	DWG. NO.: TYPSERCON–C



MATERIALS LIST:

1. MJ TEE SHALL BE IRON BODY, AWWA C–110 OR C–153 APPROVED, 350 PSI RATING WITH 2" FEMALE IRON PIPE THREADS. TEE MAYBE REPLACED WITH A SERVICE SADDLE FOR EXISTING MAIN INSTALLATIONS.
2. 2" BRASS NIPPLE SHALL BE STANDARD PIPE THREADS, 6" LENGTH.
3. 2" GATE VALVE BE IRON BODY, RESILIENT SEAT, NON RISING.
4. POLYETHYLENE PIPE SHALL BE SDR9, PE3408
5. METER ASSEMBLY SHALL BE PROVIDED BY LUS AT CUSTOMER EXPENSE.
6. WATER METER BOX SHALL BE EAST JORDAN BCF 1730–12 WITH CAST IRON LID AND CAST IRON READER.

NOTES:

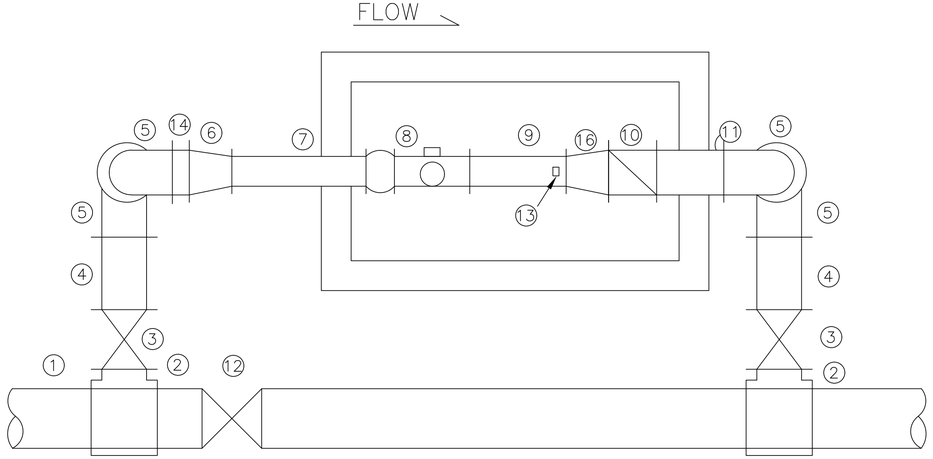
1. MJ VALVE AND FITTINGS SHALL BE INSTALLED WITH RETAINER GLANDS, FORD UFR SERIES.

LAFAYETTE UTILITIES SYSTEM
ENGINEERING DIVISION
LAFAYETTE, LA

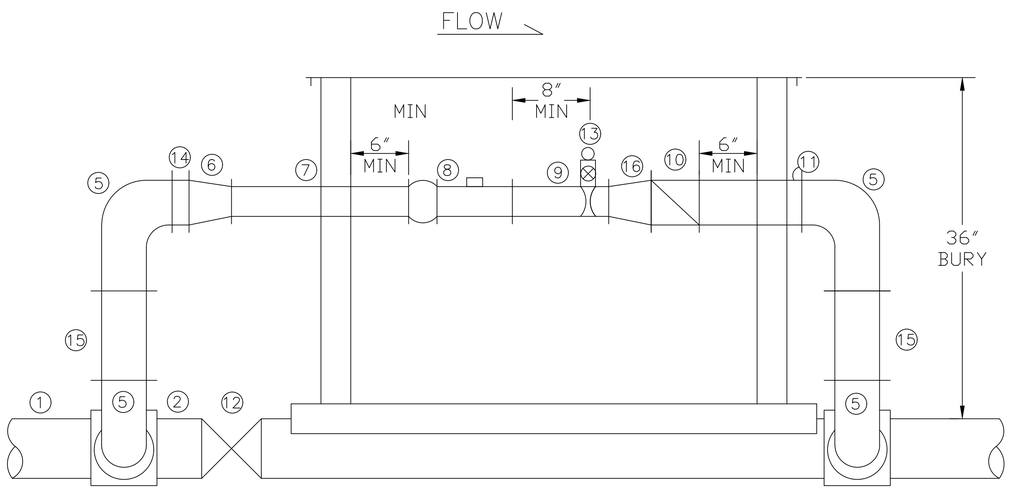
DUAL 2" WATER METERS

DATE 11–10–2003	SCALE NTS
DESIGNED BY TS	DRAWN BY CJA
CHECKED BY	APPROVED
	DWG NO. 2" DUAL METER
	SHEET OF

H:\Documents\Development Guidelines\Water-Wastewater Drawings\Water\wmeter2.dwg JKOURY Jul 07, 2026



PLAN



ELEVATION

1. WATER MAIN
2. 6" TAPPING SLEEVE
3. 6" TAPPING VALVE X MJ/VALVE BOX
4. 6" D.I. PIPE, 18" LENGTH
5. 6" MJ 90° BEND
6. 4"X6" MJ REDUCER
7. 4" FLANGED CONNECTOR, 18" LENGTH
8. 4" STRAINER & METER–FLANGED (BRONZE)
9. 4" FLANGED CONNECTOR–12" LENGTH MINIMUM
10. 6" WEIGHTED SWING CHECK
11. 6" FLANGED CONNECTOR, 18" LENGTH
12. MJ VALVE WITH RETAINER GLANDS/VALVE BOX
13. 4"X2" SERVICE SADDLE/2" GATE VALVE/REDUCER TO 1/4" FEMALE THREAD/0–100psi LIQUID FILLED GAGE
14. 6" D.I. PIPE, 18" LENGTH MINIMUM
15. 6" D.I. PIPE, 12" LENGTH (OR AS REQUIRED FOR PROPER BURY).
16. 4"X6" FLANGED CONCENTRIC REDUCER.

METER SPECIFICATIONS

4" TURBO METER WITH BRONZE MAINCASE, AWWA125 POUND FLANGES, SEALED 100 GALLON ODOMETER TYPE REGISTER, MAGNETICALLY DRIVEN, 150 PSI WORKING PRESSURE FOR 8–1250 GPM RANGE. METER TO MECH. AWWA C701 STANDARDS. BADGER RECORD ALL TURBO 1000 OR APPROVED EQUAL.

STRAINER SPECIFICATIONS

4" BRONZE DUAL FLANGE PLATE STRAINERS, AWWA 125 POUND ROUND FLANGES, WITH REMOVABLE HOUSING COVER, STAINLESS STEEL STRAINER SCREEN AND HOUSING BOLTS, FOR 150 PSI WORKING PRESSURE. BADGER BRONZE PLATE STRAINER OR APPROVED EQUAL.

NOTES:

1) CONCRETE FOR METER BOX SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 4000 PSI.

2) REINFORCING STEEL FOR THE CONCRETE BOX SHALL BE ASTM A–615 GRADE 60.

3) CONCRETE BLOCKS ARE TO BE PLACED UNDER METER FOR SUPPORT.

4) ALL FLANGED FITTINGS TO BE IRON, FACED AND DRILLED TO 125 POUND TEMPLATE TO BE INSTALLED WITH MANUFACTURER APPROVED GASKET, NUTS, WASHERS, AND BOLTS ACCORDING TO AWWA C–110 STANDARDS.

5) ALL MJ FITTINGS TO BE DUCTILE IRON, MEETING AWWA C–110 STANDARDS, FORD UFR 1400 (OR APPROVED EQUAL) AND GALVANIZED ALL–THREADED RODS (2 PER RESTRAINT).

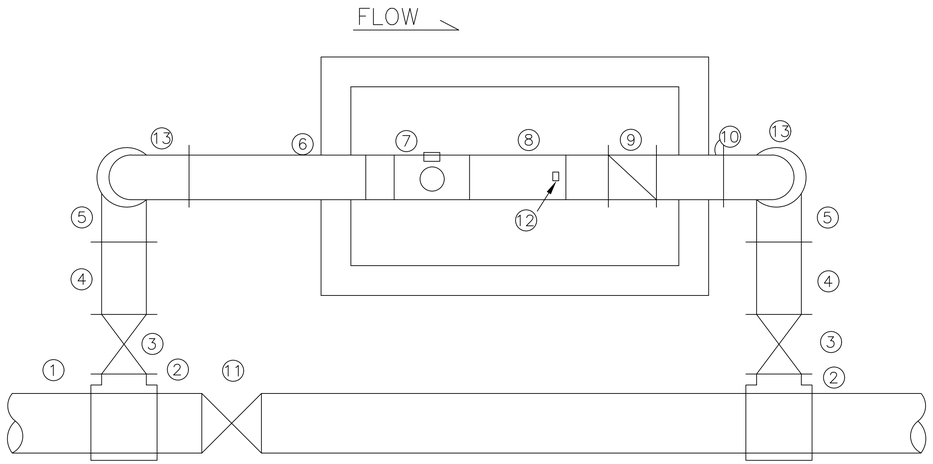
ALTERNATE: METER BOX MAY BE A STRONGWELL QUAZITE 4'X8'X4' MODEL PG4872DA48 WITH A CENTERED 8" HOLE TO BE LOCATED 18" FROM TOP ON EACH NARROW WALL OF BOX. LID TO BE 1/4" ALUMINUM TO FIT 2" OVER EACH SIDE WITH LIFTING HANDLES AND METER READER CAST IRON LID OPENING OVER METER.

LAFAYETTE UTILITIES SYSTEM
ENGINEERING DIVISION
LAFAYETTE, LA

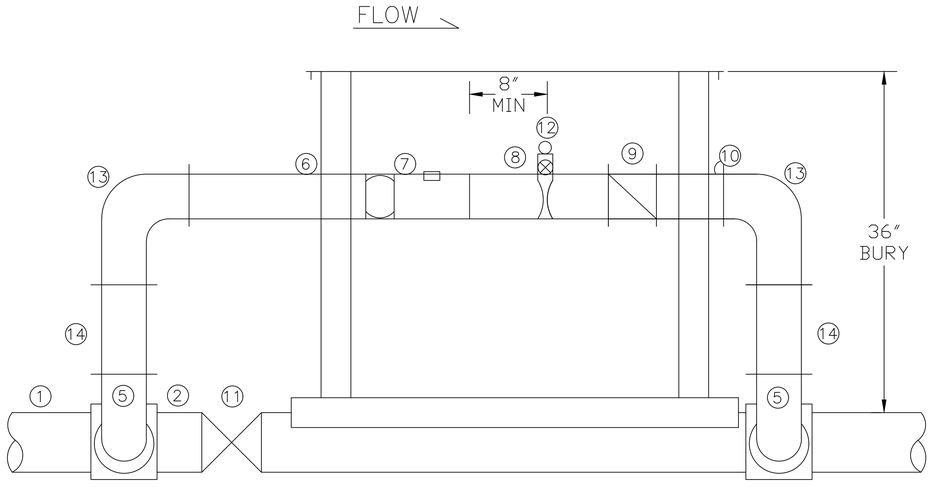
4" WHOLESALE WATER METER

DATE 1–12–2004	SCALE NTS
DESIGNED BY TS	DRAWN BY CJA
CHECKED BY	APPROVED
	DWG NO. 4"WHSLE METER
	SHEET OF

H:\Documents\Development Guidelines\Water–Wastewater Drawings\Water_wmeter4.dwg JKOURY Jul 07, 2026



PLAN



ELEVATION

1. WATER MAIN
2. 6" TAPPING SLEEVE
3. 6" TAPPING VALVE X MJ/VALVE BOX
4. 6" D.I. PIPE, 18" LENGTH
5. 6" MJ 90° BEND
6. 6" FLANGED CONNECTOR, 30" LENGTH
7. 6" STRAINER & METER–FLANGED (BRONZE)
8. 6" FLANGED CONNECTOR–12" LENGTH
9. 6" WEIGHTED SWING CHECK
10. 6" FLANGED CONNECTOR, 18" LENGTH
11. MJ VALVE AND VALVE BOX
12. 6"X2" SERVICE SADDLE/2" GATE VALVE/REDUCER TO 1/4" FEMALE THREAD/0–100psi LIQUID FILLED GAGE
13. 6" 90° BEND, MJ X FLANGE
14. 6" D.I. PIPE, 12" LENGTH (OR AS REQUIRED FOR PROPER BURY).

METER SPECIFICATIONS

6" TURBO METER WITH BRONZE MAINCASE, AWWA125 POUND FLANGES, SEALED 100 GALLON ODOMETER TYPE REGISTER, MAGNETICALLY DRIVEN, 150 PSI WORKING PRESSURE FOR 15–2500 GPM RANGE. METER TO MECH. AWWA C701 STANDARDS. BADGER RECORD ALL TURBO 1000 OR APPROVED EQUAL.

STRAINER SPECIFICATIONS

6" BRONZE DUAL FLANGE PLATE STRAINERS, AWWA 125 POUND ROUND FLANGES, WITH REMOVABLE HOUSING COVER, STAINLESS STEEL STRAINER SCREEN AND HOUSING BOLTS, FOR 150 PSI WORKING PRESSURE. BADGER BRONZE PLATE STRAINER OR APPROVED EQUAL.

NOTES:

1) CONCRETE FOR METER BOX SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 4000 PSI.

2) REINFORCING STEEL FOR THE CONCRETE BOX SHALL BE ASTM A–615 GRADE 60.

3) CONCRETE BLOCKS ARE TO BE PLACED UNDER METER FOR SUPPORT.

4) ALL FLANGED FITTINGS TO BE IRON, FACED AND DRILLED TO 125 POUND TEMPLATE TO BE INSTALLED WITH MANUFACTURER APPROVED GASKET, NUTS, WASHERS, AND BOLTS ACCORDING TO AWWA C–110 STANDARDS.

5) ALL MJ FITTINGS TO BE DUCTILE IRON, MEETING AWWA C–110 STANDARDS, FORD UFR 1400 (OR APPROVED EQUAL) AND GALVANIZED ALL–THREADED RODS (2 PER RESTRAINT).

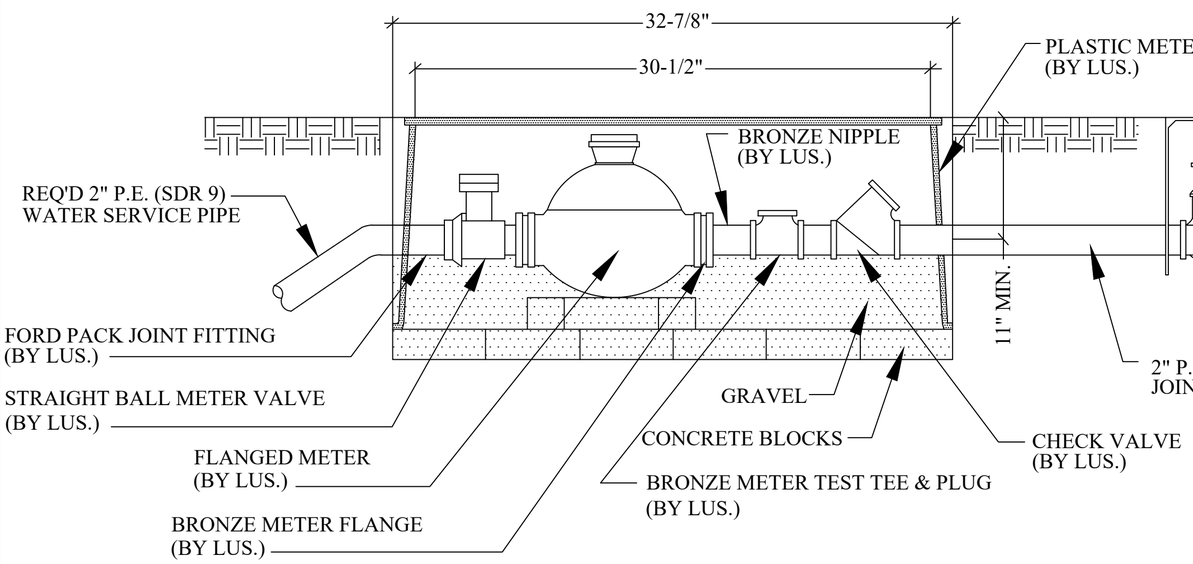
ALTERNATE: METER BOX MAY BE A STRONGWELL QUAZITE 4'X8'X4' MODEL PG4872DA48 WITH A CENTERED 8" HOLE TO BE LOCATED 18" FROM TOP ON EACH NARROW WALL OF BOX. LID TO BE 1/4" ALUMINUM TO FIT 2" OVER EACH SIDE WITH LIFTING HANDLES AND METER READER CAST IRON LID OPENING OVER METER.

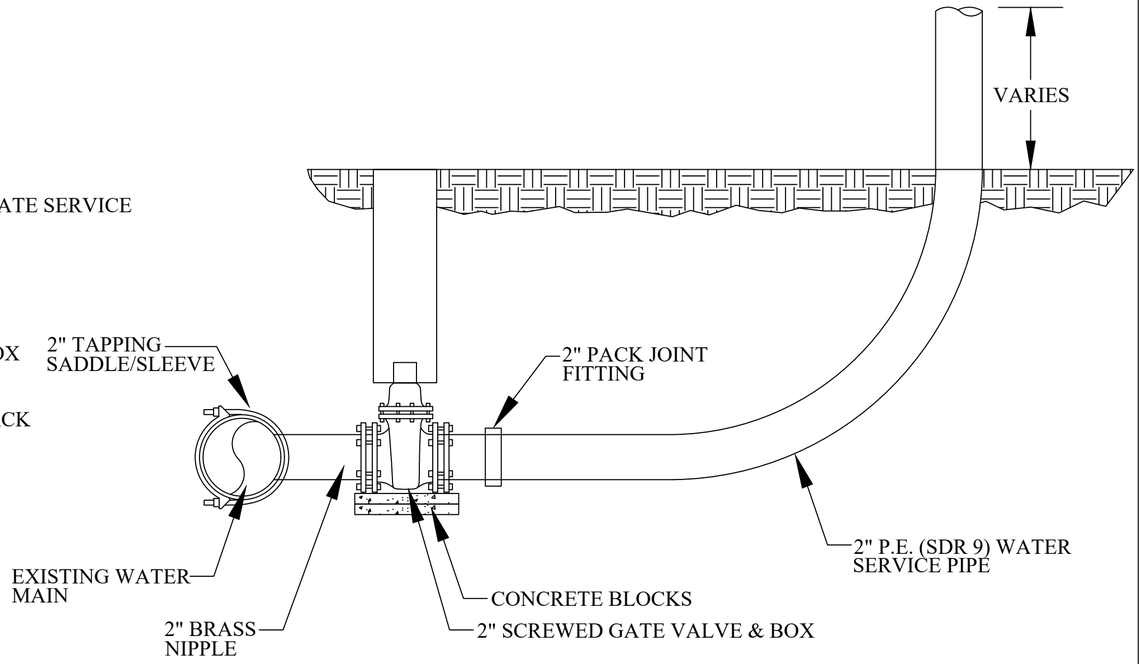
LAFAYETTE UTILITIES SYSTEM
ENGINEERING DIVISION
LAFAYETTE, LA

6" WHOLESALE WATER METER

DATE 1–12–2004	SCALE NTS
DESIGNED BY TS	DRAWN BY CJA
CHECKED BY	APPROVED
	DWG NO. 6" WHSLE METER
	SHEET OF

H:\Documents\Development Guidelines\Water-Wastewater Drawings\Water\wmeter6.dwg JKOURY Jul 07, 2026





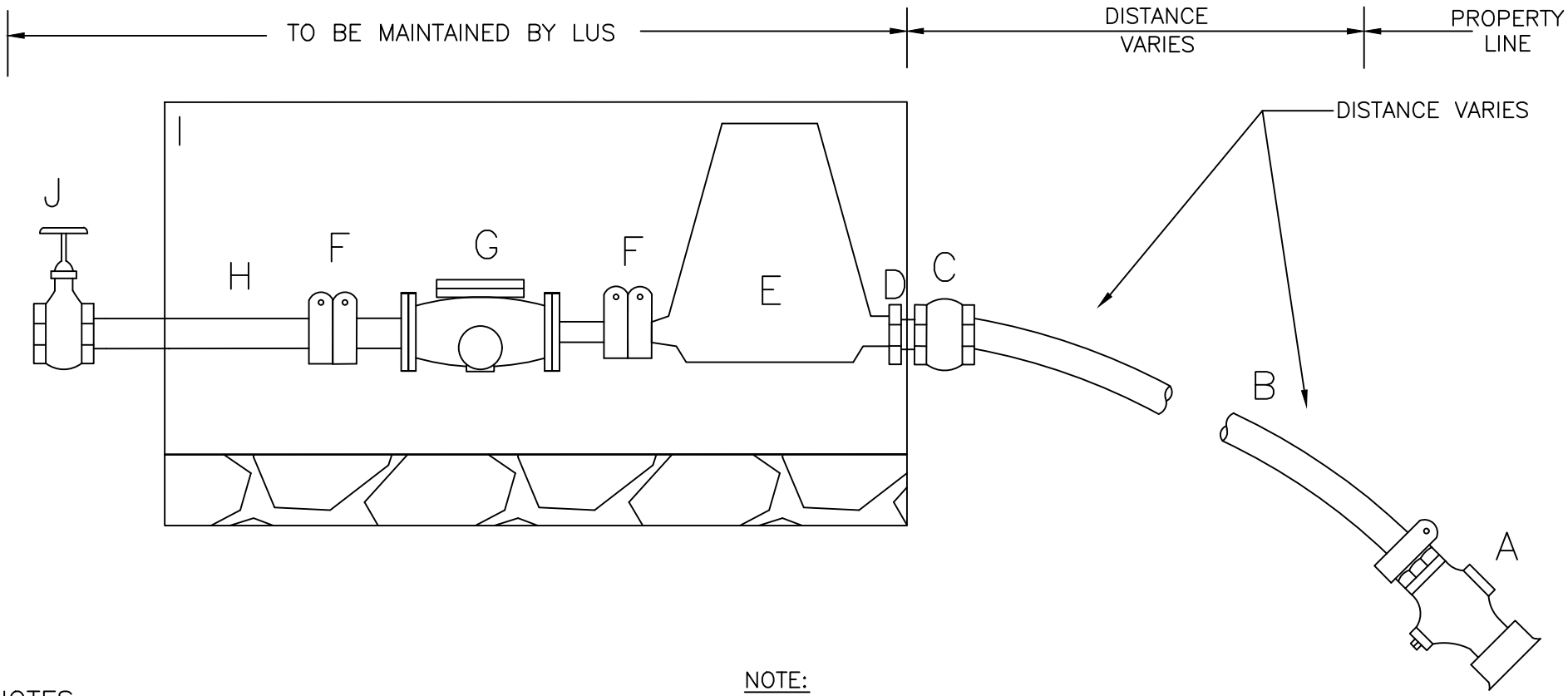
NOTES:

1. CONTRACTOR TO LEAVE WATER SERVICE PIPE EXPOSED ABOVE GROUND, WITH ENOUGH PIPE TO MAKE CONNECTION TO FITTING.
2. CONTRACTOR RESPONSIBLE TO TAP LUS WATER MAIN, 2" GATE VALVE, BOX, AND 2" P.E. (SDR 9) WATER MAIN, AS PER LUS SPECIFICATIONS.

1–1/2" & 2"
WATER METER INSTALLATION

LAFAYETTE UTILITIES SYSTEM

DATE: 6–24–2015	SCALE: N.T.S.
DRAWN BY: CJA	APPROVED: SD
CHECKED: SD	DWG. NO.: 2WMETERINSTALLATION



NOTES:

- x A – 2.5" HYDRANT X 1.5" NPT SWIVEL FITTING TO HYDRANT PUMPER
- x B – 1.5" SS BRAIDED HOSE IN HYDRANT CONFIGURATION WITH A 2.5" SWIVEL ON EACH SIDE
- x C – 1.5" HYDRANT MALE ON A FLANGE
- x D – 1.5" METER FLANGE
- x E – 1.5" METER (INSTALLED BY THE WATER DIVISION)
- x F – 1.5" METER FLANGE
- x G – 1.5" RP BACKFLOW PREVENTER
- x H – 8" GALVANIZED OR BRASS PIPE
- x I – LUS FABRICATED METER BOX
- x J – CUSTOMER'S VALVE

NOTE:

INSERTS MUST BE USED ON ALL TUBING CONNECTIONS.
NO DIRECT PAYMENT. (FORD #52)

REVISED 10–31–2025
REVISED 5–30–2025
REVISED 6–11–2014
REVISED 9–24–91

TEMPORARY CONSTRUCTION WATER METER DETAIL

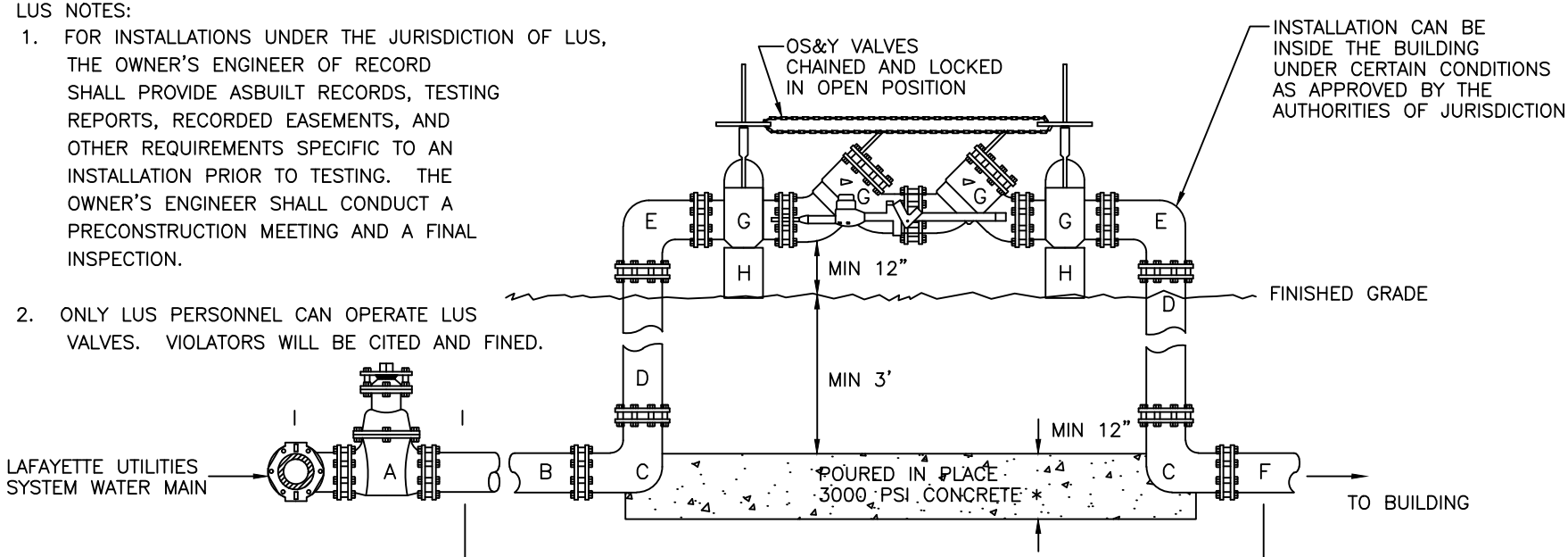
LAFAYETTE UTILITIES SYSTEM

DATE: 10–31–25	SCALE: N.T.S.
DRAWN BY: JPK	APPROVED:
CHECKED: TJC	DWG. NO.: TempConstMtr

LUS NOTES:

1. FOR INSTALLATIONS UNDER THE JURISDICTION OF LUS, THE OWNER'S ENGINEER OF RECORD SHALL PROVIDE ASBUILT RECORDS, TESTING REPORTS, RECORDED EASEMENTS, AND OTHER REQUIREMENTS SPECIFIC TO AN INSTALLATION PRIOR TO TESTING. THE OWNER'S ENGINEER SHALL CONDUCT A PRECONSTRUCTION MEETING AND A FINAL INSPECTION.

2. ONLY LUS PERSONNEL CAN OPERATE LUS VALVES. VIOLATORS WILL BE CITED AND FINED.



LEGEND *

A – MJ RESILIENT GATE VALVE & BOX (INSTALLATION VARIES): TAPPING VALVE/SLEEVE–M&H 974/MUELLER H615); GATE VALVE/ANCHOR TEE–M&H (AWWA C–509) /MJ DUCTILE IRON (350 PSI) AWWA C–110/C–153; BOX–TYLER 5–1/4.

B – AWWA CLASS 150, C–900, SDR 18, PVC PIPE

C – 90° MJ DUCTILE IRON (350 PSI) FITTING (AWWA C–110/C–153) WITH RETAINER GLANDS (FORD UFR 1500/UFR 1400).

D – DUCTILE IRON FLANGED BY PLAIN END PIPE (AWWA C–151).

E – 90° FLANGED DUCTILE IRON (350 PSI) FITTING (AWWA C–110/C–153).

F – AWWA CLASS 200, C–900, PVC PIPE.

G – WATTS 709 DCDA ASSEMBLY/AMES 3000 SS/FEBCO 856, WITH BY–PASS METER, OS&Y VALVES, AND BY PASS DOUBLE CHECK VALVE.

H – CONCRETE SUPPORT.

I – ALL FITTINGS/JOINTS/VALVES/APPURTENANCES MUST BE RESTRAINED. TWO VALVES WILL BE REQUIRED WHERE THE EXISTING LUS MAIN IS EXTENDED (IE: PUBLIC ROADWAY CROSSING).

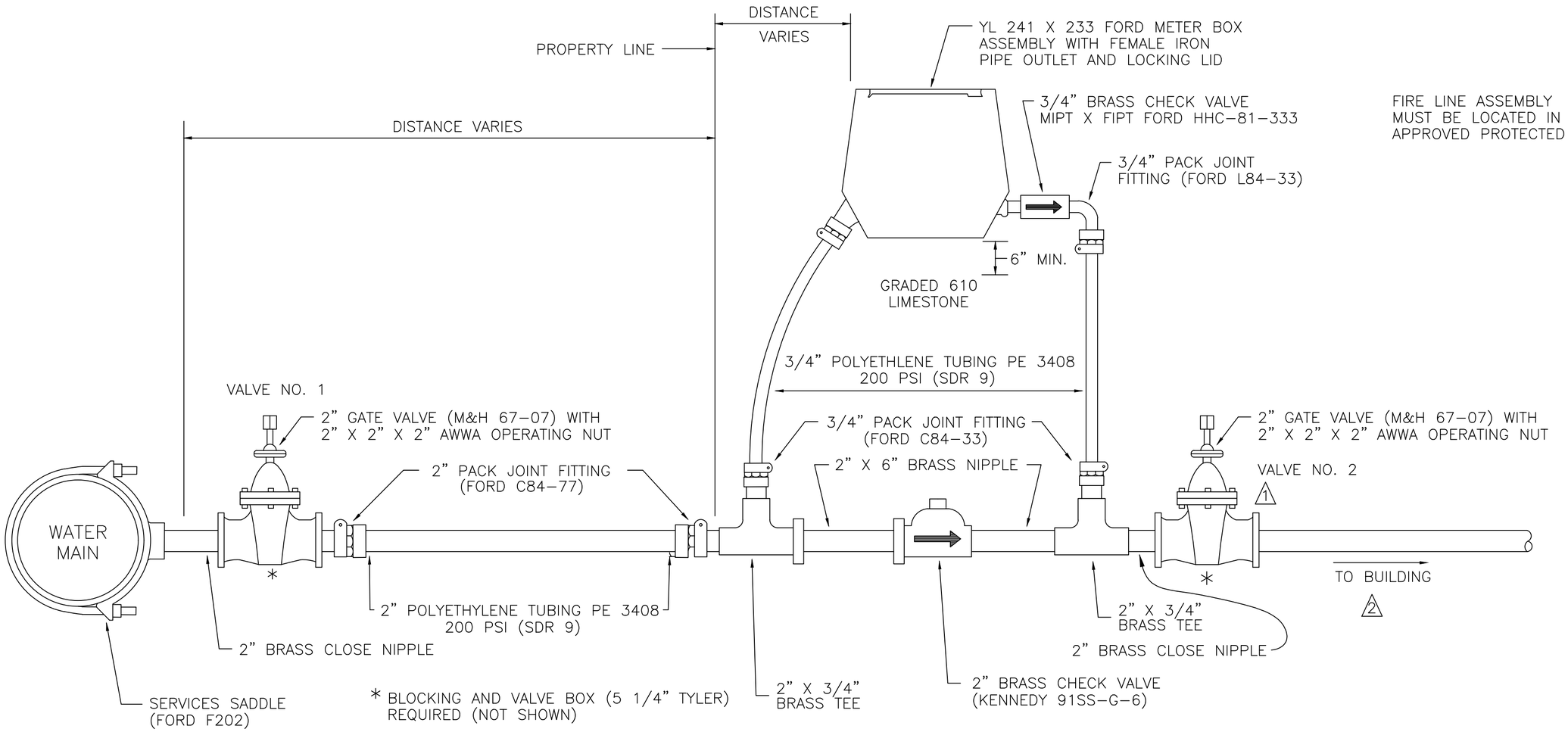
* OR PRIOR APPROVED BY AUTHORITIES OF JURISDICTION.

PROVIDE FREEZE PROTECTION ON ALL INSTALLATIONS (OUTSIDE & INSIDE) AT THE DIRECTION OF THE STATE OF LOUISIANA FIRE MARSHALL.

3"–10"
FIRE LINE DOUBLE CHECK DETECTOR ASSEMBLY

LAFAYETTE UTILITIES SYSTEM

DATE: 2–19–02	SCALE: NTS
DRAWN BY: CJA	APPROVED:
CHECKED:	DWG. NO.: F.L. CHK



FIRE LINE ASSEMBLY
MUST BE LOCATED IN AN
APPROVED PROTECTED AREA

REQUIREMENTS

1. FULL SIZE FLUSHING / TESTING RISER INSTALLED ADJACENT TO VALVE NO. 2. TESTING SHALL COMMENCE WHEN ENGINEER OF RECORD SUBMITS WRITTEN VERIFICATION THAT CONSTRUCTION WAS BUILT TO LUS STANDARDS, ASBUILT RECORD IS SUBMITTED. RECORDED PLAT OF SURVEY CONTAINING ANY NECESSARY EASEMENT IS SUBMITTED, AND ALL OTHER SPECIFIC PROJECT REQUIREMENTS HAVE BEEN COMPLETED.

2. ALL UNDER GROUND CONSTRUCTION TO THE BUILDING MUST CONFORM TO NFPA STANDARDS AND APPROVED BY THE CITY OF LAFAYETTE, FIRE PREVENTION DIVISION.

NOTES:

1) INSERTS MUST BE USED ON ALL TUBING CONNECTIONS. (FORD #51/#55)
2) SUBSTITUTE MATERIALS MUST BE PRIOR APPROVED.
3) TRACING WIRE REQUIRED ON 2" P.E. TUBING.

NO VALVE SHALL BE OPERATED TO ALLOW WATER TO BE TRANSMITTED FROM A LAFAYETTE UTILITIES SYSTEM SOURCE WITHOUT THE DIRECT SUPERVISION OF LUS. VIOLATORS WILL BE PROSECUTED.

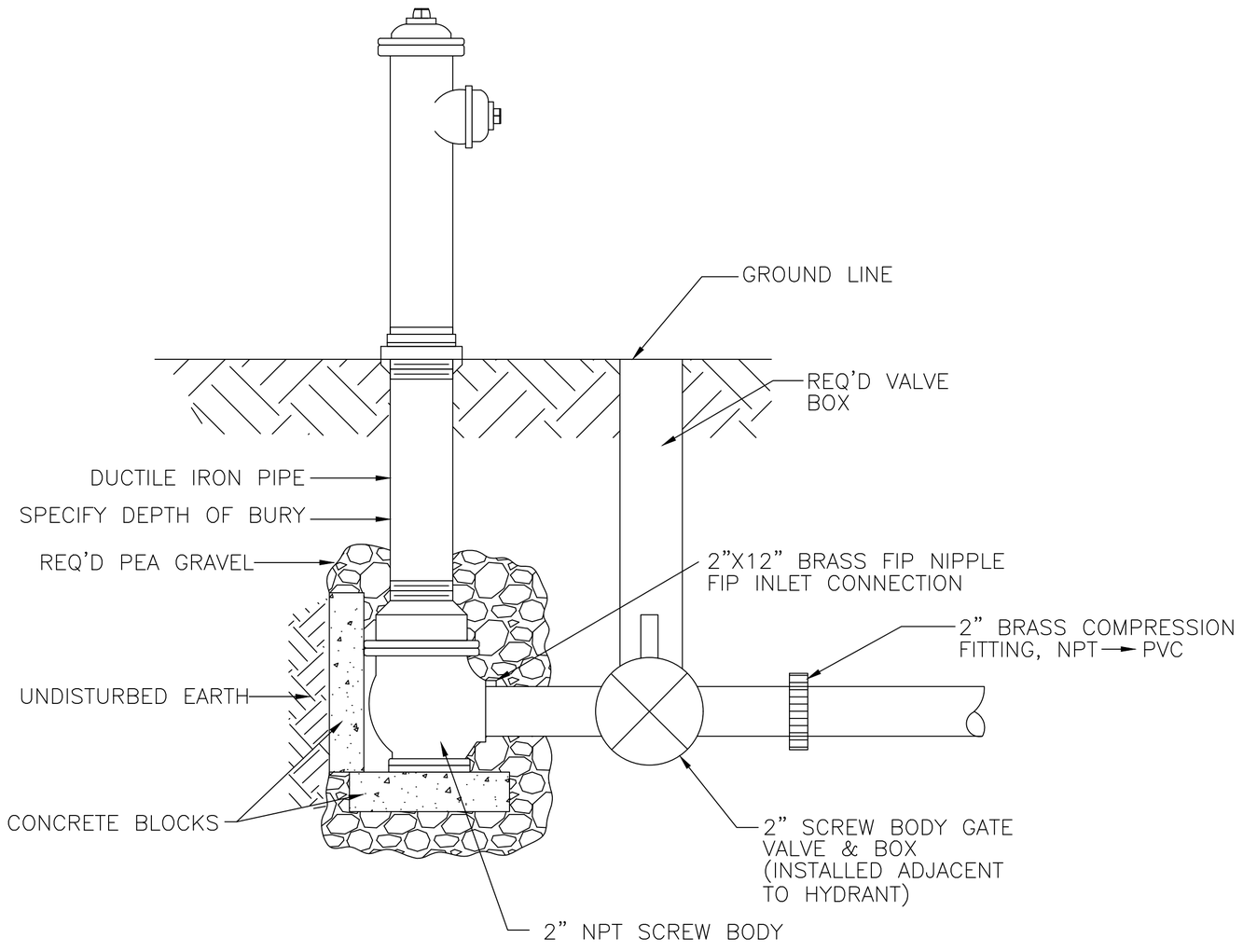
GENERAL
THE ENGINEER OF RECORD SHALL CONDUCT A PRECONSTRUCTION MEETING WITH THE INSTALLING CONTRACTOR AND LUS.
THE ENGINEER OF RECORD SHALL CONDUCT A FINAL INSPECTION UPON THE COMPLETION OF ALL PAVING / LANDSCAPING.

TYPICAL 2" FIRE LINE LEAK DETECTOR INSTALLATION

LAFAYETTE UTILITIES SYSTEM

DATE: 4-9-98	SCALE: NTS
DRAWN BY: DLT	APPROVED:
CHECKED:	DWG. NO.: 2"FLCHK

ECLIPSE NO. 2 POST HYDRANT



NOTES:

FLUSHING HYDRANTS SHALL BE ECLIPSE NO. 2 POST HYDRANTS NON FREEZING AS MANUFACTURED BY JOHN C. KUPFERLE FOUNDRY CO., ST. LOUIS, MO.

HYDRANTS SHALL BE SELF-DRAINING, COMPRESSION TYPE WITH 2-3/16" MAIN VALVE OPENING. INLET CONNECTION SHALL BE 2" NPT. OUTLET SHALL BE 2" NIP.

HYDRANTS SHALL HAVE A 2" DUCTILE IRON PIPE RISER WITH A CAST IRON STOCK TOP, AND NON-TURNING OPERATION ROD. PRINCIPAL INTERIOR OPERATING PARTS SHALL BE BRASS AND BE REMOVABLE WITHOUT EXCAVATING THE HYDRANT.

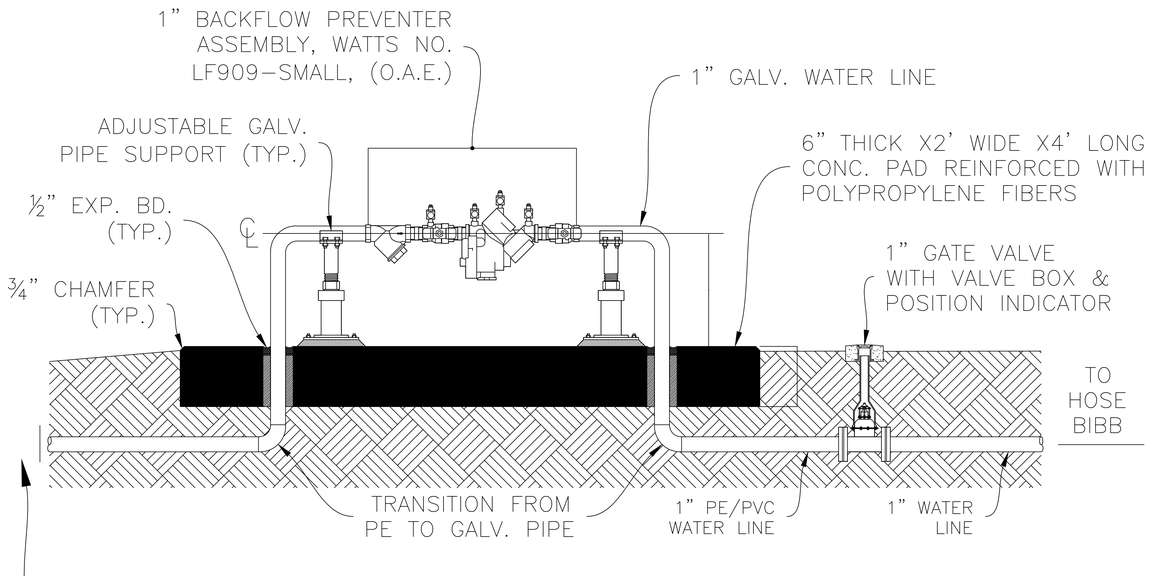
RECOMMENDATIONS OF THE AWWA SHOULD BE FOLLOWED WHEN INSTALLING THE HYDRANT.

TYPICAL 2" FLUSHING HYDRANT DETAIL

LAFAYETTE UTILITIES SYSTEM

DATE: 2-19-14	SCALE: NTS
DRAWN BY: CJA	APPROVED:
CHECKED: BG	DWG. NO.: 2"FLHYD.

NOTE:
INSULATE ALL ABOVE GROUND WATER LINES.

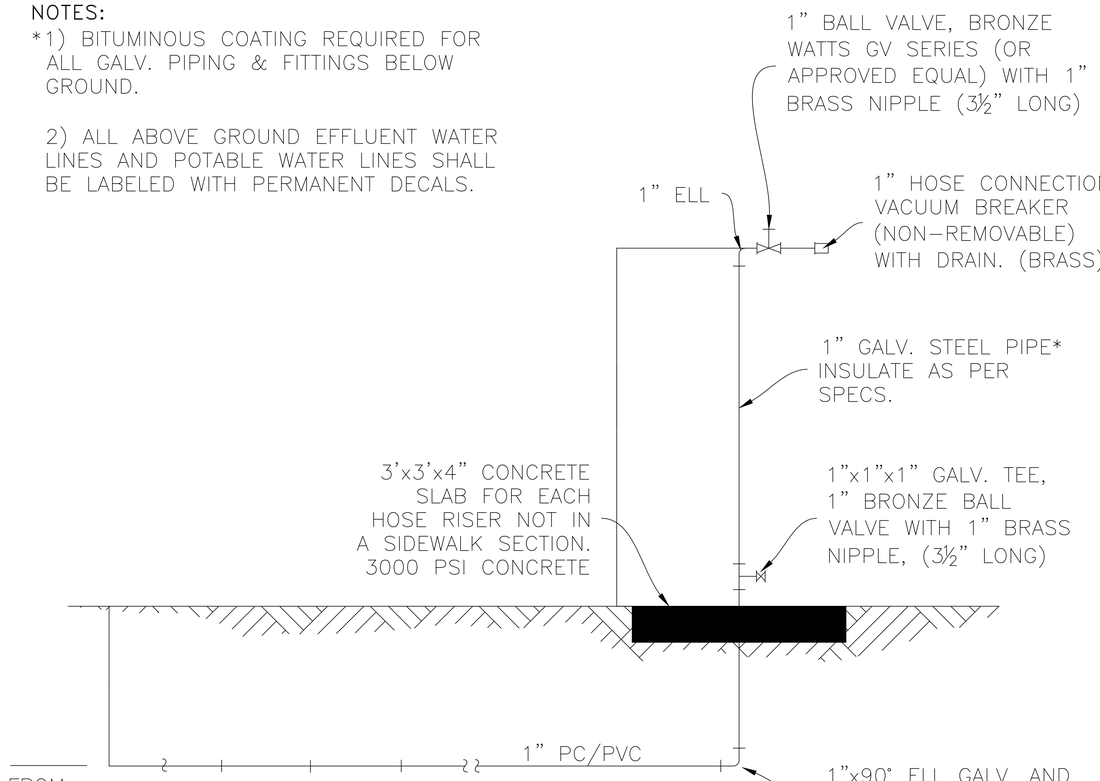


1" BACKFLOW PREVENTER

N.T.S.

NOTES:
*1) BITUMINOUS COATING REQUIRED FOR ALL GALV. PIPING & FITTINGS BELOW GROUND.

2) ALL ABOVE GROUND EFFLUENT WATER LINES AND POTABLE WATER LINES SHALL BE LABELED WITH PERMANENT DECALS.



1" HOSE BIBB ABOVE GROUND

N.T.S.

LAFAYETTE UTILITIES SYSTEM
ENGINEERING DIVISION
LAFAYETTE, LA

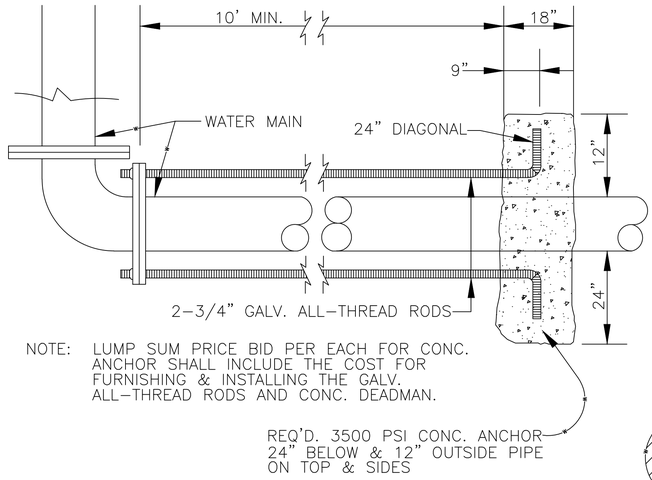
BACKFLOW PREVENTER ASSEMBLY & HOSE BIBB DETAIL

DATE 4/2/2026	SCALE NTS
DESIGNED BY	DRAWN BY JPK
CHECKED BY BPE	APPROVED BPE
	DWG NO. 1BkflwPrevHsBb
	SHEET 1 OF 1

H:\Documents\Development Guidelines\Water-Wastewater Drawings\Water\1BkflwPrevHsBb.dwg JKOURY Jul 07, 2026

GENERAL NOTES:

1. WHERE SHOWN ON PLANS, NEW WATER MAINS TO BE INSTALLED BY JACK OR BORE WILL BE INSTALLED BELOW EXISTING UTILITIES. THIS DEPTH WILL BE DETERMINED IN FIELD AFTER VERIFICATION OF DEPTH OF EXISTING UTILITIES. CONTRACTOR NEEDS TO TAKE THIS INTO CONSIDERATION WHEN BIDDING AS THERE WILL BE NO ADDITIONAL COMPENSATION FOR EXTRA DEPTH.
2. WORK AREAS MUST BE KEPT NEAT AND FREE OF ALL DEBRIS.
3. BORE UNDER ALL ROADWAYS, HARD SURFACE DRIVEWAYS, AND AS DIRECTED BY PROJECT MANAGER.
4. MECHANICALLY TAMP ALL EXCAVATIONS BY A TRENCH COMPACTOR (IE; WACKER–A–PACKER, RAMMAX) IN ACCORDANCE TO CODE OF ORDINANCES CHAPTER 78, ARTICLE III, DIVISION 2.
5. UTILITIES SHOWN ON THE PLANS ARE APPROXIMATE AND DO NOT INCLUDE SERVICE LOCATIONS. THERE IS NO EXPRESSED OR IMPLIED GUARANTEE AS TO THE ACCURACY OF THE VARIOUS UTILITIES OR OMISSIONS. FINAL LOCATIONS OF ALL WATER LINES AND APPURTENANCES SHALL BE DETERMINED IN THE FIELD BY THE PROJECT MANAGER UPON CONTRACTORS VERIFICATION OF LOCATION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS NOT TO DISRUPT OR DAMAGE EXISTING UTILITIES.
6. LOCATION OF ALL BORE PITS WILL BE DETERMINED IN FIELD BY PROJECT MANAGER.
7. PROJECT MANAGER TO DETERMINE ALL METHODS OF RESTRAINT.
8. ALL STREETS MUST BE MAINTAINED BY WASHING AND REMOVING RESIDUE DAILY. (NO DIRECT PAY)
9. ON RAINY DAYS, CONTRACTOR MUST VISIT SITE AND WASH ROADWAYS AND DRIVEWAYS OF ANY RESIDUE. (NO DIRECT PAY)
10. CONTRACTOR MUST BE CONTACTABLE ON A 24 HOUR BASIS.
11. THE TRUE DEGREE OF CURVATURE OF BENDS WILL BE DETERMINED IN THE FIELD TO BEST MEET THE CONDITIONS.
12. MAINTAIN TRAFFIC CONTROL ACCORDING TO "MUTCD" TRAFFIC CONTROL BOOK (LATEST REVISION) AND STATE OF LOUISIANA DOTD REQUIREMENTS. (NO DIRECT PAY) ANY TRAFFIC SIGNS DAMAGED WILL BE REPLACED BY THE CONTRACTOR. (NO DIRECT PAY) TRAFFIC ENGINEERING SHALL BE INVITED TO THE PRE–CONSTRUCTION MEETING.
13. MAINTAIN 3' OF COVER BELOW DRAINAGE INVERTS FOR ALL MAINLINE INSTALLATIONS.
14. DO NOT DRIVE OR PLACE ANY EQUIPMENT/MATERIAL ON DRIVEWAYS.
15. STOP SIGNS AND MAILBOXES MUST BE TUNNELED OR REMOVED AND REPLACED AT NO COST TO OWNER. IF REMOVED, THEY MUST BE REPLACED THE SAME DAY.
16. CONTRACTOR TO SHORE AND BRACE POWER POLES ADJACENT TO THE PROPOSED WATER LINE. (NO DIRECT PAY)
17. THE CONTRACTOR SHALL ABIDE BY THE LAFAYETTE CONSOLIDATED GOVERNMENT'S SUBSTANCE ABUSE POLICY. DRUG OR ALCOHOL USE WILL NOT BE TOLERATED.
18. CONTRACTOR SHALL PROVIDE A DIGITAL MPEG VIDEO OF THE PROJECT TO PRODUCE A RECORD OF EXISTING CONDITIONS PRIOR TO ANY WORK BEING PERFORMED. NO WORK WILL BE ALLOWED UNTIL THE PROJECT MANAGER REVIEWS THE VIDEO. EACH ADDRESS MUST BE IDENTIFIED BY AUDIO DESCRIPTION AND/OR A VIEW OF PHYSICAL ADDRESS. (NO DIRECT PAY)
19. NO PACK JOINT FITTINGS UNDER ROAD OR OTHER PERMANENT STRUCTURE SHALL BE INSTALLED. A CONTINUOUS SERVICE TUBING IS REQUIRED FROM SERVICE TAP TO METER BOX.
20. MAINTAIN DRAINAGE THROUGHOUT JOB. NO VALVES, FIRE HYDRANTS OR OTHER APPURTENANCES ALLOWED IN OR INTERFERE WITH DRAINAGE SYSTEM. CONTRACTOR WILL BE REQUIRED TO RESHAPE DITCHES TO PUBLIC WORKS APPROVAL.
21. CONTRACTOR SHALL REMOVE ALL EXISTING METER BOXES AND INSTALL NEW METER BOX WITH CUSTOMER HAND CUT OFF VALVE & BOX.
22. PUBLIC WORKS RIGHT OF WAY PERMIT (FORM #320) MUST BE COMPLETED BY CONTRACTOR. COPY OF PERMIT MUST BE KEPT ON SITE DURING CONSTRUCTION.
23. AREA WHERE DRAINAGE CULVERT REMOVAL IS NECESSARY FOR WATER MAIN INSTALLATION MUST BE REPLACED WITH NEW CULVERTS, AS PER PUBLIC WORKS APPROVED INSTALLATION METHODS (RAMNECK, FILTER CLOTH, BACKFILLING). (SEE CONCRETE COLLAR DETAIL BELOW)
24. WATER MAINS CROSSING SEWERS SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF 1.5' BETWEEN THE OUTSIDE OF THE WATER MAIN AND THE OUTSIDE OF THE SEWER. (SEE "TYPICAL SEWER CROSSING DETAIL") MAINTAIN A HORIZONTAL DISTANCE OF 6' BETWEEN WATER AND SEWER.

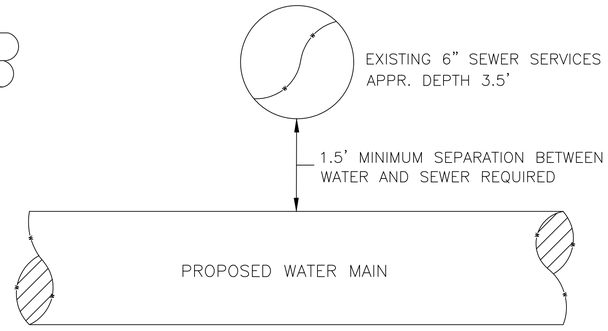


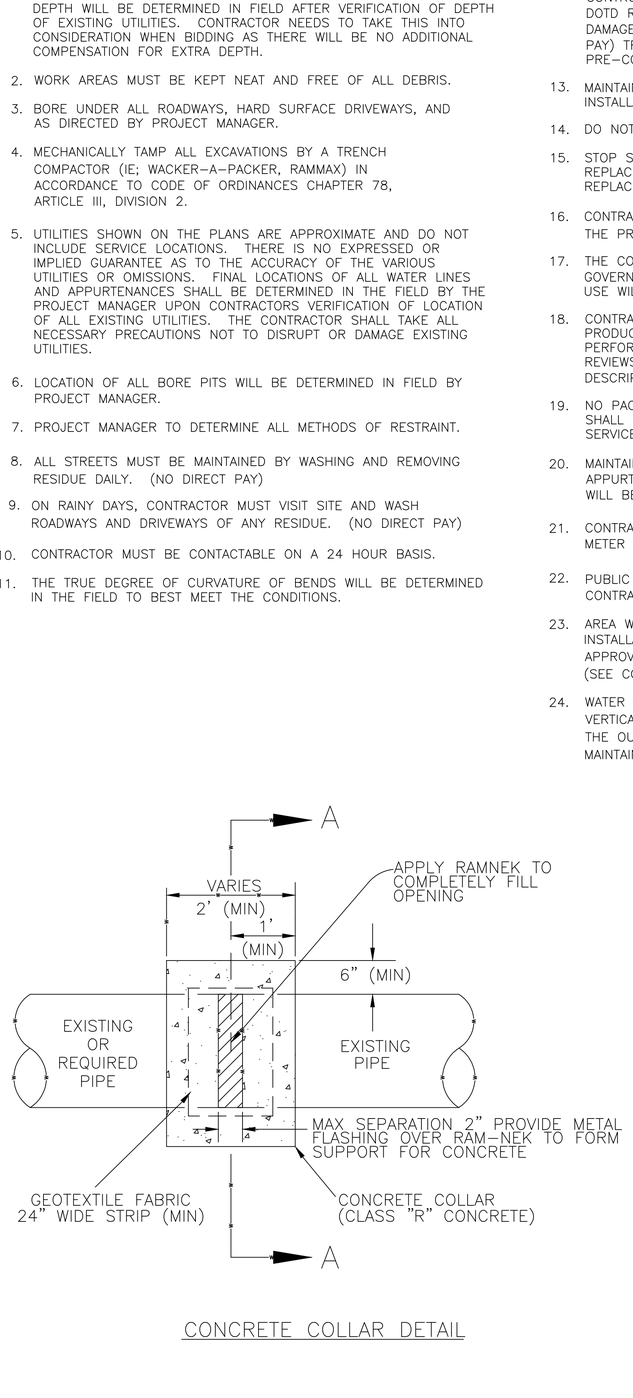
NOTE: LUMP SUM PRICE BID PER EACH FOR CONC. ANCHOR SHALL INCLUDE THE COST FOR FURNISHING & INSTALLING THE GALV. ALL–THREAD RODS AND CONC. DEADMAN.

DETAIL OF WATER MAIN CONC. DEADMAN

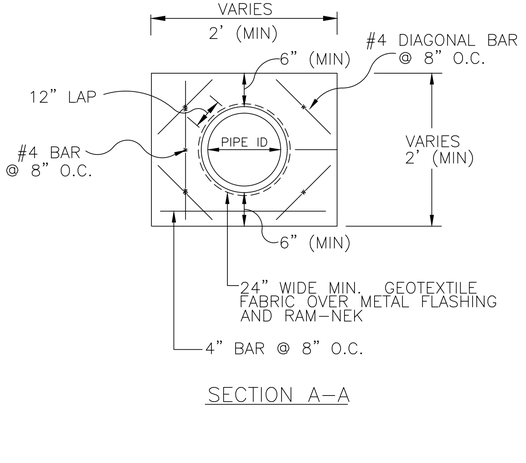
N.T.S.

TYPICAL SEWER SERVICE CROSSING DETAIL (NTS)

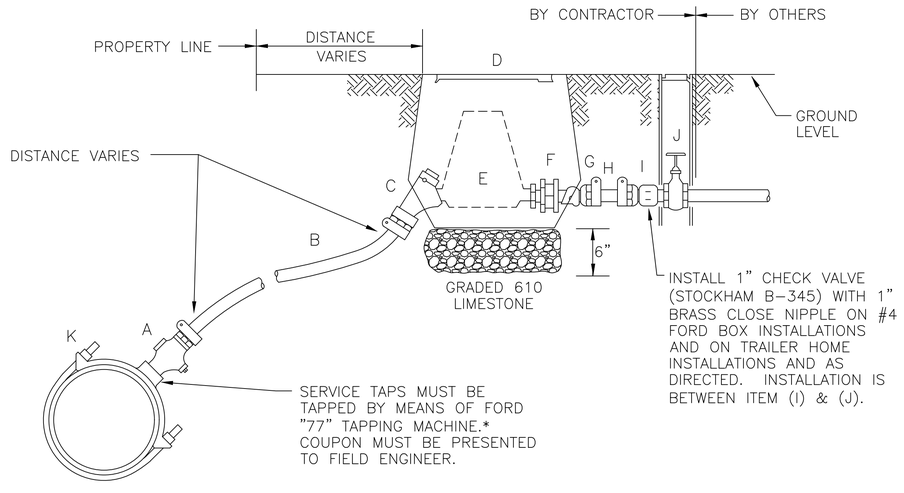




CONCRETE COLLAR DETAIL



SECTION A–A



NOTES:

- x A – 1" PACK JOINT CORPORATION (FORD F1000)*
- x B – 1" HIGH DENSITY POLYETHYLENE PE3408 160 PSI (SELL CLASS 355434–C)
- x C – 1" YOKEBOX VALVE – PACK JOINT
- x D – FORD YOKE BOX – YL244–244–T–NL (1" X 1")*. 1" METER REQUIRES NO.4 FORD BOX.*
- E – 5/8" X 3/4" METER (RECONNECT EXISTING METER)
- x F – 5/8" X 3/4" EXPANSION CONNECTION
- x G – 1" PACK JOINT OUTLET
- x H – 1" PLASTIC PIGTAIL 18" LONG 1" HIGH DENSITY POLYETHYLENE PE 3408 160PSI (SELL CLASS 355434–C)
- x I – 1" PACK JOINT FITTING TO PIPE THREAD (FORD C84–33)*
- x J – CUSTOMER'S VALVE AND BOX
- x K – SERVICE SADDLE CLAMPS – FORD DOUBLE STRAP MODEL (F–202)*

x THESE COME AS ONE COMPOSITE UNIT
* OR APPROVED EQUAL

NOTE:

INSERTS MUST BE USED ON ALL TUBING CONNECTIONS. NO DIRECT PAYMENT. (FORD #52)

TYPE 'B' SERVICE CONNECTION

LAFAYETTE UTILITIES SYSTEM
ENGINEERING DIVISION
LAFAYETTE, LA

GENERAL NOTES

DATE 7–7–2020		SCALE 1"=20'	
DESIGNED BY BPE		DRAWN BY BPE	
CHECKED BY BG		APPROVED	
		DWG NO.	
		SHEET	OF

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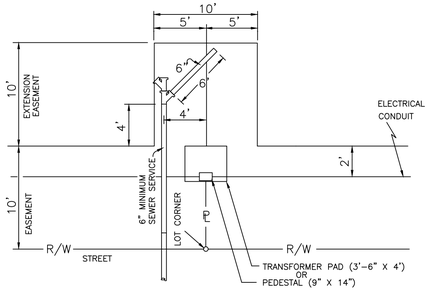
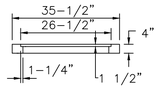


SEWER SERVICE IN UTILITIES EASEMENT



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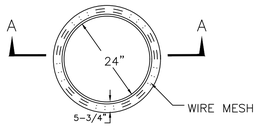
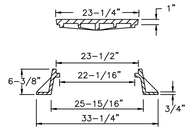


CONCRETE ADJUSTING DONUT

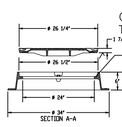
COVER–EJ
TYPE V-1501
(OAE)



RING–EJ
TYPE V-1503
(OAE)

(STANDARD)

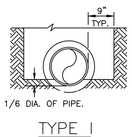
CAMPRESSION ASSEMBLY–EJ
TYPE–V–2339 (OAE)



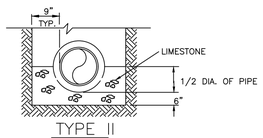
(WATER TIGHT)

MANHOLE FRAME AND COVER

NOTE: MANHOLES LOCATED OUTSIDE OF THE PAVED RIGHT–OF–WAY AND OUTSIDE OF OTHER PAVED SURFACES, SHALL USE TYPE V–1503 W/ V–1501. MANHOLES LOCATED INSIDE OF THE PAVED RIGHT–OF–WAY SURFACES OR INSIDE OTHER PAVED SURFACES, SHALL USE TYPE V–2339 CAMPRESSION ASSEMBLY

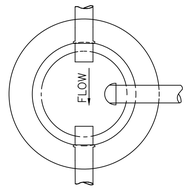


TYPE I

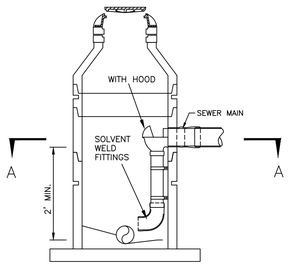


TYPE II

TYPICAL SEWER FOUNDATIONS



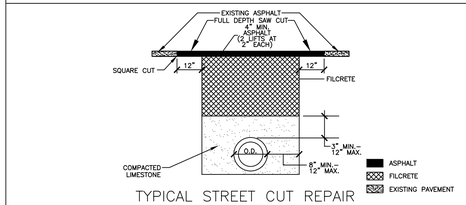
SECTION A–A



NOTE: DROP TO BE THE SAME SIZE AS THE SEWER MAIN.

TYPICAL MAIN LINE DROP MANHOLE

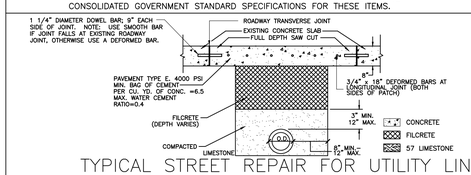
NOTE: DROP SYSTEM SHALL BE RELINER INSIDE DROP SYSTEM OR APPROVED EQUAL.



TYPICAL STREET CUT REPAIR FOR ASPHALT STREETS

NOTES:

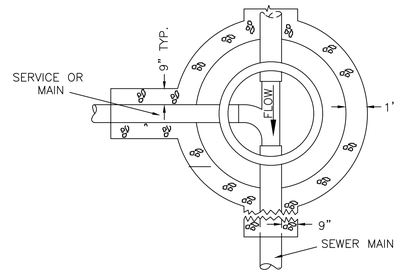
1) HOT MIX ASPHALT TO BE COMPACTED TO 92% DENSITY MINIMUM. FOR A MINIMUM OF FOUR INCHES (4") THICK, CONSTRUCTED IN TWO (2) – TWO INCH (2") LIFTS.
2) FILCRETE MIX SHALL MEET LAFAYETTE CONSOLIDATED GOVERNMENT STANDARD.
3) 57 LIMESTONE MUST BE COMPACTED IN 12" LIFTS TO 95% DENSITY FOR EACH LIFT. A VIBRATORY COMPACTOR WILL BE REQUIRED.
4) TACK COAT TO BE APPLIED PRIOR TO ASPHALT LAYING.
5) ALL PAVEMENT STRIPING AND/OR RAISED PAVEMENT REFLECTORS DESTROYED SHALL BE REPLACED. MATERIAL AND INSTALLATIONS SHALL MEET LAFAYETTE CONSOLIDATED GOVERNMENT STANDARD SPECIFICATIONS FOR THESE ITEMS.



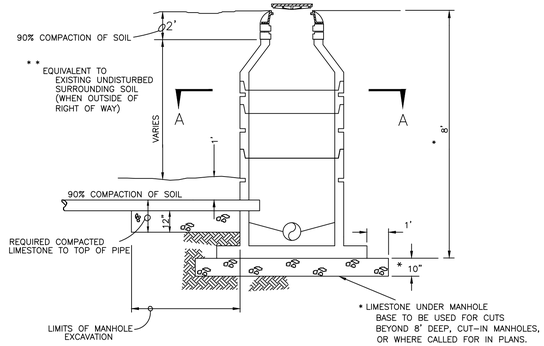
TYPICAL STREET REPAIR FOR UTILITY LINE REHABILITATION FOR CONCRETE STREETS

NOTES:

1) EXISTING CONCRETE MUST BE DRILLED & DOWELED BEFORE NEW CONCRETE IS POURED. DOWEL BARS AT TRANSVERSE JOINTS MUST BE 1 1/4" IN DIAMETER, 18" LONG WITH 9" EPOXYED INTO EXISTING CONCRETE SPACED AT 12" ON CENTER. USE SMOOTH DOWEL BARS AT EXISTING ROADWAY JOINT ONLY. OTHERWISE USE DEFORMED DOWEL BARS. DOWEL BARS AT LONGITUDINAL JOINT MUST BE 3/4" IN DIAMETER DEFORMED BARS, 18" LONG WITH 9" EPOXYED INTO EXISTING CONCRETE. MUST BE 18" ON CENTER ALONG LONGITUDINAL SIDES OF STREET CUT PATCH.
2) CONCRETE TEST CYLINDERS SHALL BE MADE BY THE CONTRACTOR OR TESTING LABORATORY AT CONTRACTOR'S EXPENSE, AND BREAK RESULTS SHALL BE FORWARDED TO LAFAYETTE CONSOLIDATED GOVERNMENT, PUBLIC WORKS DEPARTMENT. TRAFFIC MAY BE PUT ON CONCRETE PATCH WHEN PSI STRENGTH IS REACHED.
3) A BROOM FINISH IS REQUIRED AND CONCRETE CURED BY AN APPROVED METHOD.
4) FILCRETE MIX SHALL MEET LAFAYETTE CONSOLIDATED GOVERNMENT STANDARDS AND SHALL BE POURED FLUSH WITH EXISTING CONCRETE ROADWAY SURFACE.
5) ALL NEW JOINTS SHALL CONFORM TO THE EXISTING JOINTS.
6) 57 LIMESTONE MUST BE COMPACTED IN 12" LIFTS TO 95% DENSITY FOR EACH LIFT. A VIBRATORY COMPACTOR WILL BE REQUIRED.
7) ALL PAVEMENT STRIPING AND/OR RAISED PAVEMENT REFLECTIONS DESTROYED SHALL BE REPLACED. MATERIAL AND INSTALLATION SHALL MEET LAFAYETTE CONSOLIDATED GOVERNMENT STANDARD SPECIFICATIONS FOR THESE ITEMS.



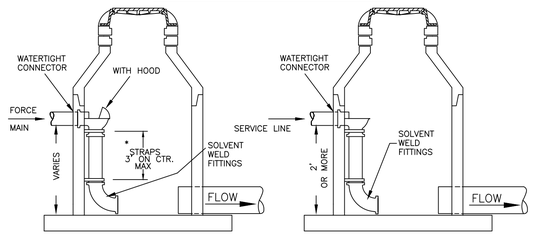
SECTION A–A



TYPICAL BACKFILL FOR SEWER MANHOLE

** NOTE: COMPACTION WITHIN THE RIGHT OF WAY SHALL BE 90% STANDARD PROCTOR DENSITY IN 12" LIFTS. 95% WHEN ON SHOULDER OR EDGE OF ROAD

INSIDE MANHOLE DROPS

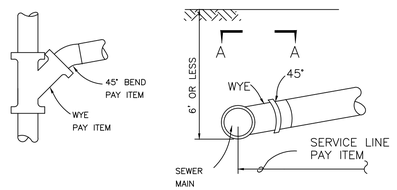


FORCE MAIN TIE–IN

SERVICE INTO MANHOLE

* 1/8" X 1" STAINLESS STEEL STRAP. ANCHOR TO WALLS WITH S.S. BOLTS. S.S. STRAP AND BOLTS ARE TO BE A MINIMUM GRADE TYPE 316

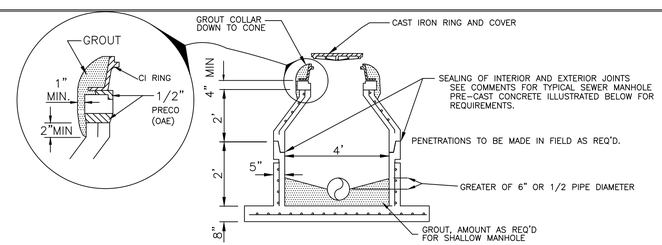
NOTE: 1) DROP SYSTEM SHALL BE RELINER INSIDE DROP SYSTEM OR APPROVED EQUAL.
2) FOR FORCE MAIN TIE–IN, THE INTERIOR SURFACES OF THE RECEIVING MANHOLE SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS.



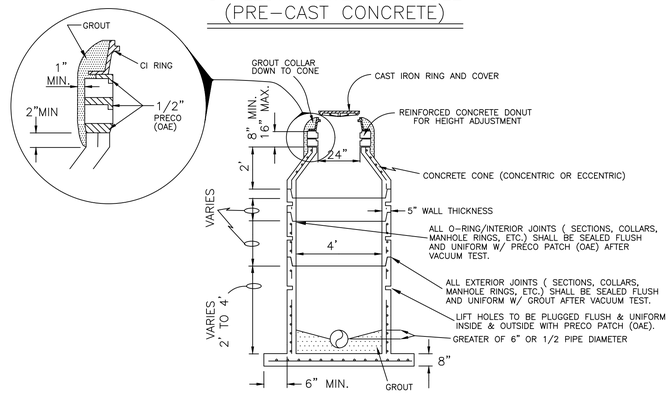
SECTION A–A

PROFILE

SEWER SERVICE CONNECTION (WITHOUT RISER)



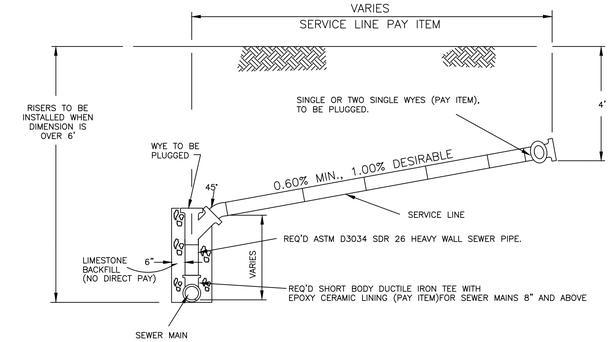
SHALLOW SEWER MANHOLE (PRE–CAST CONCRETE)



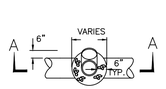
TYPICAL SEWER MANHOLE (PRE–CAST CONCRETE)

NOTES: SHALLOW AND TYPICAL SEWER MANHOLE (PRE–CAST CONCRETE)

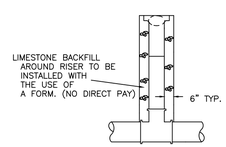
1) ALL SECTIONS ARE CUSTOM MADE AND CONFORM TO ASTM SPECIFICATIONS DESIGNATION C–478 OR LATEST REVISION FOR PRECAST CONCRETE MANHOLE, RISERS, AND TOPS.
2) MAINS AND SERVICES SHALL EXTEND 6" INTO MANHOLES.
3) INVERT TURNS SHALL BE LONG RADIUS.
4) OPENINGS FOR SEWER PIPE CAN BE MADE AT ANY LOCATION BELOW CONCRETE DONUT'S.
5) WATERTIGHT CONNECTIONS SHALL BE INSTALLED ON ALL MANHOLE PENETRATIONS.
6) ALL PIPE PENETRATIONS SHALL BE CORED AND REQUIRE PRECO PATCH (OAE) INSIDE AND OUTSIDE.
7) MANHOLES OUTSIDE OF THE PAVED RIGHT–OF–WAY OR OTHER PAVED SURFACES SHALL HAVE A STAINLESS STEEL "RAINSTOPPER" MANHOLE COVER INSERT.



SEWER SERVICE CONNECTION (WITH RISER)



PLAN VIEW



SECTION A–A

BACKFILL FOR 6" SERVICE RISER

2/18/98 M.H. RING & COVER	
5/26/99 TYPICAL STREET REPAIR CONCRETE	
8/27/03 MANHOLE DROP DETAILS SEWER FOUNDATIONS SERVICE RISER DETAILS	
12/29/03 CALLOUT INSIDE DROP SYSTEM	
01/09/06 COATING OF INTERIOR SURFACES OF MANHOLES RECEIVING FORCEMAINS.	
2/16/11 TYPICAL STREET REPAIRS	
10/7/11 RELINER DROP BOWL	
7/25/12 SERVICE CONNECTION EPOXY CERAMIC LINING	
12/31/12 M.H. RING & COVER	
02/24/15 M.H. RING & COVER	
06/08/21 CHANGED 610 TO 57 LIMESTONE.	

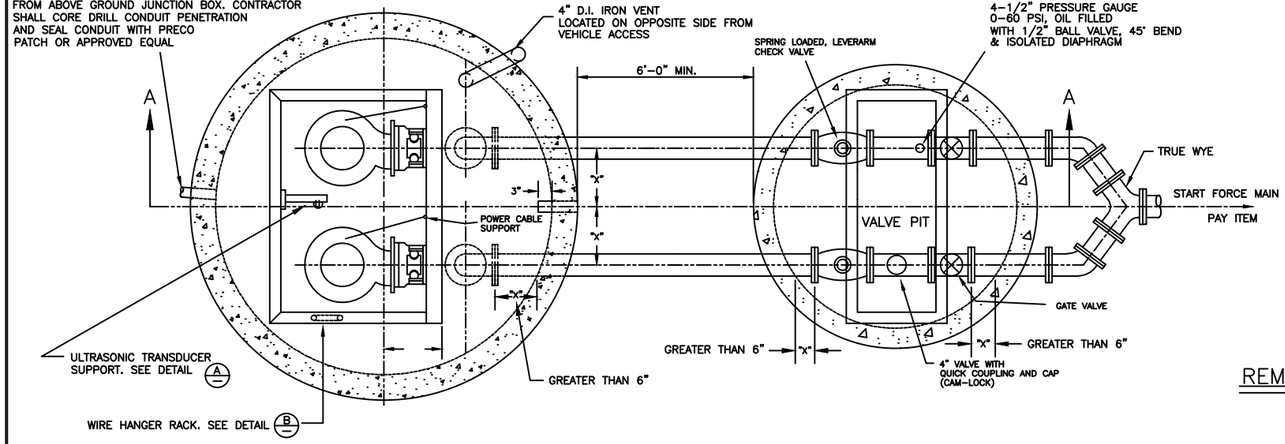
NOTE:
OAE = OR APPROVED EQUAL.

LAFAYETTE UTILITIES SYSTEM
ENGINEERING DIVISION
LAFAYETTE, LA

TYPICAL SEWER DETAILS

DATE 11/27/89	SCALE NTS
DESIGNED BY WPB; JSC; EB	DRAWN BY LUMIS
CHECKED BY BG	APPROVED
REVISIONS: B/27/03 JP ; 2/16/11 WAD 10/24/11 CJA 12/5/90JRJD 5/7/96JM 1/06/06 LGR 10/7/11 WAD 11/14/11 CJA 3/11/91RJD 7/18/96TMS7/26/12 WAD 12/31/12 CJA 3/24/15 WAD 5/25/93AHM 2/18/98JWA 06/08/21 CWN 12/5/90JRJD 9/21/98 WAD 3/11/95JMG 3/28/99 WAD 2/5/96JPG 3/12/02 CJA	DWG NO. DET1
	SHEET OF

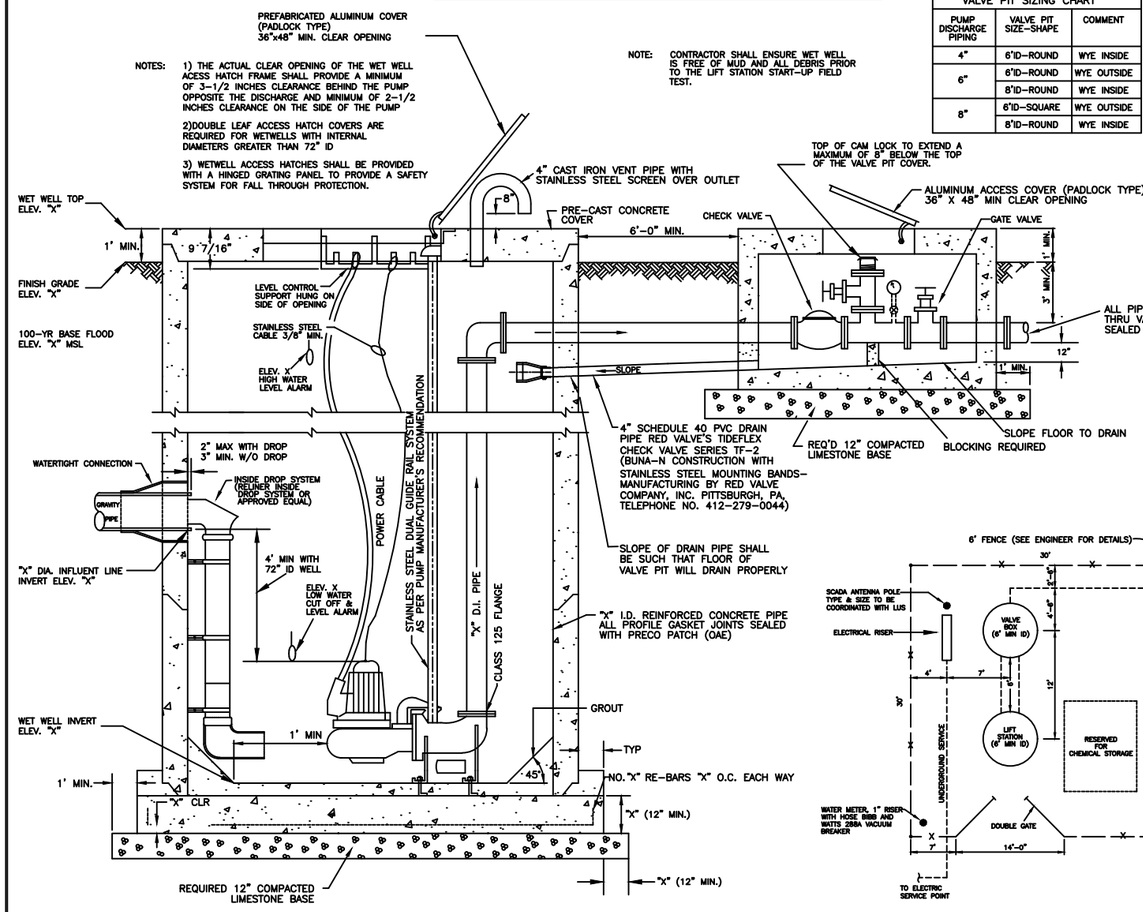
X:\STANDARD\SEWER\DET1.DWG



PLAN VIEW OF WET WELL & VALVE BOX

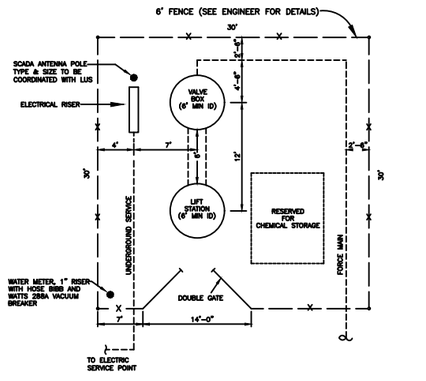
VALVE PIT SIZING CHART		
PUMP DISCHARGE PIPING	VALVE PIT SIZE-SHAPE	COMMENT
4"	6'ID-ROUND	WYE INSIDE
6"	6'ID-ROUND	WYE OUTSIDE
	8'ID-ROUND	WYE INSIDE
8"	6'ID-SQUARE	WYE OUTSIDE
	8'ID-ROUND	WYE INSIDE

NOTE: CONTRACTOR SHALL ENSURE WET WELL IS FREE OF MUD AND ALL DEBRIS PRIOR TO THE LIFT STATION START-UP FIELD TEST.



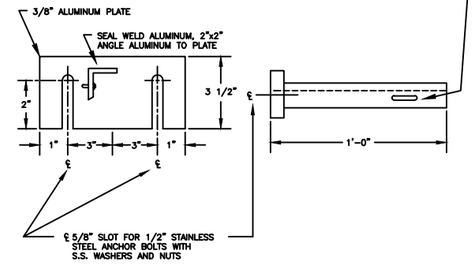
SECTION A-A ELEVATION

NOTE: FASTEN ALL FLANGED FITTINGS WITH TYPE 316 STAINLESS STEEL BOLTS AND NUTS.

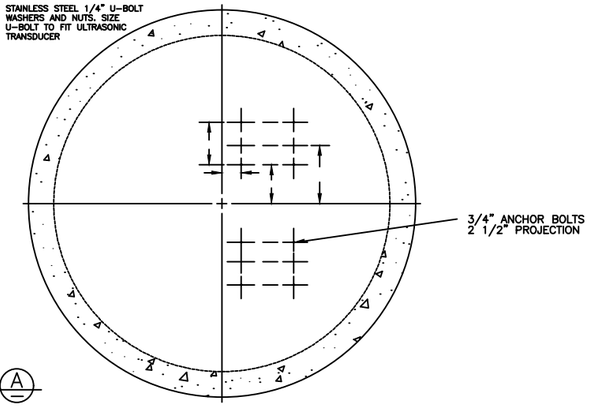


TYPICAL LIFT STATION SITE LAYOUT

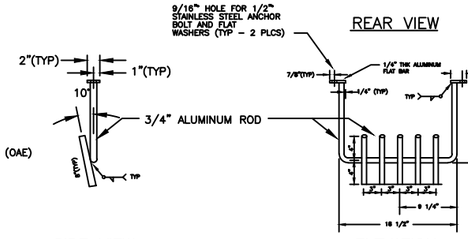
DESIGN DATA		
PUMPS		
TOTAL DYNAMIC HEAD	=	FT
DESIGN PUMPING RATE	=	GPM
480v / 3 ø SUBMERSIBLE		



REMOVABLE ULTRASONIC TRANSDUCER SUPPORT (A)



PLAN VIEW OF WET WELL BASE ANCHOR BOLTS LOCATION OR MANUFACTURES RECOMMENDATION

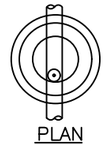


SIDE VIEW

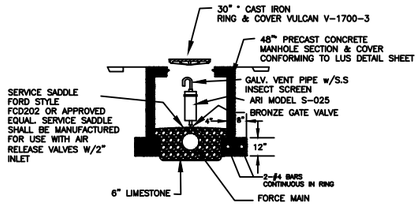
REAR VIEW

ELEVATION

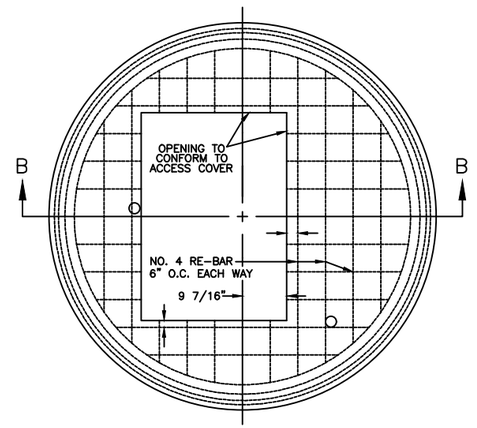
WIRE HANGER RACK (B)



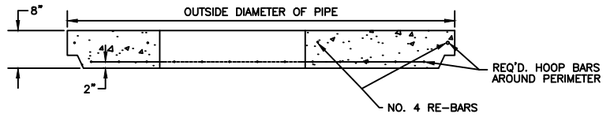
PLAN
AIR RELEASE VALVE ASSEMBLY



AIR RELEASE VALVE ASSEMBLY



PLAN VIEW OF CONCRETE COVER



SECTION B-B ELEVATION

SQUARE CONCRETE COVER WITH ACCESS OPENING ACCEPTABLE WITH CITY'S PRIOR APPROVAL FABRICATED PRIOR TO INSTALLATION.

REV. #	DESCRIPTION
1	04/22/96 ADD LAYOUT, LIFT STATION SIDE LAYOUT, WPB/RAD
2	11/20/98 LOCATION, COVER, LEVEL, PRESSURE GAUGE, AREA FOR ULTRASONIC WPB/TDS/?
3	10/20/99 TRUE WYE, ADDED SCADA ANTENNA POLE CJH
4	02/09/01 TRANDUCER HANGER WIRE HANGER RACK CJH
5	03/26/02 ADD TIDE DROP, TIDEFLEX CJH
6	12/20/02 CAST IN INSIDE DROP SYSTEM JY
7	01/06/06 ADD DIMENSION CALL OUT; ACCESS COVER, VALVE PIT SIZE, ADD NOTES; TYPICAL LS SITE LAYOUT
8	10/23/06 SPRING LOADED CHECK VALVE, DUAL RAILS FOR PUMP, WALL THICKNESS FOR FLANGE TO WALL, REMOVE PUMP DATA TABLE TS
9	9/20/07 AIR RELEASE VALVE PLAN & PROFILE TS
10	8/29/13 AIR RELEASE VALVE BE

THIS DRAWING IS A STANDARD PROVIDED BY LUS AND IS TO BE MODIFIED TO MEET SPECIFIC PROJECT REQUIREMENTS. PROVIDE ALL DIMENSIONS AND ELEVATIONS DENOTED WITH AN "X"

LAFAYETTE UTILITIES SYSTEM
ENGINEERING DIVISION
LAFAYETTE, LA

WET WELL & VALVE BOX
SUBMERSIBLE
LIFT STATION DETAIL
STANDARD 2 PUMP LIFT STATION

DATE 5-15-02	SCALE NTS
DESIGNED BY LUS	DRAWN BY DRAFTING
CHECKED BY LUS	APPROVED LUS
REVISIONS: 02/09/01CJH 04/22/96WPB 03/26/02CJH 08/05/04WAB 11/18/98WAB 10/20/99WAB 02/09/01CJH 9/20/07WAB 12/20/02JY 1/20/06WAB 08/27/03JY 8/05/13BE 01/06/06LR 08/29/13WAB 10/23/06WAB	DWG NO. DET2
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